The Starting Wright Teacher’s Handbook:

Lessons to Prepare Students with Disabilities for College and Careers in STEMM

Starting Wright
Wright State University
351 Russ Engineering Center
3640 Colonel Glenn Hwy
Dayton, Ohio 45435
937-775-5123
startingwright@wright.edu
Introduction

Starting Wright is a multifaceted program created to support students with disabilities in preparing to transition from high school to post-secondary education and employment. The program focuses on increasing the number of students that enter highly-valued careers, especially those related to the increasingly important fields of Science, Technology, Engineering, Mathematics and Medicine (STEMM). The Starting Wright website (www.startingwright.org) provides access to live interactive webcasts, podcasts and a variety of additional resources to build career interests and to encourage personal and academic preparation for college success.

One of the fundamental tenets underlying the Starting Wright program is that an effective approach to improving post-secondary outcomes for students with disabilities must support the efforts of all stakeholders in the transition process. For this reason, the program contains elements targeting not only the students, but also their parents, vocational rehabilitation counselors and teachers. This handbook is aimed specifically at the educators who work with students in grades 9-12 that with the potential to enter and succeed in postsecondary education at levels ranging from basic certification courses to associates or bachelor’s degrees and beyond. It contains a set of lessons for classroom use that are linked to Ohio Academic Content Standards which directly address the goals of raising interest and motivation for pursuing STEMM careers and arming students with the personal and academic skills and knowledge needed for college success.

There is a significant shortage of workers with disabilities in STEMM fields. Research shows us that only about one-third of students with a disability pursue post-secondary education and even fewer pursue degrees in STEMM fields. Our program aims to address this issue and provide all stakeholders with an understanding of the skills necessary to move into these fields.

Increasing awareness of the opportunities in STEMM fields at the earliest age possible is a key to helping students with disabilities begin effectively planning for their transition to post-secondary education and successful, productive careers. STEMM fields offer more opportunities for students with disabilities to have higher earnings and increased employability. The transition planning process is key to the end goal and starts at home and in the classroom.

Program and Content Overview

These lesson plans were written to help facilitate the transition planning process for students with disabilities, explore careers in STEMM fields and help hone personal and academic skills that will make students successful as they move to post-secondary education.

There are 16 comprehensive lessons, many of which can be broken into smaller lessons for use over the course of the year. These lessons were written specifically with students with disabilities in mind. We have outlined some common modifications and accommodations that can be used. While these lessons have been tailored specifically to students with disabilities the lessons are easily incorporated into a general education classroom where there might only be one or two students with disabilities.

Standards, Benchmarks and Indicators

The modules have also been aligned with the Ohio Academic Standards in technology, mathematics and science. There are also lessons with assessments tied to Content Standards in English/Language Arts. The content was designed to be used in grades 9 through 12. The standards addressed in the lesson can be found at the beginning of each lesson plan.
# Table of Contents

**Career Exploration**

- The Career is Right........................................................................................................5
- Unearthing a STEMM Career in Geology.................................................................29
- Exploring a Career in Animal Science.................................................................51
- I’m Never Gonna Use This!.......................................................................................71
- Career Spotlight........................................................................................................93
- Talk the Walk, Walk the Talk..................................................................................113
- Great Minds Survey.................................................................................................131

**Lab-Based Lessons**

- Oops! There's an oil spill!.......................................................................................154

**Academic Skills**

- Once is NOT Enough...............................................................................................178
- Study Right...............................................................................................................192
- Believe it or Not?......................................................................................................222

**Personal Skills**

- Filling Your Toolbox...............................................................................................232
- 24/7.............................................................................................................................254
- Going Pro..................................................................................................................272

**College Preparation and Planning**

- Phone Tag- You're It!...............................................................................................286
Area: Career Exploration

**STEMM Career Connection:** This activity will introduce the spectrum of STEMM careers to students.

**Title:** The Career is Right

**Grade Levels:** 9th- 10th

**Academic Content Areas:** Science, Math, Technology, and Language Arts

**Topics:** Career Exploration

**Goal:** To raise awareness and interest in STEMM careers.

**Performance Objectives:**
Students will:
1. Explore various STEMM careers.

**Big Question**
What careers are available to students in the fields of science, technology, engineering, math, and medicine?

**Brief Summary**
In this lesson, students are introduced to the concept of STEMM. In subsequent activities, students will be introduced to individuals currently working in STEMM careers. This will allow students to investigate and become familiar with the spectrum of careers available to them.

**Main Ideas**
There is a growing demand for individuals who are trained in a STEMM career. The students of today enter into the workforce every year with the hopes of gainful employment. To increase the chance of this, students need to be aware of the spectrum of careers in the fields of science, technology, engineering, math, and medicine. Hopefully, through this awareness students will obtain the necessary job skills and training to build a career in a STEMM field.
Content Standards

Science Grades 9-10: Scientific Ways of Knowing
   Benchmark D: Recognize that scientific literacy is part of being a knowledgeable citizen.

Science Grades 9-10: Earth and Space Sciences
   Benchmark F: Summarize the historical development of scientific theories and ideas issues in earth and space science.

Science Grades 9-10: Life Sciences
   Benchmark J: Summarize the historical development of scientific theories and ideas issues in life science.

Science Grades 9-10: Physical Sciences
   Benchmark H: Trace the historical development of scientific theories and ideas, and describe emerging issues in the study of physical science.

Materials
   • Starting Wright STEMM Careers Video Clip
   • Video Guide
   • Career Exploration
   • Online Career Investigation

Preparation for Lesson
   • Make student copies of necessary worksheets
   • Prepare the video clips for use

Vocabulary

STEMM- science, technology, engineering, math, and medicine

Science- the study of the physical world and its manifestations, especially by using systematic observation and experiment

Technology- the branch of knowledge that deals with the creation and use of technical means and their interrelation with life, society, and the environment, drawing upon such subjects as industrial arts, engineering, applied science, and pure science

Engineering- the art or science of making practical application of the knowledge of pure sciences, as physics or chemistry, as in the construction of engines, bridges, buildings, mines, ships, and chemical plants
Math - the study of the relationships among numbers, shapes, and quantities. It uses signs, symbols, and proofs and includes arithmetic, algebra, calculus, geometry, and trigonometry.

Medicine - the art or science of restoring or preserving health or due physical condition, as by means of drugs, surgical operations or appliances, or manipulations: often divided into medicine proper, surgery, and obstetrics.

Career - a job or occupation regarded as a long-term or life-long activity.

Time needed
The activities in this lesson are intended to be used as time allows and subject matter permits. They can be spread out over the course of the school year, quarter, month, week, etc. as the teacher sees fit. It is recommended that before beginning any activities concerning specific careers that the Introductory Activity be completed to familiarize the students with the concept of STEMM.

Lesson

Introductory Activity (20 minutes)
Introduce students to the concept of STEMM, using the Starting Wright, STEMM Careers, What is STEMM? Video Clip. Have students complete the What is STEMM? Video Guide while watching the clip. The clip is less than 5 minutes and moves quickly through its content. Use the video guide as a springboard for discussion after the clip by reviewing the questions and answers and discussing. Explain to students that during the said period of time the class will be involved in discussion and exploration of STEMM careers.

Career Exploration (30 minutes maximum)

Part One (depends on length of video)
In class, watch a STEMM Careers Video Clip, of your choosing, see Appendix D. Students should complete the corresponding STEMM Career Exploration worksheet. Discuss the answers to the worksheet after the clip.

Part Two
In this section of the lesson, students will be assigned for homework an article to read from the Heartland Science web page, http://www.heartlandscience.org/teachers.htm, and to complete The Career is Right Online STEMM Investigation. Choose an article from the web page that fits with the video clip from Part One, allow students to then choose the topic they'd like to read about. Warn them they must choose a topic that discusses an individual versus an accomplishment in science.

Part Three (10 minutes)
When students have completed the assignment in Part Two, wrap-up with a discussion of thoughts on the topics they read.
Optional Extensions

- This lesson is a series of activities to introduce STEMM careers to students. To extend or go into more depth with students, utilize the other career exploration lessons on the Starting Wright webpage.
- Instead of having students complete the homework worksheet in Part Two, assign the students to write a summary of the topic they chose.
- Invite individuals working in STEMM fields to your classroom.

Helpful Hints for Teachers

- There are numerous ways that this lesson could be modified. Please modify it to fit your needs as far as the content you are required to teach but most importantly to fit the needs of your students.
- Provide digital copies for students who struggle with the physical act of writing.
- The topics from the Heartland Science web page can be downloaded as PDF documents and copied for students.
- Based on the ability of your students, you could assign them the topics as well as the articles to read. This would reduce the amount of time they spend determining which topic is appropriate to read.
- Some students may need transcript of the video clips. In addition, some students may require multiple viewings of the clips.
- On the student copies of the worksheets, add lines in the spaces for the student responses.

Helpful Hints for Parents

-Expose your child to the spectrum of STEMM careers by attending area career fairs.
- Take your child to work and discuss what you do, what type of education is required of your position, etc.
- Encourage student to seek on-site job shadowing experiences. Check with a school counselor for more information.
- Provide students with hands-on experiences related to their field of interest by making use of the resources in your community such as nature reserves and parks, museums, zoos, and aquariums.
Appendix A: Video Guides

Teacher Guide

What is STEMM?

Video Guide

DIRECTIONS: While watching the video clip answer the questions below.

1. What does STEMM stand for?
   - science, technology, engineering, math, medicine

2. Why choose a STEMM career?
   - many future careers are in STEMM fields
   - there are a wide variety of positions available

3. Give an example of a career in the field of science.
   - chemist
   - biologist
   - vet
   - vet tech
   - geologist

4. Give an example of a career in the field of technology.
   - computer scientist
   - forensic scientist

5. Give an example of a career in the field of engineering.
   - aerospace engineer
   - electrical engineer

6. Do all STEMM careers require the same amount of math?
   - each career has different math requirements

7. Are careers in medicine in high demand?
   - yes
What is STEMM?

Video Guide

DIRECTIONS: While watching the video clip answer the questions below.

1. What does STEMM stand for?

2. Why choose a STEMM career?

3. Give an example of a career in the field of science.

4. Give an example of a career in the field of technology.

5. Give an example of a career in the field of engineering.

6. Do all STEMM careers require the same amount of math?

7. Are careers in medicine in high demand?
Appendix B: STEMM Career Exploration

Teacher Career Exploration Answer Key

STEMM Career Exploration
Chris Atchison

Directions: While watching the interview with Chris Atchison, answer the following questions.

1. What is Chris’ STEMM career?
   geologist

2. How would you categorize his career field, science, technology, engineering, math, or medicine?
   science

3. Where are some of the places Chris has worked as part of his career?
   Canada, San Salvador,

4. What is a typical job in geology like?
   in the gas and oil industry or education

5. What question would you like to ask Chris?
   answers will vary

6. What would you like about his job?
   answers will vary

7. What would you dislike about his job?
   answers will vary

8. Describe something you found interesting about the interview.
   answers will vary
Student Career Exploration

Name: _________________________________________________________

STEMM Career Exploration
Chris Atchison

Directions: While watching the interview with Chris Atchison, answer the following questions.

1. What is Chris’ STEMM career?

2. How would you categorize his career field, science, technology, engineering, math, or medicine?

3. Where are some of the places Chris has worked as part of his career?

4. What is a typical job in geology like?

5. What question would you like to ask Chris?

6. What would you like about his job?

7. What would you dislike about his job?

8. Describe something you found interesting about the interview.
Teacher Career Exploration Answer Key

STEMM Career Exploration
Angela Breitenbucher

Directions: While watching the interview with Angela Breitenbucher, answer the following questions.

1. What is Angela’s STEMM career?
   - electrical engineer

2. How would you categorize her career field, science, technology, engineering, math, or medicine?
   - engineering

3. What are some of Angela’s daily responsibilities?
   - works in the Electrical Transmission Systems department
   - creates mathematical models
   - solves future problems in the electrical system

4. How did she get interested in engineering?
   - loved math and physics in high school

5. How does Angela’s disability affect her job?
   - it does not affect her job

6. What does Angela describe as the most exciting part of her job?
   - finding creative ways to solve problems

7. What did she advise for those interested in careers in engineering?
   - work hard in science and math classes

8. Describe something you found interesting about the interview.
   - answers will vary
STEMM Career Exploration
Angela Breitenbucher

Directions: While watching the interview with Angela Breitenbucher, answer the following questions.

1. What is Angela’s STEMM career?

2. How would you categorize her career field, science, technology, engineering, math, or medicine?

3. What are some of Angela’s daily responsibilities?

4. How did she get interested in engineering?

5. How does Angela’s disability affect her job?

6. What does Angela describe as the most exciting part of her job?

7. What did she advise for those interested in careers in engineering?

8. Describe something you found interesting about the interview.
STEMM Career Exploration
Betsie Jones

Directions: While watching the interview with Betsie Jones, answer the following questions.

1. What is Betsie’s STEM career?
   - veterinarian technician

2. How would you categorize his career field, science, technology, engineering, math, or medicine?
   - medicine

3. What was Betsie’s educational background?
   - she has a bachelor’s degree in another field but vet techs require an associate’s degree, you do not necessarily need a four-year degree
   - also, a preceptorship (like an internship) to be a vet tech

4. Describe Betsie’s typical day.
   - vet techs check the animals and tend to their needs
   - help doctors and get meds
   - see patients with doctors

5. What did Betsie describe as the most challenging part of her job?
   - working with people

6. What advice did Betsie give for students interested in a career as a vet tech?
   - observe in a clinic

7. What would you like or dislike about her job?
   - answers will vary

8. If you could ask Betsie a question about her career, what would it be?
   - answers will vary
**Student Career Exploration**

Name: ____________________________________________

**STEMM Career Exploration**

**Betsie Jones**

**Directions: While watching the interview with Betsie Jones, answer the following questions.**

1. What is Betsie’s STEMM career?

2. How would you categorize his career field, science, technology, engineering, math, or medicine?

3. What was Betsie’s educational background?

4. Describe Betsie’s typical day.

5. What did Betsie describe as the most challenging part of her job?

6. What advice did Betsie give for students interested in a career as a vet tech?

7. What would you like or dislike about her job?

8. Describe something you found interesting about the interview.
Teacher Career Exploration Answer Key

STEMM Career Exploration
Brad Lovell

Directions: While watching the interview with Brad Lovell, answer the following questions.

1. What is Brad’s STEMM career?
   systems support manager

2. How would you categorize his career field, science, technology, engineering, math, or medicine?
   technology

3. What are some of Brad’s daily responsibilities?
   setting up new customers
   maintaining computer hardware and software

4. Describe Brad’s educational background.
   certified in A++, basic networking classes, and Microsoft training

5. What did Brad describe as a reward of his job?
   working with costumers to help solve problems

6. What academic area did he suggest was an important part of his job?
   mathematics

7. What would you like or dislike about his job?
   answers will vary

8. If you could ask Brad a question about his career, what would it be?
   answers will vary
Student Career Exploration

Name: _________________________________________________________

STEMM Career Exploration
Brad Lovell

Directions: While watching the interview with Brad Lovell, answer the following questions.

1. What is Brad’s STEMM career?

2. How would you categorize his career field, science, technology, engineering, math, or medicine?

3. What are some of Brad’s daily responsibilities?

4. Describe Brad’s educational background.

5. What did Brad describe as a reward of his job?

6. What academic area did he suggest was an important part of his job?

7. What would you like or dislike about his job?

8. If you could ask Brad a question about his career, what would it be?
Teacher Career Exploration Answer Key

STEMM Career Exploration
Tracy Pugh

Directions: While watching the interview with Tracy Pugh, answer the following questions.

1. What is Tracy’s STEMM career?
   marine biologist

2. How would you categorize her career field, science, technology, engineering, math, or medicine?
   science

3. On a typical day, what are some activities that Tracy might engage in?
   working in the office on the computer doing data analysis
   on a fishing boat
   wide variety of activities

4. What was Tracy’s educational background?
   undergraduate degree in biology/environmental science
   graduate degree in marine biology

5. What question would you like to ask Tracy?
   answers will vary

6. What would you like about her job?
   answers will vary

7. What would you dislike about her job?
   answers will vary

8. Describe something you found interesting about the interview.
   answers will vary
STEMM Career Exploration
Tracy Pugh

Directions: While watching the interview with Tracy Pugh, answer the following questions.

1. What is Tracy’s STEMM career?
2. How would you categorize her career field, science, technology, engineering, math, or medicine?
3. On a typical day, what are some activities that Tracy might engage in?
4. What was Tracy’s educational background?
5. What question would you like to ask Tracy?
6. What would you like about her job?
7. What would you dislike about her job?
8. Describe something you found interesting about the interview.
Teacher Career Exploration Answer Key

TEIEM Career Exploration
Blair Wentworth

Directions: While watching the interview with Blair Wentworth, answer the following questions.

1. What is Blair’s STEMM career?
   cardiovascular sonographer

2. How would you categorize his career field, science, technology, engineering, math, or medicine?
   medicine

3. What does Blair do as part of his job?
   takes ultra sounds of the heart and blood vessels

4. What is his educational background?
   Blair has 30 years’ experience and had on the job training. Currently, 2 and 3 year credential licensing programs are required.

5. What types of job opportunities are available to sonographers?
   opportunities at imaging clinic and hospitals

6. What does Blair describe as the rewarding part of his job?
   helping patients

7. What was his advice for students?
   there are always job opportunities available in the medical field

8. Describe something you would like or dislike about Blair’s career.
   answers will vary
Directions: While watching the interview with Blair Wentworth, answer the following questions.

1. What is Blair’s STEMM career?

2. How would you categorize his career field, science, technology, engineering, math, or medicine?

3. What does Blair do as part of his job?

4. What is his educational background?

5. What types of job opportunities are available to sonographers?

6. What does Blair describe as the rewarding part of his job?

7. What was his advice for students?

8. Describe something you would like or dislike about Blair’s career.
Appendix C: Online Career Investigation

Teacher Online Career Investigation Sample Answer Key

The Career is Right
Online STEMM Career Investigation

DIRECTIONS: Go to the Heartland Science webpage at http://www.heartlandscience.org/teachers.htm, read the article assigned by your teacher and fill in the following chart.

**Article:** Environmental Resources From Animal Extinction to Ozone
**Topic:** Rowland Friend of the Environment

<table>
<thead>
<tr>
<th>Name of Individual:</th>
<th>F. Sherwood Rowland</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>STEMM Area:</strong></td>
<td>Science</td>
</tr>
<tr>
<td><strong>Career Field or Job Title:</strong></td>
<td>Atmospheric Chemistry</td>
</tr>
<tr>
<td><strong>Educational Background:</strong></td>
<td>Article did not give education.</td>
</tr>
<tr>
<td>FYI: B.A. from Ohio Wesleyan University 1948, M.S. 1951 and Ph. D. 1952 from University of Chicago</td>
<td></td>
</tr>
<tr>
<td><strong>Accomplishments</strong></td>
<td>How did the individual advance science in their area of study?</td>
</tr>
<tr>
<td>1995 Nobel Prize in Chemistry for his role in discovering the global environmental threat of CFC’s.</td>
<td></td>
</tr>
<tr>
<td>Established Atmospheric Chemistry as a major field of study.</td>
<td></td>
</tr>
</tbody>
</table>

**Description of their daily work**
What did the individuals daily work look like?
Under what conditions might they have worked?
Article did not state explicitly.

Students may infer from the article that F. Sherwood Rowland would be working both outside checking ozone and CFC levels as well as inside a laboratory analyzing air samples.

**What tools and instruments might they have use?**
Article did not state explicitly.

Students may infer that the scientist would have used tools found in a chemistry lab or tools used by a meteorologist.

**Connections**
How does the knowledge and skills learned in your science classes apply to this career?
Answers will vary.

If you could ask this individual a question about their life or work what would you ask?
Answers will vary.
<table>
<thead>
<tr>
<th>Would you consider a career in this field of science? Explain your response.</th>
<th>What is something you found surprising or interesting about the individual or their work?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Answers will vary.</td>
<td>Answers will vary.</td>
</tr>
</tbody>
</table>
**Student Online Career Investigation**

Name: _________________________________________________________

**The Career is Right**  
**On-line STEMM Career Investigation**

DIRECTIONS: Go to the Heartland Science webpage at http://www.heartlandscience.org/teachers.htm, read the article assigned by your teacher and fill in the following chart.

Article: _________________________________________________________

Topic: _________________________________________________________

<table>
<thead>
<tr>
<th>Name of Individual:</th>
<th>STEMM Area:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Career Field or Job Title:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Educational Background:</th>
<th>Accomplishments- How did the individual advance science in their area of study?</th>
</tr>
</thead>
</table>

Description of their daily work- What did the individuals daily work look like? Under what conditions might they have worked?

<table>
<thead>
<tr>
<th>Connections- How does the knowledge and skills learned in your science classes apply to this career?</th>
<th>If you could ask this individual a question about their life or work what would you ask?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Would you consider a career in this field of science? Explain your response.</td>
<td>What is something you found surprising or interesting about the individual or their work?</td>
</tr>
</tbody>
</table>
**Appendix D: Video Clip Content and Running Times**

**STEMM Careers - Those indicated in bold are included as part of this lesson.**

<table>
<thead>
<tr>
<th>Running Time</th>
<th>Name</th>
<th>Career</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:50-4:05</td>
<td>Brad Lovell</td>
<td>Systems Support Manager</td>
</tr>
<tr>
<td>4:05-9:35</td>
<td>Angela Breitenbucher</td>
<td>Electrical Engineer</td>
</tr>
<tr>
<td>9:35-13:15</td>
<td>Blair Wentworth</td>
<td>Cardiovascular Sonographer</td>
</tr>
<tr>
<td>13:15-20:31</td>
<td>Tracy Pugh</td>
<td>Marine Biologist</td>
</tr>
</tbody>
</table>

**Up Front and Up Close**

<table>
<thead>
<tr>
<th>Approximate Length</th>
<th>Name</th>
<th>Career</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 min.</td>
<td>Cary Supalo</td>
<td>Chemist</td>
</tr>
<tr>
<td>7 min.</td>
<td>Sergeant Coy</td>
<td>Animal Science</td>
</tr>
<tr>
<td>15 min.</td>
<td>Chris Atchinson</td>
<td>Geology</td>
</tr>
<tr>
<td>10 min.</td>
<td>Brian Dotson</td>
<td>Engineering</td>
</tr>
<tr>
<td>7 min.</td>
<td>Mike Unterseher</td>
<td>Allied Health</td>
</tr>
<tr>
<td>6 min.</td>
<td>Betsie Jones</td>
<td>Vet Tech</td>
</tr>
<tr>
<td>10 min.</td>
<td>Jon Gallagher</td>
<td>Computer Scientist</td>
</tr>
</tbody>
</table>
Appendix E: Additional Resources


http://startingwright.org/

Heartland Science
http://www.heartlandscience.org/teachers.htm

We Use Math
http://weusemath.org/

STEM Careers
http://stemcareer.com/
Area: Geology/Career Exploration

STEMM Career Connection: Earth & Space Science

Title: Unearthing a STEMM Career in Geology

Grade Levels: Ninth - Tenth

Academic Content Areas: Science, Mathematics; Technology; Language Arts

Topics: Science and Technology; Scientific Ways of Knowing; Career Interests and selection

Goal: To increase interest and understanding in STEMM careers.

Performance Objectives:
Students will:
1. Identify and report possible job skills and course/training requirements in the career field of geology.

Big Question

What can you tell me about preparing for a career in a STEMM field?

Brief Summary

In this exploration, students will complete hands-on job related activities, and use observation, data recording, analysis, and reporting skills to inform others on the variety of areas to be considered when choosing a STEMM career including interests, skills and suggested coursework/training/degree.

Main Ideas

Students need to explore their own interests and abilities, and identify some of the necessary skills for the job of choice and required course preparation and degree. A career in STEMM may provide an opportunity to live and work in diverse communities and environments all over the world.
Content Standards

Science Grades 9-10

Standard: Earth and Space Science
Benchmark E: Explain the processes that move and shape Earth’s surface.

Standard: Scientific Ways of Knowing
Benchmark D: Recognize that scientific literacy is part of being a Knowledgeable citizen.

Language Arts Standard Grades 8-10

Standard: Research
Benchmark E: Communicate findings, reporting on the substance and processes orally, visually and in writing or through multimedia.

Standard: Communications: Oral and Visual Standard
Benchmark G: Give presentations using a variety of delivery methods, visual displays and technology.

Technology Grades 9-12

Standard 3: Technology for Productivity Applications
Benchmark B: Identify, select and apply appropriate technology tools and resources to produce creative works and to construct technology enhanced models.

Standard 4: Technology and Communication Applications
Benchmark B: Create, publish, and present information, utilizing formats appropriate to the content and audience.

Materials

- Starting Wright Video clips (3): Careers in STEM, Interview with a Geologist, Great Minds in STEM- John Wesley Powell
- Index card
- Sticky notes
- Computer and printer access for students
- Career Clusters Interest Survey
- Student worksheets #1-2
- Game Show Menu
- Student Choice Proposal form
- Rubric
- Game Show Activity Cards
- PowerPoint- Unearthing A Career in Geology
- Pre/post-test
Various worksheets based on activities selected.

**Preparation for Lesson**
- Copy pre/post-tests, Career Clusters Interest Survey, Game Show Menu and Rubric, Student Choice Proposal form, Student Activity Sheets #1-2, Game Show Activity Cards.
- Test PowerPoint to ensure it will run properly. Test websites to ensure they are accessible.
- YouTube access may be blocked. You may want to download video clips to a source of external memory such as a flash drive or insert in the PowerPoint. You may also visit www.TeacherTube.com to see if the video is available at this site.
- Prepare materials for Game Show Menu Choices (differentiated activities).

**Vocabulary**
Definitions provided by dictionary.com

**Geologist**- a person who studies the origin, history, structure, and composition of the earth.

**Geology**- the scientific study of the origin, history, structure, and composition of the earth.

**Geophysicist**- a geologist who uses physical principles to study the properties of the earth.

**natural landforms**- features of the landscape, natural physical features of the earth’s surface, for example, valleys, plateaus, mountains, plains, hills, loess, or glaciers

**plate tectonics**- The theory that explains the global distribution of geological phenomena such as seismicity, volcanism, continental drift, and mountain building in terms of the formation, destruction, movement, and interaction of the earth’s lithospheric plates.

**Volcanology**- The scientific study of volcanoes and volcanic phenomena.

**Time needed**
Eight days (50 minute periods each day).

**Your class may require more time. Lessons do not have to be consecutive days.**

**Day One:** Hook, Starting Wright Careers in STEMM Video, Career Clusters Interest Survey

**Day Two:** Pretest, Geology Game Show Menu Activity - A Career in STEMM

**Day Three:** Hook, Student Activity Sheet #1 - Careers in Geology, Game Show Menu Activity
Day Four: Starting Wright Interview with a Geologist Video, Student Activity Sheet #2- An
Interview with a Geologist, Game Show Menu Activity-- Skills & Interests
Day Five: Hook, Starting Wright Great Minds in STEMM- John Wesley Powell Video, Game
Show Menu- Great Minds
Day Six: Hook, Game Show Menu- Job Duties
Day Seven: Game Show Menu- Applying Your Learning
Day Eight: Final discussion and wrap-up, post-test

Lesson
DAY ONE:
Hook: Have The Mountain You Tube playing when students enter the room at http://www.youtube.com/watch?v=Rk6_hdRtJOE. (slide 1 of PowerPoint) (15 minutes)

Ask students what they think about the video. Draw their attention to the different sites, music. Discuss how it makes them feel, where they think it might take place, what is similar about all of the images (nature, things that form naturally). Lead students in thinking about what it must be like to live and maybe work in environments like those in the video. Ask who do you think might work in these types of environments. (possible answers: naturalist, animal scientist, park rangers, geologists). Record answers on the board.

Activity One: (20 minutes)
Begin PowerPoint (slides 2-10)
Discuss that careers in the fields mentioned can take you to some of the most fascinating destinations in the world such as Hawaii, Grand Canyon, the Great Barrier Reef, the Himalayas, any local sites of interest.

Ask: What kind of training or degree do you think you might need in order to work in one of the fields mentioned? (possible answers: math, science, anatomy, etc.)

Introduce the Starting Wright Website. Draw students' attention to the Careers in STEMM section.
• View Starting Wright Careers in STEMM Video.

Activity Two: (15 minutes)
Ask how many students may be interested in a career in STEMM (by a show of hands).

Continue with a large group discussion about the importance of identifying your own interests and abilities when considering a career path. Have the class brainstorm ways to gather this information about their own interests, abilities/skills and/or career path. List student suggestions on board (possible answers may include: talk with teacher, parent, counselor; write a personal journal; explore websites; complete interest surveys; review school grades).

Have students complete the Career Clusters Interest Survey (see attached InterestSurvey-1.pdf) and store in their Starting Wright Portfolio. Direct students
who are not finished to take home and return to school tomorrow.

**Formative Assessment: EXIT TICKET**
In a triad- Have students answer, “What does STEMM mean?” and record answer on index card. Students must turn in card to exit class. Teacher will use this information to check for student learning and understanding.

**DAY TWO:**

**Activity One: (20 minutes)**
With a partner, the student will share results of *Career Clusters Interest Survey.*

Have a large group discussion based on the following topics:
- importance of identifying your own interests before choosing a career
- researching the job requirements/skills needed for a career in this area
- the courses needed for a degree/certificate in this field.

Discuss the opportunities a career in STEMM can offer a student in relationship to traveling to, living and working (conditions and environment) in some of the most beautiful places on Earth especially in the career field of a geologist.

Ask students to recall some of the areas viewed on the PowerPoint. Explain a person working in the field of geology might have the opportunity to live and work in these places.

Have students complete the *Pre-test.*

**Activity Two: (20 minutes)**
Pass out *Geology Game Show Menu.* Go over how to use, expectations and Student Choice proposal form, and grading rubric.
Direct students to review the activity choices. Direct student attention to first column- *A Career in STEMM.* Have students individually select 1 activity from this column to complete; begin work in class today. Once they have selected the activity, give each student the corresponding activity card while bringing student’s attention to the time allowance/due date of each individual activity. Have students store Menu, Rubric, and activity card in their Starting Wright Portfolio.

**DAY THREE:**
**Hook:** Discuss one reason why you might want to consider a career in Geology is the places you get to see like you might on a road trip. Ask if anyone has been on a road trip; where did they go, what did they see. Ask students to name another reason why one might consider a career in geology (possible answers: enjoy working outside with the earth, interested in earth science, etc.) *(15 minutes)*

View You Tube- Why I Became a Geologist- Road trip! at
http://www.youtube.com/watch?v=Feq5pwH2TFw&feature=related
**Activity One: (20 minutes)**
In a dyad grouping, have pairs of students learn more about a geologist by exploring one of the following websites and complete the *Student Activity Sheet #2- Careers in Geology*.
Direct students to choose a geology career (specific job) to research.

- **GEOLOGY CAREERS**- [http://www.saddleback.edu/faculty/jrepka/career.html](http://www.saddleback.edu/faculty/jrepka/career.html)
- **GEOLOGIST & RELATED**- [http://www.career-descriptions.co.uk/geologist-and-related-geoligcal-career-description.htm](http://www.career-descriptions.co.uk/geologist-and-related-geoligcal-career-description.htm)

**Activity Two: (15 minutes)**
Direct students to get out portfolio and pull out menu. Direct students to continue working on yesterday’s activity.

**Formative Assessment: Three-Minute Summary**
Using information from yesterday’s research activity, describe three different job types in the career field of a geologist.

**DAY FOUR**:
**REVIEW:**
Check progress on Menu Activity - *A Career in STEMM*. Answer any questions, address concerns. Remind students to keep working on 1st activity at home and remind of due date. Complete this with all Menu Activities on a daily basis during review time.

**Activity One: (15 minutes)**
Introduce the interview clip with a geologist in the Starting Wright program. Discuss things to consider when choosing a career. Suggested topics: Things he did to get prepared for a job in Geology/STEMM; Can you relate info from this info to what you are learning on your first Menu activity from *A Career in STEMM* column.

Students will complete **STUDENT ACTIVITY SHEET #3- An Interview with a Geologist**.

- View *Up Close & Up Front Interview with a Geologist Video*.

**Activity Two: (20 minutes)**
**Game Show Menu- Skills & Interests**: Direct students to pull out Starting Wright portfolio and review the activity choices under the second column- Skills & Characteristics. Have students individually select 1 activity from this column to complete; begin work in class and continue as homework (& continue working on activities from column1). Once they have selected the activity, give each student the corresponding activity card while bringing student’s attention to the time allowance/due date of each individual activity. Have students store Menu, Rubric, and activity card in their Starting Wright Portfolio.

**Formative Assessment: Paper wad Response**
Using two separate sticky notes, direct each student to list two things they should consider when choosing a career. Wad up papers and throw at the front of the room. Teacher directs students (by individual rows or tables) to come up to the front of the room, pick up one paper wad, and take back to their seat. Have students to volunteer reading their responses. Teacher records on board.

**DAY FIVE:**

**Activity One: (25 minutes)**

As students enter the room, view PowerPoint (slides 11-15). Ask students: Do you recognize this place?; What about the formations in the pictures? The majority of students will not be familiar with HoPing Island.

**History:** HoPing Island was called Liao Island in the past. It is located at the north of Taiwan. In 1626, the Spanish army built castles, churches and fortresses, preparing to do business with China and Japan. The castle on the southwest is called San Salvador, the saint savior. This is the first and currently the only castle in Keelung. During the Spanish occupation, HoPing Island had busy trading activities with Southeast Asia. After World War II, the island was renamed HoPing Island. HoPing Island, known to be perfect for diving and sea fishing, after years of erosion by the wind and sea, the eroded rocks and coasts have formed special shapes.

As a whole group, visit Blog site on HoPing Island at http://boonbot.com/blogs/sander/2010/05/24/Keelung-Peace-Island.aspx or save on an external memory device such as a flash drive prior to the lesson. Discuss the images and comments. Discuss that this must have been a great discovery when first found. Tell the students we are going to watch a video about another great discovery, the Grand Canyon, discovered by John Wesley Powell.

- **View Great Minds in STEMM- Powell Video**

**Activity Two: (25 minutes)**

**Game Show Menu- Great Minds:** Direct students to pull out SW portfolio and review the activity choices under the third column- Great Minds. Have students individually select 1 activity from this column to complete; begin work on today in class and continue as homework (& continue working on activities from columns 1 and 2). Once they have selected the activity, give each student the corresponding activity card while bringing student’s attention to the time allowance/due date of each individual activity. Have students store Menu, Rubric, and activity card in their Starting Wright Portfolio.

**DAY SIX:**

**Activity One: (25 minutes)**

**Hook:** PowerPoint (slides 2-10) Ask students if they recognize any of the places on the PowerPoint. Share student answers aloud with class. Include images of local sites. Ask if they know how these areas might have been formed; what evidence do you have to support this (students will need practice with this concept); what clues guided them in this decision/guess/answer.

Ask students if they know how the various mountains were formed (plate tectonics).
Ask if any student recorded a **geophysicist** as a possible career of a geologist on Day 3.

Discuss that a geophysicist would work and study in these areas. Explain that geophysicists use a variety of techniques to study the physical properties of the earth. They make deductions about the distribution of rock types and their structure below the surface at great depths. Some of their job duties would be to make observations about how the mechanisms involved in the break-up, movement, collision and amalgamation of continents and processes which govern the formation of continents and also, among other things to find minerals. Geophysicists may work in earthquake-prone areas, measure effects of the atmosphere on radio and satellite communications, examine size and shape of land masse, drifting of continents, the magnetic fields around the earth, and even volcanology—the study of the earth's interior. Some tools they may use include radar, dynamite, computers, magnetometers, gravimeters, and maps. (PowerPoint slide 12)

**Activity Two: (25 minutes)**
*Game Show Menu - Job Duties:* Direct students to pull out SW portfolio and review the activity choices under the fourth column - Job Duties. Have students individually select 1 activity from this column to complete; begin work in class and continue as homework (& continue working on activities from column 1-3). Once they have selected the activity, give each student the corresponding activity card while bringing student’s attention to the time allowance/due date of each individual activity. Have students store Menu, Rubric, and activity card in their Starting Wright Portfolio.

**DAY SEVEN:**
*Game Show Menu - Applying Your Learning:* Direct students to pull out SW portfolio and review the activity choices under the third column - Applying Your Learning. Have students individually select 1 activity from this column to complete; begin work in class and continue as homework (& continue working on activities from column 1-4). Once they have selected the activity, give each student the corresponding activity card while bringing student’s attention to the time allowance/due date of each individual activity. Have students store Menu, Rubric, and activity card in their Starting Wright Portfolio.

Organize students (based on selection of the same activity from column 5) in cooperative groups of 3 to complete the activity from Applying Your Learning column.

Meet with individual students to set up date for presentation.

**DAY EIGHT:**
Wrap up Post-test, Menu Activities and presentations.

**Optional extensions**
- There is some debate over how the Rocky Mountains formed. Read article *New Insights on How the Rocky Mountains Formed* - How can a mountain

- Complete a virtual field trip to two of the following sites, and compare and contrast the areas. Use the Venn Diagram provided by the teacher.
  - The Virtual Field trip to Natural Bridges http://www.uky.edu/KGS/geoky/fieldtrip/naturalbridge/naturalbridgeguide.htm
  - Grand Canyon- Geology is Scenery Virtual Field Trip http://www.aapg.org/slide_bank/grand_canyon/01.cfm
  - Clifton Hills Niagara Falls Virtual Tour http://www.cliftonhill.com/explore/media-gallery/virtual-tour

- On your own, visit one or two local sites to explore activities and careers in geology. Select a site to visit from the teacher provided list. Create a journal entry discussing where you went, date, what you did/observed, who you met, something you discovered at the site, something you might like to try, and why or why not you would like to work at this site. If interested in working at this site, discuss how you might go about volunteering or seeking a career in this field.

Helpful Hints for Teachers

- It will be important for you to conference with students on a daily basis during in-class, independent work time to check progress on Menu activities. Rather than giving a single end of the unit due date for activities, you may need to assign shorter due dates for each activity with certain students based on individual needs. Chunking activities into smaller parts with assigned due dates for each activity may be useful. Assist the student with recording chunking due dates on a calendar and provide an extra copy to the parent.
- Provide a model copy of a completed Starting Wright portfolio. This can be helpful for those students who struggle with organization.
- Be sure to make accommodations for individuals with visual, auditory or physical disabilities. This might include enlarged worksheets and screen images devices, text-to-speech software or peer reader, adapted mouse or keyboard with easy access to computer or use of laptop, or a peer scribe.
- Pick and choose activities from the Menu based on your students' needs.
- Incorporate the use of virtual field trips. The Walter Geology Library Virtual Field Trip Guide: United States and Canada offers a variety of virtual field trips and teacher resources- http://www.lib.utexas.edu/geo/onlineguides.html
- If you encounter difficulties using YouTube. Try visiting TeacherTube @ http://www1.teachertube.com/ or Teachers’ Domain @ http://www.teachersdomain.org/ for Digital Media for the Classroom and Professional Development.

Helpful Hints for Parents

Parental encouragement and support has a positive impact on student planning and transition. Below are a few suggested activities in which you can provide
opportunities for your child to explore and identify their own interests and abilities as it relates to career planning.

- Provide students with hands-on activities related to the field of interest by starting with field trips to the local nature reserves and parks, natural history museums, zoos, aquariums, state parks, science museums such as CoSi.
- Encourage student to participate in summer activities held by local nature reserves, state parks, zoos, etc.
- Help students identify skills.
- Help students identify the need to participate in math and science courses in high school.
- Encourage student to seek on-site job shadowing or volunteering experiences. Check with the school counselor for more information on job shadowing requirements/criteria. Contact local parks and museums for volunteering opportunities.
- Complete online virtual field trips to areas of student interest
## Unearthing a STEMM Career in Geology

### Game Show Menu

<table>
<thead>
<tr>
<th>A CAREER IN STEMM</th>
<th>SKILLS &amp; INTERESTS</th>
<th>GREAT MINDS</th>
<th>JOB DUTIES</th>
<th>APPLYING YOUR LEARNING</th>
<th>POINTS Each level</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Interview your school counselor. <strong>Generate</strong> a list of math, science and technology related courses offered at your high school.</td>
<td>□ List 8 common skills and interests of a Geologist. <strong>Compare</strong> those interests to your own and <strong>predict</strong> whether or not you might be successful in this career field.</td>
<td>□ <strong>Create</strong> a newspaper article on J.W.Powell reporting his discovery during the appropriate time-period.</td>
<td>□ <strong>Identify</strong> and <strong>label</strong> 5 of the tallest natural landforms of the U.S. on a map. Include the name, type of landform, and how it formed.</td>
<td>□ <strong>Construct</strong> a Geologist’s field journal with 5 entries identifying five different areas in the world you would like to work.</td>
<td>10-15 points</td>
</tr>
<tr>
<td>□ Research 3 colleges offering a degree in the geology career/job of choice. <strong>Locate</strong> the type of degree and math, science and technology course requirements in this field of study.</td>
<td>□ <strong>Create</strong> a Help Wanted Ad for a geologist position at Yellowstone National Park in Wyoming. Include 3 or more skills, interests and level of education required.</td>
<td>□ <strong>Research</strong> and <strong>report</strong> information on 5 scientists working in the field of geology. Include an explanation of their contribution to science and the world.</td>
<td>□ <strong>Create</strong> an Acrostic poem using the term GEOLOGIST. Be sure to use words that describe the job skills, duties, tools, and/or training required to be a geologist.</td>
<td>□ Choose a specific mountain range or natural landform anywhere in the world and <strong>compose</strong> your own legend about how it was formed.</td>
<td>20-25 points</td>
</tr>
<tr>
<td>□ <strong>Produce</strong> and <strong>present</strong> a video preview clip of a new educational television show you will be starring in as a geologist. Include information about the courses you had to take in high school and college.</td>
<td>□ Choose 10 characteristics or skills of a geologist. <strong>Generate</strong> a questionnaire with 10 questions about the characteristics and <strong>use</strong> with a classmate.</td>
<td>□ <strong>Design</strong> a tourist brochure about a trip through the Grand Canyon based on Powell’s route.</td>
<td>□ <strong>Track and record</strong> earthquake activity in 1 region for 2 weeks. <strong>Analyze</strong> and then <strong>present</strong> your findings on the patterns you observed to the class.</td>
<td>□ Select and view a movie about a fictional geological event from the teacher list. <strong>Write</strong> a movie review of that film and <strong>share</strong> with the class.</td>
<td>30 points</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Student Choice (prior approval) (25-50 points)</th>
<th>Student Choice (prior approval) (25-50 points)</th>
<th>Student Choice (prior approval) (25-50 points)</th>
<th>Student Choice (prior approval) (25-50 points)</th>
<th>Student Choice (prior approval) (25-50 points)</th>
<th>25-50 points</th>
</tr>
</thead>
</table>

**Total:** ________ **Total:** ________ **Total:** ________ **Total:** ________ **Total:** ________ **Total Grade:** ___

Name: ____________________________
**Student Activity Sheet #1 - A Career in Geology**

**Directions:** With a partner, complete the table below after visiting one of the following websites.

- GEOLOGY CAREERS- [http://www.saddleback.edu/faculty/jrepka/career.html](http://www.saddleback.edu/faculty/jrepka/career.html)
- GEOLOGIST & RELATED- [http://www.career-descriptions.co.uk/geologist-and-related-geological-career-description.htm](http://www.career-descriptions.co.uk/geologist-and-related-geological-career-description.htm)

<table>
<thead>
<tr>
<th>Career Field/Job Title: __________</th>
<th>Type of Degree Required:</th>
<th>Description of Job/Duties:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description of where you will work and possible conditions:</td>
<td>Description of tools or instruments:</td>
<td></td>
</tr>
<tr>
<td>Would you consider a career in this line of work? YES or NO, and explain why or why not?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Student Activity Sheet #2 - An Interview with a Geologist

**Directions:** After viewing the interview clip, answer the questions listed below.

<table>
<thead>
<tr>
<th>Tell me what a geologist might do at work?</th>
<th>Name 2 things you already knew or thought you knew about a job in geology?</th>
<th>What are some things you can do to prepare for a career in geology?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>What is something you did NOT know about being a geologist before viewing this interview?</td>
<td>Name 1 thing that surprised you about a job as a geologist?</td>
<td>How can you find out more about a career in geology?</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix B: Teacher Materials

- **Career Clusters Interest Survey**- Source: Adapted from the Guidance Division Survey, Oklahoma Department of Career and Technology education (2005).
  **Refer to Interest Survey-1.pdf**
- **Geology Game Show Menu & Rubric**- Source: Adapted from Differentiating Instruction With Menus: Science by Laurie E. Westphal. Prufrock Press Inc, 2007.
- **Geology Student Choice Proposal Form & Activity Cards**- Source: Adapted from Differentiating Instruction With Menus: Science by Laurie E. Westphal. Prufrock Press Inc, 2007.

### Suggestions for Differentiation:

**Incorporate On-going Assessment**- Meaningful on-going assessments is needed to check student growth and progress. On-going assessment will provide the teacher with direct feedback to assist in determining appropriate instruction that may require adjusting approaches, choices, and scaffolding for varying individual student needs. Some suggestions include: modify presentation method of activities/worksheets by providing electronic copies, adding lines to boxes, enlarging spaces for written responses, modified pre/post-test format by using multiple choice, word banks, etc.

**Provide Activities that Promote Student Engagement**- Ensure each task is interesting, engaging, challenging, and accessible to essential understanding and skills. Provide opportunities that promote a balance between teacher and student-selected activities. Some suggestions include: listing discussion questions on the board/PowerPoint to aid students who have difficulty with attention/focus; allow whiteboard response method for students who are uncomfortable volunteering answers.

**Promote Varied Expectations and Requirements**- Be willing to adjust teacher expectations and requirements for student responses based on student needs.

**Integrate Multiple Flexible/Creative Grouping**- This grouping of students promotes cooperation and working with others, increases student participation and productivity, and maximizes opportunities to tailor instruction to students’ performance levels.

**Include Formative Assessment**- This type of assessment helps teachers differentiate instruction with the primary purpose of checking for student understanding during the learning process rather than at the end of a unit of study. When used on a daily basis, formative assessment can guide instruction based on student performance and understanding while (or after) learning a new concept or process. Formative assessment supports learning by providing multiple and varied attempts for practice that will assist students toward improving their performance. This is a quick and easy way through individual, partner or group or work to use varying types of assessments that include clear expectations and descriptive student feedback.
The Game Show Menu is modeled after the Jeopardy Game Show. It covers multiple topics or objectives (referred to as categories in Jeopardy and organized horizontally on the board) with a least three predetermined choices and point values, as well as a Student Choice Activity for each objective (category). Choices are assigned points based on the levels of Bloom’s Taxonomy (increasing vertically in levels). All choices carry different weights and have different expectations for completion time and effort.

A point criterion is set forth that equals 100%. Students must complete at least one activity from each objective (category) in order to reach their goal.

Benefits

Student Choice- Increases ownership and buy-in, allows for many choices for students. If the student chooses not to complete one of the offered activities, the student can propose their own activity for each category. A Student Choice Activity Proposal form must be completed and presented by the student and approved by the teacher before attempting.

Varied Learning Levels- Allows for individualized contracts for different learning levels within the classroom. Each student can contract for a certain number of points for their total 100%.

Objectives Guaranteed- Each student must complete an activity from each objective covered, even if it is at a lower level.

Special Considerations

Establishing Expectations- Teachers must establish and confirm clear understanding of student on expectations and guidelines of completing the menu. Student Choice must be clearly defined and discussed prior to beginning the menu including how to submit an activity proposal. Approved forms must be stapled to the student’s menu sheet.

Timeframe- This particular menu is designed to be completed within a 2-3 week timeframe. This will vary based on your students’ individual needs. Some activities may be completed at home as well as in class if more time is needed. You may also consider utilizing study hall times.

***Be sure to establish due dates at the start of each category, and have students record this date on the menu.

Special Note: Print Menu and Rubric back-to-back.

Menu explanation is adapted from Prufrock Press Inc. Differentiating Instruction With Menus: Science by Laurie E. Westphal, 2007.
### Unearthing a STEMM Career in Geology

#### Game Show Menu Rubric

<table>
<thead>
<tr>
<th>CRITERIA</th>
<th>EXCELLENT Full Credit</th>
<th>GOOD Half Credit</th>
<th>POOR No Credit</th>
<th>SELF</th>
</tr>
</thead>
</table>
| **Content:**  
Is the content of the product well chosen? | Content chosen represents the best choice for the product. Graphics are well chosen and related to content. | Information or graphics are related to content, but are not the best choice for the product. | Information or graphics presented does not appear to be related to topic or task. | |
| **Completeness:**  
Is everything included in the product? | All information needed is included. Product meets the product criteria and the criteria of the task as stated. | Some important information is missing. Product meets the product criteria and the criteria of the task as stated. | Most important information is missing. The product does not meet the task, or does not meet the product criteria. | |
| **Creativity:**  
Is the product original? | Presentation of information is from a new perspective. Graphics are original. Product includes an element of fun and interest. | Presentation of information is from a new perspective. Graphics are not original. Product has elements of fun and interest. | There is no evidence of new thoughts or perspectives in the product. | |
| **Correctness:**  
Is all of the information included correct? | All information present in the product is correct and accurate. | N/A | Any portion of the information presented in the product is incorrect. | |
| **Appropriate Communication:**  
Is the information in the product well communicated? | All information is neat and easy to read. Product is in appropriate format and show significant effort. Oral presentations are easy to understand and presented with fluency. | Most of the product is neat and easy to read. Product is in appropriate format and shows significant effort. Oral presentations are easy to understand, with some fluency. | The product is not neat and easy to read or the product is not in the appropriate format. It does not show significant effort. Oral presentation was not fluent or easy to understand. | |

Name:______________________________

**Recommended Ohio Sites to Visit**

*Directions:* Visit Ohio sites to further explore your interest in geology and science. Many sites will provide an opportunity to learn more about the environment, working conditions, tools, job duties, and careers of individuals working in science. Be sure to document your visit through photographs, notes, and artifacts collected at the site that can be compiled in your very own Science Career notebook or journal.

<table>
<thead>
<tr>
<th>Area of Interest</th>
<th>Site Name &amp; Website</th>
<th>Site Location</th>
<th>Site History/Information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gem Mining</strong></td>
<td>Seneca Mining Company <a href="http://www.senecacaverns.com/location.htm">http://www.senecacaverns.com/location.htm</a></td>
<td>Bellevue, Ohio. 105 miles Northwest of Akron, Ohio.</td>
<td>A real operating sluice with flowing water where you pan for gemstones, minerals, crystals, arrowheads, and new for 2001 - fossils!</td>
</tr>
<tr>
<td><strong>Caverns &amp; Caves</strong></td>
<td>Ohio Caverns <a href="http://www.ohiocaverns.com/">http://www.ohiocaverns.com/</a></td>
<td>West Liberty, Ohio about 30 miles northeast of Dayton, Ohio.</td>
<td>The Ohio Caverns are found concealed beneath the rolling farmland and wooded countryside of Champaign County. The caverns were formed thousands of years ago when an underground river cut through ancient limestone and created vast rooms and passageways that later filled with countless crystal stalactites, stalagmites and other amazing formations.</td>
</tr>
<tr>
<td></td>
<td>Hocking Hills: Old Man's Cave <a href="http://www.heartofhocking.com/Old_Mans_Cave.htm">http://www.heartofhocking.com/Old_Mans_Cave.htm</a></td>
<td>Logan, Ohio. In the Foothills of the Appalachian Mountains, one hour southeast of Columbus, Ohio.</td>
<td>A mile-long gorge at Old Man's Cave displays a variety of geologic features, including waterfalls, sandstone cliffs and rock formations with names like the Devil's Bathtub, Sphinx Head, Eagle Rock and Whale in the Wall; also home to the 149-foot-tall hemlock that’s said to be the tallest tree in Ohio.</td>
</tr>
<tr>
<td><strong>Rock Formations</strong></td>
<td>Greenville Falls Natural Area <a href="http://www.miamicountyparks.com/greenevillefalls.html">http://www.miamicountyparks.com/greenevillefalls.html</a></td>
<td>Covington, Ohio in Miami County just 35 minutes Northwest of Dayton, Ohio</td>
<td>Part of the Stillwater State Scenic River System and includes beautiful cascades and impressive Silurian dolomite and limestone cliffs occurring along the valley of Greenville Creek.</td>
</tr>
<tr>
<td><strong>Wetlands</strong></td>
<td>Ohio Wetlands: Kiser Lake <a href="http://www.dnr.state.oh.us/Home/preserves_main/kiser_lake/tabid/948/Default.aspx">http://www.dnr.state.oh.us/Home/preserves_main/kiser_lake/tabid/948/Default.aspx</a></td>
<td>Conover, Ohio. Just 45 minutes North of Dayton, Ohio</td>
<td>These low-lying areas are covered or saturated by water during part of each year. This results in specialized wet soil types and water dependent plants. Includes marshes, swamps, bogs and fens.</td>
</tr>
<tr>
<td><strong>Prairies</strong></td>
<td>Resthaven Wildlife Area <a href="http://ohiodnr.com/Home/tabid/4414/Default.aspx">http://ohiodnr.com/Home/tabid/4414/Default.aspx</a></td>
<td>Northwest of Castalia, Ohio. Near Sandusky Bay, Lake Erie</td>
<td>These 2,272 acres lies centered in what was originally a wet marl prairie. Early accounts record an extensive wet prairie reaching from the present city of Sandusky to Port Clinton.</td>
</tr>
</tbody>
</table>
Appendix C: Assessments

Assessments Part One - Pretest/Posttest

Name: __________________________________________ Date: ________________

Period: ________

STEMM Career in Geology: Pre-Test

Directions: Answer all questions below to the best of your ability.

1. What is a geologist? ___________________________

2. What does a geologist study? ___________________________

3. What types of duties might a geologist perform? ___________________________

4. Describe how the following natural landforms were formed.
   a. Hawaii- ___________________________
   b. Himalaya Mountain Range- ___________________________
   c. Grand Canyon- ___________________________

5. List three recommended skills for a geologist.
   a. ___________________________
   b. ___________________________
   c. ___________________________

6. What does STEMM mean? ___________________________

7. List three high school courses that would help prepare you for a career in STEMM?
   a. _________ b. _________ c. _________

8. What great natural landform feature did J.W. Powell discover?
   ___________________________

9. Name three jobs in the career field of a geologist.
   a. _________ b. _________ c. _________

10. Name three things you must consider when planning a career.
    ___________________________
    ___________________________
    ___________________________
Key for Pretest/Posttest:
Name: _____________________________________________________________ Date: ________________
Period: ______

STEMM Career in Geology: Post-Test

Directions: Answer all questions below to the best of your ability.

1. **What is geology?**  Geology is the study of the Earth, the materials of which it is made, the structure of those materials, and the processes acting upon them.

2. **What does a geologist do?**  Geologists work to understand the history of our planet. The better they can understand Earth’s history the better they can foresee how events and processes of the past might influence the future.

3. **What types of duties might a geologist perform?**  Measure earthquake activity, magnetic fields, volcanology, bodies of water and amount of rainfall, answers will vary

4. **Describe how the following natural landforms were formed.**
   a. Hawaii - **volcanic activity**
   b. Himalaya Mountain Range - **converging tectonic plates**
   c. Grand Canyon - **erosive activity of the Colorado River**

5. **List three recommended skills for a geologist.**
   a. answers will vary
   b. research, use a computer, make calculations, etc.
   c. ____________

6. **What does STEMM mean?**  **Science, Technology, Engineering, Math, and Medicine**

7. **List three high school courses that would help prepare you for a career in STEMM?**
   a. answers will vary  b. **calculus**  c. **earth science**

8. **What great natural landform feature did Powell discover?**  The Grand Canyon

9. **Name three jobs in the career field of a geologist.**
   a. answers will vary  b. **Paleontologist**  c. **Geophysicist**

10. **Name three things you must consider when planning a career.**
    Own interests, skills, and abilities; the courses I need to take in high school; the courses I will take in college when working toward a degree; what type of degree is needed for a career in my chosen career field; tuition costs at possible colleges offering a degree in my career field of choice; qualifications to enter the program at the college level; my own independent living skills and desires.
Assessments Part Two

**Portfolio**
Students will maintain a portfolio of artifacts generated from the Starting Wright project.

**Game Show Menu & Rubric:** Students select from a list of projects with various levels of difficulty and point value. Menu is adapted from the television game show, Jeopardy.

**Refer to Geology Game Show Menu & Rubric.**
Appendix D: Notes for Parents

Dear Parent(s):

It is important for students transitioning from high school to postsecondary education to build a repertoire of tools to better prepare themselves for achieving their goals. Developing strategies and skills that will enable them to become independent, responsible learners is critical in this process. The activities in this unit provide students the opportunity to explore their own interests and skills. This exploration allows the student to identify the important components to consider while determining the correct career field to enter. You can assist the student in preparing for success in college by visiting


- **Any office of Disability Services at the postsecondary institution of the student’s interest/choice**.

Some additional follow up enrichment activities that you can assist the student with while exploring his/her interests are visits to local sites and an interview with a professional in the career field. Attached is a list of local sites that may be of interest to an individual seeking a career in geology. On-site visits provide the opportunity to see first-hand some of the activities, the environment and working conditions of a geologist. An additional activity that will promote exploration is an interview with a local professional working in the student's career area of interest. Many professionals are willing and enjoy working with young people who may be interested in their profession. Some may even be willing to conduct the interview via phone. Be sure to have the student set up the interview time and conduct the interview himself/herself. It is important to note that you may need to work with the student on developing and practicing appropriate questions and etiquette prior to the interview. Practicing with the parent until he/she is comfortable with initiating the call is crucial. A great final question to have the student ask may be, “Is there anything else you would like to share that we did not discuss?” The student may gain information regarding a topic he/she may not have considered.
Appendix E: Additional Resources

- Power Point
- Jeopardy Game Template in Power Point format
- Websites:
  ~ Walter Geology Library Virtual Field Trip Guide: United States and Canada
    http://www.lib.utexas.edu/geo/onlineguides.html
  ~ What is Geology?  Everything you need to know about Geology.
    http://geology.com/articles/what-is-geology.shtml
  ~ Geology Careers. Learn more about a career in Geology.
    http://www.saddleback.edu/faculty/jrepka/career.html
Area: Animal Science/Career Exploration

STEMM Career Connection: Life Science

Title: Exploring a STEMM Career in Animal Science

Grade Levels: Ninth - Tenth

Academic Content Areas: Science, Mathematics; Technology; Language Arts

Topics: Science and Technology; Scientific Inquiry; Data Analysis and Probability

Goal: To increase interest and understanding in STEMM careers.

Performance Objectives:
Students will:
1. Identify and report possible job skills and training requirements in the career field of animal science.

Big Question

What can you tell me about preparing for a job in a STEMM career?

Brief Summary

In this exploration, students will complete hands-on job related activities, and use observation, data recording, analysis, and reporting skills to inform others on the variety of areas to be considered when considering a career in STEMM careers including interests, skills and suggested coursework/training/degree.

Main Ideas

Students need to explore their own interests and abilities, and identify some of the necessary skills for the job of choice and required course preparation and degree. A career in STEMM may provide an opportunity that does not require a college degree.
Content Standards

Science Grades 9-10

Standard: Life Sciences

Benchmark G: Describe how human activities can impact the status of natural systems.

Standard: Scientific Ways of Knowing

Benchmark D: Recognize that scientific literacy is part of being a Knowledgeable citizen.

Language Arts Standard Grades 8-10

Standard: Research

Benchmark E: Communicate findings, reporting on the substance and processes orally, visually and in writing or through multimedia.

Standard: Communications: Oral and Visual Standard

Benchmark G: Give presentations using a variety of delivery methods, visual displays and technology.

Technology Grades 9-12

Standard 3: Technology for Productivity Applications

Benchmark B: Identify, select and apply appropriate technology tools and resources to produce creative works and to construct technology enhanced models.

Standard 4: Technology and Communication Applications

Benchmark B: Create, publish, and present information, utilizing formats appropriate to the content and audience.

Materials

- Index card
- Sticky notes
- Career Intelligence: Career Skills Worksheet (may be completed online at http://www.career-intelligence.com/assessment/career-skillset-worksheet.asp)
- Computer and printer access for students
- Starting Wright Video clips (2) - Starting Wright Careers in STEMM; Up Close & Up Front Interview with a Veterinarian Technologist
- Computer and printer access for students
- Student worksheets #1-2
- 2-5-8 Menu
- Rubric
- PowerPoint- Animal Science

*Various worksheets based on activities selected*
**Preparation for Lesson**

Copy Career Intelligence Career Skills Worksheet, 2-5-8 Menu and Rubric, Student Choice Proposal form, Student Activity Sheets #1-3.
Test PowerPoint to ensure it will run properly, test websites to ensure they are accessible.
Prepare materials for Menu Choices (differentiated activities).

**Vocabulary**

**Animal scientist**- a specialist in the branch of biology dealing with animals

**Research veterinarian**- a specialist who provides medical services in support of the health of animals and conducts research to keep animals and humans safe.

**Veterinary technologist**- Veterinary technicians assist veterinarians in providing care to animals. They perform routine laboratory procedures and clinical procedures, such as taking blood, dispensing and giving medication, and performing medical tests, all under the supervision of a veterinarian.

**Note: Outline additional vocabulary you feel is important to the careers you discuss. Narrow down to top 10.**

**Time needed**
Six days (50 minute periods each day).
**Your class may require more time. Lessons do not have to be consecutive days.**

**Day One:** Hook, Student Activity Sheet #1, Career Skills List/Form
**Day Two:** Review Career Skills Results, 2-5-8 Menu- Level 2 Activity
**Day Three:** Hook, Student Activity Sheet #2, 2-5-8 Menu- Level 5 Activity
**Day Four:** Starting Wright Interview with a Vet Tech, Student Activity Sheet #3-, 2-5-8 Menu- Finish Level 2 Activity
**Day Five:** 2-5-8 Menu- Level 8 Activity
**Day Six:** Final discussion and wrap-up and presentations

**Lesson**

**DAY ONE:**

**Hook: (15 minutes)**

Begin PowerPoint (slides 1-6): Have the PowerPoint on slide 1 and pass out **Student Activity Sheet #1-“What Is That?”** as students enter the room. Explain that students will complete this activity on their own and then review as a large group taking a couple of student responses for guesses on each image. The last image is a close up image of the turtle’s shell.

Ask students if they have ever seen a turtle shell shaped like this. Ask if anyone knows why this deformity may have occurred.
**Activity One: (20 minutes)**


Play the video clips (2) describing the situation.

Discuss how human activities can impact the status of natural systems; natural habitats of animals. Ask students to identify the world issue: pollution. Brainstorm ways on how to solve or at a minimum improve this issue. Lead students in thinking about immediate ways they can assist: recycle, don’t pollute, volunteer at animal shelters or nature preserves.

Ask who do you think might work in these types of jobs. (possible answers: veterinarian, animal scientist, park rangers, zookeeper, farmer, wildlife trainer, police officer, animal cruelty officer, pet store clerk, kennel, etc.). Record answers on the board. Ask what types of skills you might need serving in this role.

Ask: What kind of training or degree do you think you might need in order to work in one of the fields mentioned? (possible answers: math, science, anatomy, etc.) Suggest possibly a career in a STEMM field.

**Activity Two: (15 minutes)**

Ask how many students may be interested in a career in STEMM (by a show of hands).

Continue with a large group discussion about the importance of identifying your own skills when considering a career path. Have the class brainstorm ways to gather this information about them. List student suggestions on board (possible answers may include: talk with teacher, parent, counselor; write a personal journal; explore websites; complete skills assessments; review school grades).

Have students complete the *Career Skills Worksheet* (see attached) and store in their Starting Wright Portfolio. Direct students who are not finished to take home and return to school tomorrow.

**Formative Assessment: ONE MINUTE SUMMARY**

In a triad- Have students answer, “How can you continue to identify or evaluate your own skills?”. Teacher will use this information to check for student learning and understanding.

**DAY TWO:**

REVIEW yesterday’s lesson. Concepts: Identifying your skills, How human activity impacts the environment of animals living in the wild.

Play the *Like Mother Like Son* clip from [http://www.teachersdomain.org/](http://www.teachersdomain.org/)
**You will need to complete a registration online for a free membership in order to access video clips.**

Complete the *Like Mother Like Son* activity demonstrating one of the skills of an animal scientist such as observation of animals in natural habitats.

Have students record their findings on a separate sheet of paper.

**Activity One: (15 minutes)**
With a partner, the student will share results of *Career Skills Worksheet*.

Have a large group discussion on the importance of identifying your own interests before choosing a career, researching the job requirements/skills needed for a career in this area, and the courses needed for a degree/certificate in this field.

Discuss the opportunities a career in STEM can offer a student in relationship to working in animal science. Ask students to recall some of the areas viewed on the PowerPoint. Explain a person working in the field of ANIMAL SCIENCE might have the opportunity to work in various locations including a zoo, lab, pet store, veterinary office, animal husbandry, nature preserve, national parks, etc. Also, they will have the opportunity to work with multiple types of animals including: domesticated, wild, farm, aquatic, marine, etc.

**Activity Two: (20 minutes)**
Pass out *Animal Science 2-5-8 Menu*. Go over how to use, expectations and grading rubric.

Direct students to review the activity choices. Direct student attention to the Level 2 Section: Remember & Understand. Have students individually select 1 activity from this section to complete; begin work in class today. Once they have selected the activity, give each student the corresponding activity card while bringing student’s attention to the time allowance/due date of each individual activity. Have students store Menu, Rubric, and activity card in their Starting Wright Portfolio.

**DAY THREE:**
**Hook:** Have PowerPoint (slide 13) playing as students enter the room (Disney movie trailer: African Cats The World I Knew, music by Jordin Sparks. You may access this through You Tube at [http://www.youtube.com/watch?v=HKLgpEa7-yk&feature=related](http://www.youtube.com/watch?v=HKLgpEa7-yk&feature=related) (app. runtime 4:26)

**OR**

the Official DisneyNature Movie Trailer at [http://www.youtube.com/watch?v=cyw5KiT0tM0&NR=1](http://www.youtube.com/watch?v=cyw5KiT0tM0&NR=1) (app. runtime 1:51)
Discuss the clip: images, animals living in their natural environment, possible career opportunities in this area, pros and cons of working in this environment such as safety issues (with wild animals, illness/disease, etc.), working conditions (climate, outdoors, etc.).

Bring students’ attention to the location- Africa. Far from home, so what are some work environments closer to home at which they can work with animals? View PowerPoint (slides 14-20). (20 minutes)

Discuss local businesses that involve animal care, such as humane society, pet shop, veterinary office, farm, zoo, state or national parks, nature preserves, etc.

Activity One: (20 minutes)
Discuss the careers in the field including a research veterinarian:
Provides medical services in support of the health of animals. Prescribes medications, establishes and administers treatment plans, and performs surgeries on animals. Requires a DVM and at least 5 years of experience in the field or in a related area. Familiar with a variety of the field’s concepts, practices, and procedures. Relies on experience and judgment to plan and accomplish goals. Performs a variety of tasks. May lead and direct the work of others. A wide degree of creativity and latitude is expected. Typically reports to a head of a unit/department. (http://www1.salary.com/Research-Veterinarian-Higher-Ed-Salary.html)

Ask: What kind of training or degree do you think you might need in order to work in one of the fields mentioned? (possible answers: higher education degree, math, science, anatomy, etc.) Mention a research veterinarian can work in many of the places to work PowerPoint including National or State Parks, Animal laboratories, etc.

Introduce the Starting Wright Website. Draw students’ attention to the Careers in STEMM section.  
- View Starting Wright Careers in STEMM Video.

Activity Two: (10 minutes)
Direct students to get out portfolio and pull out menu. Direct student attention to the Level 5: Apply & Analyze Section. Have students individually select one activity from this section to complete; begin work in class today. Once they have selected the activity, give each student the corresponding activity card while bringing student’s attention to the time allowance/due date of each individual activity. Have students store Menu, Rubric, and activity card in their Starting Wright Portfolio.

DAY FOUR:
Activity One: (20 minutes)
Direct students to learn more about research veterinarian by exploring the following websites and completing Student Sheet #2- Careers in Animal Science with a
Activity Two: (20 minutes)
Direct students to get out portfolio and pull out menu. Direct to continue working on Level 2 & 5 activities.

Formative Assessment: EXIT TICKET-
On a sticky note, direct students to write about one thing they learned during their research that surprised them or was of particular interest. Students must place sticky note on whiteboard before leaving the classroom.

DAY FIVE:
REVIEW:
Check progress on Menu Activities Level 2 & 5. Answer any questions, address concerns. Remind students to keep working on activities at home and remind of due date. Complete this with all Menu Activities on a daily basis during review time.

Activity One: (15 minutes)
Introduce the interview clip with a veterinarian technologist in the Starting Wright program. Discuss things to consider when choosing a career; things she did to get prepared for a job in Animal Science/STEMM. Can you relate info from this info to what you are learning on activity Level 2 & 5?

• View Starting Wright Up Close & Up Front Interview with a Veterinarian Technologist Video.

Using dyad grouping, have pairs of students complete Student Activity Sheet #3-Research Veterinarian.

Activity Two: (20 minutes)
2-5-8 Menu- Level 8: Evaluate and Create. Direct students to get out portfolio and pull out menu. Review activities listed in Level 8. Have students begin work on Level 8 Activity & remind of due date.

DAY SIX:
Wrap up Menu Activities and presentations.
Optional Extensions

- Invite an Ag teacher or graduated Ag student/officer to come talk with students. Focus on the opportunities in their community for employment, training, and volunteering. Share information regarding the benefits of taking Ag class and participating in FFA (activities, office, competitions, etc.).

- On your own, visit one or two local sites to explore activities and careers in animal science. Select a site to visit from the teacher provided list. Create a journal entry discussing where you went, date, what you did/observed, who you met, something you discovered at the site, something you might like to try, and why or why not you would like to work at this site. If interested in working at this site, discuss how you might go about volunteering or seeking a career in this field. Tell about something you discovered, something you might like to try, and why or why not you would be interested in a career in this field.

- View the City Parrots clip from http://www.teachersdomain.org/. Determine what types of materials were used to build the housing/shelter, compare this to that of a natural setting, and How do the parrots protect themselves from predators, compare this to living in a rainforest.

Helpful Hints for Teachers

- It will be important for you to conference with students on a daily basis during in-class, independent work time to check progress on Menu activities. Rather than giving a single end of the unit due date for activities, you may need to assign shorter due dates for each activity with certain students based on individual needs. Chunking activities into smaller parts with assigned due dates for each activity may be useful.

- Pick and choose activities from the Menu based on your students’ needs.

- Check with Ag teachers for additional guidance and development. Some students may already be involved with FFA. This would be a great opportunity to have those students share their opinion and experiences with the class, as well as, making a connection and building rapport with the student.

- Be sure to make accommodations for individuals with visual, auditory or physical disabilities. This might include enlarged worksheets and screen images devices, text-to-speech software or peer reader, adapted mouse or keyboard with easy access to computer or use of laptop, or a peer scribe.

- If you encounter difficulties using YouTube. Try visiting TeacherTube @ http://www1.teachertube.com/ or Teachers’ Domain @ http://www.teachersdomain.org/ for Digital Media for the Classroom and Professional Development.

- Some students may benefit from adding lines in the tables or graphic circles on the student worksheets. This will provide them with a guide as to the teacher recommended length of their responses.

- Students and teachers alike are all too familiar with information being presented through the use of a PowerPoint. An additional tool for presenting information to students is Prezi. Prezi is a web-based presentation tool using a map layout and zooming to show contextual relationships. This is a new and
Helpful Hints for Parents
Parental encouragement and support is believed to have a positive impact on student planning and transition. Below are a few suggested activities in which you can provide opportunities for your child to explore and identify their own interests and abilities as it relates to career planning:

- Provide students with hands-on activities related to the field of interest by starting with field trips to the local nature reserves and parks, natural history museums, zoos, aquariums, state parks, science museums.
- Encourage student to participate in summer activities held by local nature reserves, state parks, zoos, etc.
- Encourage student to seek on-site job shadowing or volunteering experiences. Check with the school counselor for more information on job shadowing requirements/criteria. Contact local parks and museums for volunteering opportunities.
- Encourage student reading of animal science related materials including magazines (National Geographic, Discovery, etc.).
- Help students identify skills necessary for a career in the field of choice.
- Help students identify the need to participate in math and science courses in high school.
- Encourage student to seek on-site job shadowing or volunteering experiences. Check with the school counselor for more information on job shadowing requirements/criteria. Contact local humane societies, veterinary clinics, and pounds for volunteering opportunities.

**For additional information and suggestions, see Appendix D.**
Appendix A: Student Materials

Exploring a STEMM Career in Animal Science

2-5-8 Menu

Directions: Choose two activities from the menu below. You must complete activities to total 10 points. Place a checkmark in each box to show which activities you will complete. All Activities are due by ____________________________.

2 Points: Remember & Understand

☐ Identify 4 different careers in the career field of animal science. List one sample place of employment and one important skill for each career. Record your information on a large index card.

☐ Thinking about the Starting Wright Video: Interview with a Veterinary Technologist, on a separate sheet of paper list five things the vet tech did that assisted her in achieving a career in animal science. Of the five, choose two and explain how you can apply this information toward your own postsecondary goals. Be sure to mention the goal itself as well.

5 Points: Apply & Analyze

☐ Using the internet, read three articles on animal treatment and the impact of human activity (such as turtles, whales, sea lions, dolphins, whales, etc.)

Using a three-by-five table format, list the following:

- Name of Article
- Date of Article
- Name of Source
- Website address
- Nature of the Problem/animal treatment

☐ Develop a crossword puzzle using 12 of the top skills you find most important for success at the college level. Refer to the skills listed on the Career Skills Worksheet. Share your crossword puzzle with the class by providing each student with a copy. Be sure to develop and turn-in a key to the teacher.

☐ Refer to the Career Skills Worksheet.
Generate a list of skills of which you would like to improve (3-4 minimum). Describe how improving on these skills will assist you in reaching your Post-secondary goals.

Write a letter to an animal rescue organization asking for information on how you can assist with the plight of animals like Mae West, the turtle. Your letter should include the following elements:

- 2 ways animals are harmed by human activity
- an explanation as to why the animals should be helped
- 1 question asking how you can help

**Must also mail the letter and send with a postage paid, addressed, return envelope.**

Set up a visit with or contact a local college offering a degree in your career field of choice. Most school districts will allow students college visit days; check with your school counselor. Obtain the following information through conversations with campus staff, students and others.

- Program entrance requirements
- Required degree
- Length of time (typically) to obtain degree
- List of science, technology, engineering, and math courses required
- Contact information for Office of Disability Services

Display your information in the form of an informative brochure or flyer and present to the class.
**Student Activity Sheet #1- What Is That?**

**Directions:** As you watch the PowerPoint slideshow, try to identify what is being shown in the close-up image. Record your answers in the table below.

<table>
<thead>
<tr>
<th>YOUR GUESS</th>
<th>What makes you think so?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td></td>
</tr>
</tbody>
</table>
**Student Activity Sheet #2 - Careers in Animal Science**

**Directions:** With a partner, complete the table below after visiting one of the following websites.

- Bioscience Careers Veterinarian [http://www.aboutbioscience.org/veterinarian.html](http://www.aboutbioscience.org/veterinarian.html)

<table>
<thead>
<tr>
<th>Career Field/Job Title: ____________</th>
<th>Type of Degree Required:</th>
<th>Description of Job/Duties:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description of where you will work and possible conditions:</td>
<td>Description of tools or instruments:</td>
<td></td>
</tr>
<tr>
<td>Would you consider a career in this line of work? YES or NO, and explain why or why not?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Name(s): ________________

Student Activity Sheet #3- An Interview with a Veterinarian Technologist

Directions: While viewing the clip, complete the concept circle below based on the interviewee's responses.
Appendix B: Teacher Materials


Suggestions for Differentiation:

Incorporate On-going Assessment- Meaningful on-going assessments are needed to check student growth and progress. On-going assessment will provide the teacher with direct feedback to assist in determining appropriate instruction that may require adjusting approaches, choices, and scaffolding for varying individual student needs.

Provide Activities that Promote Student Engagement- Ensure each task is interesting, engaging, challenging, and accessible to essential understanding and skills. Provide opportunities that promote a balance between teacher vs. student-selected activities.

Promote Varied Expectations and Requirements- Be willing to adjust teacher expectations and requirements for student responses based on student needs.

Integrate Multiple Flexible/Creative Grouping- This grouping of students promotes cooperation and working with others, increases student participation and productivity, and maximizes opportunities to tailor instruction to students' performance levels.

Include Formative Assessment- This type of assessment helps teachers differentiate instruction with the primary purpose of checking for student understanding during the learning process rather than at the end of a unit of study. When used on a daily basis, formative assessment can guide instruction based on student performance and understanding while (or after) learning a new concept or process. Formative assessment supports learning by providing multiple and varied attempts for practice that will assist students toward improving their performance. This is a quick and easy way through individual, partner or group or work to use varying types of assessments that include clear expectations and descriptive student feedback.
Exploring a STEMM Career in Animal Science

2-5-8 Menu

The 2-5-8 Menu covers multiple activities (designed in the format of a 3 X 3 table) with two predetermined choices at Level 2: Remember & Understand with a point value of 2, three choices at Level 5: Apply & Analyze with a point value of 5 and two choices at Level 8: Evaluate & Create with a point value of 8. Each choice is based on the levels of Bloom’s Taxonomy. The student must earn 10 points to receive a 100% making their own combination of activities. All choices carry the same expectations for completion time and effort.

Benefits

Student Choice- Increases ownership and buy-in, allows for many choices for students. The student may choose an activity from the Student Choice Activity List to present as a proposal for the Free Space Student Choice Activity. A Student Choice Activity Proposal form must be completed and presented by the student and approved by the teacher before attempting.

Varied Learning Levels- Allows for individualized contracts for different learning levels within the classroom. Each student must complete a tic-tac-toe pattern (vertical, diagonal, or horizontal) consisting of 3 activities.

Versatility- The menu can address one topic or three different objectives. Covering three different objectives will require students to complete one activity from each column or row.

Special Considerations

Establishing Expectations- Teachers must establish and confirm clear understanding of student on expectations and guidelines of completing the menu. Student Choice must be clearly defined and discussed prior to beginning the menu including how to submit an activity proposal. Approved forms must be stapled to the student’s menu sheet.

Timeframe- This particular menu is designed to be completed within a 1-2 week timeframe. This will vary based on your students’ individual needs. Some activities may be completed at home as well as in class if more time is needed.

***Be sure to establish due dates at the start, and have students record this date on the menu.

Special Note: Print Menu and Rubric back-to-back.

Menu explanation is adapted from Prufrock Press Inc. ‘Differentiating Instruction With Menus: Science’ by Laurie E. Westphal, 200
# Exploring a STEMM Career in Animal Science

## 2-5-8 Menu Rubric

<table>
<thead>
<tr>
<th>CRITERIA</th>
<th>EXCELLENT</th>
<th>GOOD</th>
<th>POOR</th>
<th>SELF</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Content:</strong></td>
<td>Full Credit</td>
<td>Half Credit</td>
<td>No Credit</td>
<td></td>
</tr>
<tr>
<td>Is the content of the product well chosen?</td>
<td>Content chosen represents the best choice for the product. Graphics are well chosen and related to content.</td>
<td>Information or graphics are related to content, but are not the best choice for the product.</td>
<td>Information or graphics presented does not appear to be related to topic or task.</td>
<td></td>
</tr>
<tr>
<td><strong>Completeness:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is everything included in the product?</td>
<td>All information needed is included. Product meets the product criteria and the criteria of the task as stated.</td>
<td>Some important information is missing. Product meets the product criteria and the criteria of the task as stated.</td>
<td>Most important information is missing. The product does not meet the task, or does not meet the product criteria.</td>
<td></td>
</tr>
<tr>
<td><strong>Creativity:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is the product original?</td>
<td>Presentation of information is from a new perspective. Graphics are original. Product includes an element of fun and interest.</td>
<td>Presentation of information is from a new perspective. Graphics are not original. Product has elements of fun and interest.</td>
<td>There is no evidence of new thoughts or perspectives in the product.</td>
<td></td>
</tr>
<tr>
<td><strong>Correctness:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is all of the information included correct?</td>
<td>All information present in the product is correct and accurate.</td>
<td>N/A</td>
<td>Any portion of the information presented in the product is incorrect.</td>
<td></td>
</tr>
<tr>
<td><strong>Appropriate Communication:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is the information in the product well communicated?</td>
<td>All information is neat and easy to read. Product is in appropriate format and show significant effort. Oral presentations are easy to understand and presented with fluency.</td>
<td>Most of the product is neat and easy to read. Product is in appropriate format and shows significant effort. Oral presentations are easy to understand, with some fluency.</td>
<td>The product is not neat and easy to read or the product is not in the appropriate format. It does not show significant effort. Oral presentation was not fluent or easy to understand.</td>
<td></td>
</tr>
</tbody>
</table>

Name: _____________________________

Rubric is adapted from Prufrock Press Inc. • Differentiating Instruction With Menus: Science by Laurie E. Westphal, 2007.
Appendix C: Assessments Part One

**Portfolio**
Students will maintain a portfolio of artifacts generated from the Starting Wright project.

**2-5-8 Menu & Rubric:** Students select from a list of projects with various levels of difficulty and point value. Menu is adapted from the television game show, Jeopardy.

**Refer to Student Materials for 2-5-8 Menu & to Teachers Materials for Rubric.**
Appendix D: Notes for Parents

Dear Parent(s):

It is important for students transitioning from high school to postsecondary education to build a repertoire of career exploration and researching skills to better prepare themselves for achieving more realistic goals. Learning more about your own skills, interests and abilities, course requirements and program entrance criteria at the college level, the type of degree required for a career, and the availability of programs are all considerations that each student need identify and understanding when planning for the move to postsecondary education.

You can assist the student on “Getting Ready for College” by completing activities at the following websites:

- **Get Ready for College**
  [http://www.getreadyforcollege.org/gPg.cfm?pageID=163](http://www.getreadyforcollege.org/gPg.cfm?pageID=163)
- **Getting Ready for College EARLY**

Also recommended is the completion of online activities that the student can complete individually or with a parent that focus on career exploration and development. One recommended site is Career Exploration at [http://breitlinks.com/careers/career_activities.htm](http://breitlinks.com/careers/career_activities.htm). This site allows the student to explore job sections and complete related exploration activities. Students can begin by learning more about Career Planning that involves self-assessment, identifying and exploring, goal setting and planning, and taking action.
Appendix E: Additional Resources

- Power Point: Exploring a Career in Animal Science
- Official Disney Nature Movie Trailer: African Cats at [http://www.youtube.com/watch?v=cyw5KiT0tM0&NR=1](http://www.youtube.com/watch?v=cyw5KiT0tM0&NR=1) (run time 1:51)
Area: Mathematics/Career Exploration

STEMM Career Connection: Mathematics

Title: “I’m Never Gonna Use This!”

Grade Levels: Ninth - Tenth

Academic Content Areas: Science, Mathematics; Technology; Language Arts

Topics: Mathematics; Career Exploration and selection; Learning Styles

Goal: To increase interest and understanding in STEMM careers.

Performance Objectives: Students will:
   1. Identify and report career opportunities, job skills and training requirements in the field of mathematics.
   2. Identify and report how math skills learned in math class relates to various careers.

Big Question

What can you tell me about preparing for a job in a STEMM career?

Brief Summary

One of the biggest challenges teachers make is dispelling the old defeating phrase shared by many students, “Why do I have to do this? I’m never gonna use this!”
This lesson will provide students with the opportunity to connect what they are learning in math class (core principles) to an end result (how it will apply in real life). Making this end result more accessible to students earlier on is crucial in developing interests in STEMM careers.

This lesson also encourages teachers to seek out participation from community professionals whose work involves mathematics. Everyone needs to be involved in the education of our students, especially those who can give insight on “How” students will use what they are learning in math in their career fields. This lesson incorporates having classroom speakers share how math is used in their
professions, as well as giving a demonstration of the types of tools being used and how they assist in their job duties.

**Main Ideas**

Students will make a connection between what they are learning in math class and possible careers in STEMM. Students will gain a greater understanding of being able to identify their learning styles and the characteristics of those styles to assist in developing effective study habits and strategies. It is helpful for students to understand how they acquire information from their environment, process that information for understanding, and store and retrieve that information. Using this knowledge to create learning environments and individualized study habits that better support how the student learns may ultimately increase the odds of academic success for most college students.

**Content Standards**

**Language Arts Standard Grades 8-10**

**Standard:** Research

**Benchmark E:** Communicate findings, reporting on the substance and processes orally, visually and in writing or through multimedia.

**Standard:** Communications: Oral and Visual Standard

**Benchmark G:** Give presentations using a variety of delivery methods, visual displays and technology.

**Technology Grades 9-12**

**Standard 3:** Technology for Productivity Applications

**Benchmark B:** Identify, select and apply appropriate technology tools and resources to produce creative works and to construct technology enhanced models.

**Standard 4:** Technology and Communication Applications

**Benchmark B:** Create, publish, and present information, utilizing formats appropriate to the content and audience.
**Materials**

- Starting Wright Video clips (3): *Careers in STEMM, How to Choose a Career, How Do You Get to a STEMM Career.*
- Index card
- Sticky notes
- Computer and printer access for students
- CITE Learning Styles Inventory
- Student worksheets #1-2
- Sample Animator Info Sheet
- Tic-Tac-Toe Menu
- Rubric
- Free Space: Student Choice Activity List
- Activity Cards
- Pre/Post-test
- PowerPoint- A Great Place to Work, 21 Seriously Cool Careers that Use Math

**Various worksheets based on activities selected**

**Preparation for Lesson**

Copy pre/post-tests, CITE Learning Styles Inventory, Tic-Tac-Toe Menu, Student Activity Sheets #1-2 (will need three copies per student of #2), Free Space Student Choice Activity List, proposal forms, Activity Cards, sample animator info sheet.

Test PowerPoint to ensure it will run properly. Test websites to ensure they are accessible.

You Tube access may be blocked. You may want to download video clips to a source of external memory such as a flash drive or insert in the PowerPoint. You may also visit [www.TeacherTube.com](http://www.TeacherTube.com) to see if the video is available at this site.

Prepare materials for Tic-Tac-Toe Menu Choices (differentiated activities).

**Vocabulary**


**Auditory Style:** Learning through hearing and speaking, enjoys discussions, needs to say it to learn it, sounds of the environment.

**Kinesthetic Style:** Learning through doing; large motor muscles, body movement.

**Tactual Style:** Learning through sensations and feelings, sense of touch and small motor experiences, use their hands.
Visual Style: Learning through seeing, need to see it, enjoy videos, movies, demonstrations, likes colors, visualization is easy, likes maps, graphic organizers, pictures.

**Note: Outline additional vocabulary you feel is important to the careers you discuss. Narrow down to top 10.**

Time needed
Seven days (50 minute periods each day).
**Your class may require more time. Lessons do not have to be consecutive days.**

**Day One:** Hook, A Great Place to Work PowerPoint, Starting Wright- STEMM Careers video, C.I.T.E Learning Styles Inventory

**Day Two:** Review CITE Learning Styles Inventory, Pre-test, Tic-Tac-Toe Menu Activities

**Day Three:** Starting Wright- How to Choose a Career video, 21 Seriously Cool Careers Activity

**Day Four:** We Use Math Activity, Tic-Tac-Toe Menu Activities

**Day Five:** Classroom Visit/Presentation from a professional whose job involves the use of math, Starting Wright- How Do You Get to a STEMM Career video

**Day Six:** Tic-Tac-Toe Menu Activities

**Day Seven:** Final discussion and wrap-up, post-test

Lesson
**DAY ONE: Hook:** Have students imagine the perfect workplace. Include some of the job duties involved in their line of work, their co-workers. As a large group, share some of the students’ choices. A common career may be computer game design or animation. Begin PowerPoint: *A Great Place to Work* (slides 1-6).

(15 minutes)

**Activity One: (20 minutes)**
Discuss that careers in the fields shown in the PowerPoint are all careers that involve the use of math. Many of the worksites look like the most exciting, fun environments to work in, but most certainly require skill in multiple areas including math.

*Ask:* What kind of training or degree do you think you might need in order to work in one of the fields mentioned? (possible answers: math, art, technology, etc.)

Introduce the Starting Wright Website. Draw students’ attention to the STEMM Careers Section.
- View *Starting Wright STEMM Careers Video.*
**Activity Two: (15 minutes)**
Ask how many students may be interested in a career in STEMM (by a show of hands).

Continue with a large group discussion about the importance of identifying your own interests and learning styles when considering a career path. Have the class brainstorm ways to gather this information about them. List student suggestions on board (possible answers may include: talk with teacher, parent, and/or counselor; write a personal journal; explore websites; complete interest surveys; review school grades).

Have students complete the *CITE Learning Styles Inventory* (see attached CITELearningStyles.pdf) and store in their Starting Wright Portfolio. Direct students who are not finished to take the inventory home and return to school tomorrow.

**Formative Assessment: One Sentence Summary**
Ask students to write a summary sentence that describes STEMM career areas.

**DAY TWO:**
**REVIEW** yesterday’s lesson. Concepts: What does STEMM mean?; Importance of identifying interests and learning styles when considering a career.

**Activity One: (20 minutes)**
With a partner, the student will share their own results of *CITE Learning Styles Inventory*.

Have a large group discussion on the importance of identifying your learning styles when preparing for a degree/certificate. Knowing how you learn best will assist you in developing strategies and study habits.

Discuss the opportunities a career in STEMM can offer a student in relationship to a career they find rewarding. It is important to know your interests when choosing a career so that you can increase the possibility of working in an area you find rewarding.

Ask students to recall some of the work environments viewed on the PowerPoint. Have students share what they like most about the work environments and record on board (possible answers: creative, collaborative, open, innovative, non-conformist, etc.)

Have students complete the *Pre-test*.

**Activity Two: (20 minutes)**
Pass out the *Tic-Tac-Toe Menu*. As a class, go over how to use the menu and activity expectations. Review the *Student Choice proposal form*, and grading rubric.
Direct students to review the activity choices. Have students individually select the three activities they would like to complete; begin work in class today. Once they have selected an activity, give each student the corresponding activity card while bringing student's attention to the time allowance/due date. Have students store the menu, rubric, and activity card in their Starting Wright Portfolio.

**DAY THREE:**

**Activity One: (20 minutes)**
Working in a triad, have students develop a list of things they find important when choosing a career (possible answers: work environment, job tasks, preparation including education/training, pay, benefits, availability of jobs in that field, etc.). Share the lists aloud as a large group.

- View the *Starting Wright- How to Choose a Career Video.*

**Activity Two: (30 minutes)**
Direct students to learn more about careers that use math. View the *21 Seriously Cool Careers PowerPoint* ([www.mathsinsider.com](http://www.mathsinsider.com)) and discuss the types of math skills used to perform the duties of a job in these career fields.

Using dyad grouping (possibly with another student with similar career interests), have pairs of students complete *Student Activity Sheet #1- Careers that Use Math.*

**Note: Students may need additional guidance and assistance with the last box on student activity sheet #1.**

**Formative Assessment: EXIT TICKET**
List three different types of math skills discussed today in any of the career fields.

**DAY FOUR:**

**Activity One: (25 minutes)**
Introduce the *We Use Math In Careers* website at [http://weusemath.org/?q=careers](http://weusemath.org/?q=careers)
Ask students to name some of the careers that use math that they have learned about so far. Show the *Sample Animator Career Info Sheet,* and identify the sections where information is listed to assist with completing Student Activity Sheet #2.

Students will complete *Student Activity Sheet #2- Career in Mathematics Concept Circle.* Students will need to complete a total of three concept circles for this assignment.
Activity Two: (20 minutes)

REVIEW:
Check progress on Tic-Tac-Toe Menu Activities. Answer any questions, address concerns.

Tic-Tac-Toe Menu Activities- Direct students to pull out Starting Wright portfolio and review the activity choices. Have students work on activities today in class and continue as homework.

Formative Assessment: Paper wad Response
Using two separate sticky notes, direct each student to list two careers they researched today with an explanation of how each uses math. Wad up papers and throw at the front of the room. Teacher directs students (by individual rows or tables) to come up to the front of the room, pick up one paper wad, and take back to their seat. Have students to volunteer reading their responses. Teacher records on board.

DAY FIVE:
Activity One: (30 minutes)
Set up a class visit from a professional working in a career field that uses math. Direct the students to record one question they have for the individual prior to the presentation that addresses “what” or “how” the presenter prepared for a career in this field and list one statement regarding something about a career in the presenter’s field that surprised or was of an interest to the student. Have students share their questions and statements aloud with the group.

Activity Two: (15 minutes)
Introduce the Starting Wright Website. Draw students’ attention to the STEM Careers Section.
• View Starting Wright- How Do You Get to a STEM Career Video.

DAY SIX:
REVIEW:
Check progress on Tic-Tac-Toe Menu Activities. Answer any questions, address concerns.

Tic-Tac-Toe Menu Activities- Direct students to pull out Starting Wright portfolio and review the activity choices. Have students work on activities today in class and continue as homework.

DAY SEVEN:
Activity One: (50 minutes)
Wrap up Post-test and Tic-Tac-Toe Menu Activities and presentations.

Optional Extensions
• Refer to any of the activities listed on the *Free Space: Student Choice Activity List*.

• As of late, there seems to be an increasing interest in video game designing. It is important that students interested in this career field have a good understanding of the skills, course requirements, program availability at the college level, and program qualifications/requirements/criteria for acceptance in the program. A good exploration activity connected to an interest in video game design would involve identifying the closet college offering this degree, the number of colleges across the nation offering this degree, the entrance/acceptance criteria, helpful high school courses and program availability, and possible career tech options.

~Visit DegreeDirectory.Org for more information on Which Ohio colleges offer Career Training in Video Game Design.


**Helpful Hints for Teachers**

• It will be important for you to conference with students on a daily basis during in-class, independent work time to check progress on Menu activities. Rather than giving a single end of the unit due date for activities, you may need to assign shorter due dates for each activity with certain students based on individual needs. Chunking activities into smaller parts with assigned due dates for each activity may be useful.

• Pick and choose activities from the Menu based on your student’s needs.

• Be sure to make accommodations for individuals with visual, auditory or physical disabilities. This might include enlarged worksheets and screen enlarging devices, text-to-speech software or peer reader, adapted mouse or keyboard with easy access to computer or use of laptop, or a peer scribe.


• Some students may benefit from adding lines in the tables or graphic circles on the student worksheets. This will provide them with a guide as to the teacher recommended length of their responses.

• Students and teachers alike are all too familiar with information being presented through the use of a PowerPoint. An additional tool for presenting information to students is Prezi. Prezi is a web-based presentation tool using a map layout and zooming to show contextual relationships. This is a new and cool way to present and organize information that focuses on combining text, images and multimedia. Learn more @ [http://prezi.com/](http://prezi.com/).
Helpful Hints for Parents

Parental encouragement and support is believed to have a positive impact on student planning and transition. Below are a few suggested activities in which you can provide opportunities for your child to explore and identify their own interests and abilities as it relates to career planning.

- Encourage student to seek on-site job shadowing experiences. Check with the school counselor for more information on job shadowing requirements/criteria.
- Help students identify skills.
- Help students identify the need to participate in math and science courses in high school.
- Encourage student to seek on-site job shadowing or volunteering experiences. Check with the school counselor for more information on job shadowing requirements/criteria. Contact local parks and museums for volunteering opportunities.
- Take advantage of identifying and practicing the use of math in everyday life.
- Encourage activities involving problem solving, puzzles, etc., including online games, activities and tutoring.

**For additional information and suggestions, see Appendix D**
### Tic-Tac-Toe Menu

<table>
<thead>
<tr>
<th>Create a What In the World Activity: a Photograph Scavenger Hunt. Take a minimum of 8 close-up photographs of math tools. Be sure to include an answer key.</th>
<th>Research 3 colleges offering a degree in the career/job of choice that uses math. Locate the type of degree and math, science and technology course requirements in this field of study.</th>
<th>Create a job posting for a career position at Google or Pixar. Include 3 or more math skills and the level of education required.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design eBook entries on your Top 3 Career Choices that involve the use of math using PowerPoint or Word document. Include picture, job description and title.</td>
<td><strong>FREE SPACE:</strong> Student Choice List the activity you chose to complete from the Activity List. Activity # ______ Title: ______________</td>
<td>Generate a list 7-8 common skills and interests of an electrical engineer or a mechanical engineer. Compare those skills to your own and predict whether or not you might be successful in this career field.</td>
</tr>
<tr>
<td>Teach 1 quick math trick to the class (use teacher provided website). Be sure to include a description of the math skill demonstrated and taught in the lesson, opportunities to practice the new skill, and a final test of 5 questions.</td>
<td>Research and report information on 5 famous mathematicians. Include an explanation of their contribution to mathematics and the world.</td>
<td>Collect different examples of how math is used in everyday life and describe. Include one example for each of the following areas of math: geometry, measurement, linear algebra, statistics, and mathematical models.</td>
</tr>
</tbody>
</table>

Name: _____________________________
**Student Activity Sheet #1 - Careers that Use Math**

**Directions:** While viewing *21 Seriously Cool Careers*, complete the table below.

Choose 3 Career Fields you liked or you feel you would be good at.

<table>
<thead>
<tr>
<th>Career Field 1: _____________________</th>
<th>Description of Math Skills:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Career Field 2: _____________________</td>
<td>Description of Math Skills:</td>
</tr>
<tr>
<td>Career Field 3: _____________________</td>
<td>Description of Math Skills:</td>
</tr>
</tbody>
</table>

Select one of the careers you listed above and answer:
Would you consider a career in this line of work?
YES or NO, and explain why or why not?

Describe 2 things you would do to help prepare for this career.
1.
2.
Name(s): ________________

Student Activity Sheet #2 - Careers in Mathematics Concept Circle

Directions: Go to the following website: http://weusemath.org/?q=careers
Select 3 career areas that use math to explore. Locate the information needed by clicking on the Career Title to view the individual Career Field Information Sheet. Complete a concept circle for each career field.

Career field: ____________________________
Appendix B: Teacher Materials

- **21 Seriously Cool Careers PowerPoint** - Source: www.mathsinsider.com
  **Refer to 21-seriously-cool-careers.pdf**
- **C.I.T.E Learning Styles Inventory** - Source: Harding University Academic Services Center @ http://www.harding.edu/arc/strategies.html
  **Refer to CITELearningStyles.pdf**

**Suggestions for Differentiation**

**Incorporate On-going Assessment** - Meaningful on-going assessments are needed to check student growth and progress. On-going assessment will provide the teacher with direct feedback to assist in determining appropriate instruction that may require adjusting approaches, choices, and scaffolding for varying individual student needs.

**Provide Activities that Promote Student Engagement** - Ensure each task is interesting, engaging, challenging, and accessible to essential understanding and skills. Provide opportunities that promote a balance between teacher vs. student-selected activities.

**Promote Varied Expectations and Requirements** - Be willing to adjust teacher expectations and requirements for student responses based on student needs.

**Integrate Multiple Flexible/Creative Grouping** - This grouping of students promotes cooperation and working with others, increases student participation and productivity, and maximizes opportunities to tailor instruction to students' performance levels.

**Include Formative Assessment** - This type of assessment helps teachers differentiate instruction with the primary purpose of checking for student understanding during the learning process rather than at the end of a unit of study. When used on a daily basis, formative assessment can guide instruction based on student performance and understanding while (or after) learning a new concept or process. Formative assessment supports learning by providing multiple and varied attempts for practice that will assist students toward improving their performance. This is a quick and easy way through individual, partner or group or work to use varying types of assessments that include clear expectations and descriptive student feedback.
“I’m Never Gonna Use This!”
Evaluating a STEMM Career in Mathematics

How to Use the Tic-Tac-Toe Menu

The Tic-Tac-Toe Menu is modeled after the Tic-Tac-Toe Game. It covers multiple activities (designed in the format of a 3 X 3 table) with eight predetermined choices and one Free Space Student Choice Activity. Each choice is based on the levels of Bloom’s Taxonomy. The student must complete 3 activities to form a tic-tac-toe win (vertical or diagonal pattern only). All choices carry the same weights and expectations for completion time and effort.

Benefits

Student Choice- Increases ownership and buy-in, allows for many choices for students. The student may choose an activity from the Student Choice Activity List to present as a proposal for the Free Space Student Choice Activity. A Student Choice Activity Proposal form must be completed and presented by the student and approved by the teacher before attempting.

Varied Learning Levels- Allows for individualized contracts for different learning levels within the classroom. Each student must complete a tic-tac-toe pattern (vertical, diagonal, or horizontal) consisting of 3 activities.

Versatility- The menu can address one topic or three different objectives. Covering three different objectives will require students to complete one activity from each column or row.

Special Considerations

Establishing Expectations- Teachers must establish and confirm clear understanding of student on expectations and guidelines of completing the menu. Student Choice must be clearly defined and discussed prior to beginning the menu including how to submit an activity proposal. Approved forms must be stapled to the student’s menu sheet.

Timeframe- This particular menu is designed to be completed within a 1-2 week timeframe. This will vary based on your students’ individual needs. Some activities may be completed at home as well as in class if more time is needed.

***Be sure to establish due dates at the start, and have students record this date on the menu.

Special Note: Print Menu and Rubric back-to-back.

Menu explanation is adapted from Prufrock Press Inc. λ Differentiating Instruction With Menus: Science by Laurie E. Westphal, 2007
### Tic-Tac-Toe Menu Rubric

<table>
<thead>
<tr>
<th>CRITERIA</th>
<th>EXCELLENT</th>
<th>GOOD</th>
<th>POOR</th>
<th>SELF</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Content:</strong>&lt;br&gt;Is the content of the product well chosen?</td>
<td>Content chosen represents the best choice for the product. Graphics are well chosen and related to content.</td>
<td>Information or graphics are related to content, but are not the best choice for the product.</td>
<td>Information or graphics presented does not appear to be related to topic or task.</td>
<td></td>
</tr>
<tr>
<td><strong>Completeness:</strong>&lt;br&gt;Is everything included in the product?</td>
<td>All information needed is included. Product meets the product criteria and the criteria of the task as stated.</td>
<td>Some important information is missing. Product meets the product criteria and the criteria of the task as stated.</td>
<td>Most important information is missing. The product does not meet the task, or does not meet the product criteria.</td>
<td></td>
</tr>
<tr>
<td><strong>Creativity:</strong>&lt;br&gt;Is the product original?</td>
<td>Presentation of information is from a new perspective. Graphics are original. Product includes an element of fun and interest.</td>
<td>Presentation of information is from a new perspective. Graphics are not original. Product has elements of fun and interest.</td>
<td>There is no evidence of new thoughts or perspectives in the product.</td>
<td></td>
</tr>
<tr>
<td><strong>Correctness:</strong>&lt;br&gt;Is all of the information included correct?</td>
<td>All information present in the product is correct and accurate.</td>
<td>N/A</td>
<td>Any portion of the information presented in the product is incorrect.</td>
<td></td>
</tr>
<tr>
<td><strong>Appropriate Communication:</strong>&lt;br&gt;Is the information in the product well communicated?</td>
<td>All information is neat and easy to read. Product is in appropriate format and show significant effort. Oral presentations are easy to understand and presented with fluency.</td>
<td>Most of the product is neat and easy to read. Product is in appropriate format and shows significant effort. Oral presentations are easy to understand, with some fluency.</td>
<td>The product is not neat and easy to read or the product is not in the appropriate format. It does not show significant effort. Oral presentation was not fluent or easy to understand.</td>
<td></td>
</tr>
</tbody>
</table>

---

Directions: Pick an activity from the list below to complete as your Free Space Student Choice Activity. Complete a Student Proposal form and turn-in to teacher for approval. Refer to Activity Cards for completion directions and criteria.

- Create a crossword puzzle consisting of careers in mathematics.
- Create an acrostic poem for the term MATHEMATICS.
- Create an advertisement persuading the consumer to consider a career in mathematics. Be sure to include the level of education and math courses/skills requirements.
- Design an informational presentation describing tools used by an animator or video game designer.
- Visit and complete activities at the Start Where You Are website. Click on grade level be sure to complete the explore jobs section and record/print results.
  http://www.startwhereyouarevt.org/
- Visit the Alleyoop; College Readiness Network for Teens. Evaluate the site’s usefulness for high school students. List three ways you found the site to be helpful and at least one thing you would change to improve the site.
Appendix C: Assessments Part One

Pretest/Post-test
Name: _________________________ Date: _____
Period: _______

A STEMM Career in Mathematics: Pre-Test

Directions: Answer all questions below to the best of your ability.

11. What does STEMM mean? ________________________________

12. List three high school courses that would help prepare you for a career in STEMM?
   a. ___________ b. ___________ c. ___________

13. Name three careers that involve using math.
    a. ___________ b. ___________ c. ___________

14. What do you need to consider when planning a career?
    __________________________________________
    __________________________________________
    __________________________________________

15. Describe how you learn best (learning style).
    __________________________________________
    __________________________________________

16. Make a list of words (5-7 words) that describe the environment in which you learn the best.
    ___________ ___________ ___________ ___________
    ___________ ___________

17. Choose one tool you use to solve problems involving math and describe how you use it to perform a task.
    Tool: ______________________________
    How you use it to perform a task: ______________________________
    ______________________________________________
    ______________________________________________

18. Name the closest college where you can earn a degree in your career field of choice.
    Career Field: ________________________________
    College: ______________________________________

19. List any requirements or qualifications for entrance into your chosen career field program at this college.
    ________________________________________________
    ________________________________________________
A STEMM Career in Mathematics: Post-Test

**Directions:** Answer all questions below to the best of your ability.

1. **What does STEMM mean?** Science, Technology, Engineering, Math, and Medicine

2. List three high school courses that would help prepare you for a career in STEMM?
   a. answers will vary  
   b. calculus  
   c. trigonometry

3. Name three careers that involve using math.
   a. answers will vary  
   b. statistician  
   c. mechanical engineer

4. **What do you need to consider when planning a career?**
   Own interests, skills, and abilities; the courses I need to take in high school; the courses I will take in college when working toward a degree; what type of degree is needed for a career in my chosen career field; tuition costs at possible colleges offering a degree in my career field of choice; my own independent living skills and desires.

5. Describe how you learn best (learning style).
   Answers will vary

6. Make a list of words (5-7 words) that describe the environment in which you learn the best.
   answers will vary

7. Choose one tool you use to solve problems involving math and describe how you use it to perform a task.
   Tool: answers will vary
   How you use it to perform a task: answers will vary

8. Name the closest college where you can earn a degree in your career field of choice.
   Career Field: answers will vary
   College: answers will vary

9. List any requirements or qualifications for entrance into your chosen career field program at this college.
   answers will vary
Assessments Part Two

Portfolio
Students will maintain a portfolio of artifacts generated from the Starting Wright project.

Tic-Tac-Toe Menu & Rubric: Menu is adapted from the childhood game of Tic-Tac-Toe. Students select from a list of projects with various levels of difficulty creating a tic-tac-toe pattern (vertical or diagonal only). Activities are arranged according to Bloom's Taxonomy with the third row consisting of activities requiring a presentation to the class.

**Refer to Student Materials for Tic-Tac-Toe Menu & to Teachers Materials for Rubric and Student Choice Activity List.**
Dear Parent(s):

It is important for students transitioning from high school to postsecondary education to build a repertoire of tools to better prepare themselves for achieving their goals. Developing strategies and skills that will enable them to become independent, responsible learners is critical in this process. The activities in this unit provide students the opportunity to explore their own learning style. This exploration allows the student to identify how best they learn. You can assist the student by reviewing the results of the CITE Learning Styles Inventory or visiting http://www.harding.edu/arc/strategies.html. Students can map out a plan of how they can create an environment that is most conducive to their own individual learning style.

You can assist the student in preparing for success in college by visiting

- Improving Your Concentration: Factors You Can Control Now from K-State Counseling Services at http://www.k-state.edu/counseling/topics/career/concentr.html
- How to Study: A Brief Guide by W.J. Rapaport from State University of New York at Buffalo http://www.cse.buffalo.edu/~rapaport/howtostudy.html

An additional way in which you can support the student’s interest in a career in Math would be to encourage the use of online support networks and tools. One recommended tool is Alleyoop: College Readiness Network for Teens by Pearson. This site is designed to support students and families with the ultimate purpose of getting “them on track for success in college”. It offers online step-by-step videos, one-on-one tutoring, personalized practice activities, and additional math tools and strategies. http://www.alleyoop.com/?utm_source=google&utm_medium=cpc&utm_term=Math%2BFun&utm_campaign=Prototype-2011-Math

Also recommended as an online activity that the student can complete individually or with a parent is Start Where U Are website http://www.startwhereyouarevt.org/. This site allows the student to explore job sections and complete related exploration activities. Students can begin by clicking on the appropriate grade level and complete the explore jobs section. Activities are categorized by grade level and offer a record or results of student performance on these activities.
Appendix E: Additional Resources

- PowerPoint: A Great Place to Work, 21 Seriously Cool Careers that Use Math
- Additional resources
  ~ Career Interviews [http://plus.maths.org/content/Career](http://plus.maths.org/content/Career)
  ~ Easy Cal 4 Glad To Teach.co.uk [http://www.youtube.com/user/glad2teach](http://www.youtube.com/user/glad2teach)
  ~ Fast math tricks [http://www.youtube.com/watch?v=j9t-gYnPNaW](http://www.youtube.com/watch?v=j9t-gYnPNaW)
  ~ Fast math tricks of calculation [http://www.youtube.com/watch?v=hldKsKep1og&feature=relmfu](http://www.youtube.com/watch?v=hldKsKep1og&feature=relmfu)
  ~ Harding University: Learning Styles [http://www.harding.edu/arc/strategies.html](http://www.harding.edu/arc/strategies.html)
  ~ Math careers top 40 [http://weusemath.org/?q=careers](http://weusemath.org/?q=careers)
  ~ Math is So Easy [http://www.youtube.com/watch?v=qAHNPfoyPFY&feature=related](http://www.youtube.com/watch?v=qAHNPfoyPFY&feature=related)
  ~ Starting Wright STEMM Careers Videos
  ~ We Use Math video [http://weusemath.org/?q=weusemathvideo](http://weusemath.org/?q=weusemathvideo)
Area: Technology, Communication, Career Interviews, Career Research

STEMM Career Connection: Applicable to all future professions

Title: Career Spotlight

Grade Levels: Eighth – Twelfth

Academic Content Areas: All Content Areas

Topics: Career Selection, Career Investigation

Goal: Students are inspired to learn more about STEMM careers/their future careers by gaining first-hand knowledge.

Performance Objectives: Students will be able to
1. share the insight and knowledge gained regarding a specific (STEMM) career via an interview with a professional in the field.

Big Question
What does it take to be employed in a particular (STEMM) field?

Brief Summary
These mini lessons are designed to serve as an introduction or follow-up to a unit in any CORE content area. The purpose of these activities is for students to expand their knowledge of a career connected to the subject area by interviewing a professional in the field.

Main Ideas
Students will expand upon their communication skills and build their knowledge base of a career they are interested in which is tied directly to an academic unit of study.

Content Standards
TECHNOLOGY

Standard 3: Technology for Productivity Applications- Students learn the operations of technology through the usage of technology and productivity tools.
B. Identify, select and apply appropriate technology tools and resources to produce creative works and to construct technology-enhanced models.

Standard 4: Technology and Communication Applications - Students use an array of technologies and apply design concepts to communicate with multiple audiences, acquire and disseminate information and enhance learning.
A. Communicate information technologically and incorporate principles of design into the creation of messages and communication products.
B. Create, publish and present information, utilizing formats appropriate to the content and audience

**Standard 5: Technology and Information Literacy** - Students engage in information literacy strategies, use the Internet, technology tools and resources, and apply information-management skills to answer questions and expand knowledge.

C. Formulate advanced search strategies, demonstrating an understanding of the strengths and limitations of the Internet, and evaluate the quality and appropriate use of Internet resources.

**ENGLISH LANGUAGE ARTS - Writing Process Standard**

**8-10:** Use revision strategies to improve the style, variety of sentence structure, clarity of the controlling idea, logic, effectiveness of word choice and transitions between paragraphs, passages or ideas.

D. Edit to improve sentence fluency, grammar and usage.

**Writing Applications**

Produce informational essays or reports that convey a clear and accurate perspective and support the main ideas with facts, details, examples and explanations.

**Writing Conventions**

Use correct spelling conventions.

Use correct punctuation and capitalization.

Demonstrate understanding of the grammatical conventions of the English language.

**Communication: Oral and Visual Standard**

Use a variety of strategies to enhance listening comprehension.

Demonstrate an understanding of effective speaking strategies by selecting appropriate language and adjusting presentation techniques.

Give informational presentations that present ideas in a logical sequence, include relevant facts and details from multiple sources and use a consistent organizational structure.

**Materials**

- Notecards
- Student Assignment Description, Rubric, Peer Review Worksheet, Good/Bad Interview, Interview Evaluation Form
- Recording device: paper & pencil, laptop, iPod, tape recorder, camera, camcorder
- Teacher list of possible careers related to unit of study
- Videos of interviews/career spotlights – Suggested example: Starting Wright – STEMM Careers or Great Minds in STEMM
- Phone
Preparation for Lesson

- Copy: Student Assignment Description, Rubric, Peer Review Worksheet, Good/Bad Interview Chart, Interview Evaluation Form
- Share this activity with colleagues to help facilitate the list of careers and agencies available to students
- Prepare a list of careers related to the current unit of study
- Prepare a list of agencies, local and otherwise, (with contact information) in which employment in these areas is available
- Send home parent letter and project calendar

Vocabulary

**Interview** – a meeting at which information is obtained (such as those by newspaper and television reporters)

**Interviewer** – The individual who is asking questions in an interview in order to gain information

**Interviewee** – The individual who is being asked questions in an interview in order to share their information

**Career** – A profession for which one trains and which is undertaken as a permanent calling

Time Needed

4 days – can be spread out as needed (Time varies per day).

*Day One:* Warm-up activity, universal questions, research (full period)

*Day Two:* proof read of individual questions (10-30 minutes)

*Day Three:* practice interviews (20-30 minutes)

*Day Four:* presentation of interview findings (full day)

Lessons

**Day 1: Hook:** Show a brief video that outlines and/or interviews a person in a career field related to your current unit of study (See suggested videos in additional resources). Following the video, discuss with students other career fields which are related to your current topic or unit. Ask students what type of questions they would have for the individual in the video. Write down ideas the student generate on the board.

If no related video is available:

**Hook (option 2):** Ask students to imagine that sometime in the future they are being interviewed by a reporter who wants to write a column about their career. Let them brainstorm a short list of things they would and would not like to occur in the interview. Create a "T" chart of scenarios and questions that they believe would be appropriate and not appropriate during the interview.

**Follow up activity for both:** Discuss with students the importance of asking the “right” questions when given the opportunity. This shows the interviewee that you're interested and know what information you are looking for.

Pass out a notecard to each student and ask them to write one good “general” interview question for someone in a related profession to this current unit of study.

After a few minutes, have students share their question ideas and write down their ideas on the board.

Have students vote on the top five general questions which everyone will later use in their interviews.

Provide students the opportunity to research their selected profession for the remainder of the period.

This will help them generate more appropriate specific questions for the rest of their interview.
**Homework:** (1) Students are to identify someone in a related career field to interview for this assignment. (2) Task the students with creating a minimum of 5 additional specific questions for their interview. Questions must be specific to the career they will be interviewing in. At least one question must be related to the education/preparation required to gain employment in that field.

**Day 2:** While the teacher circulates the room to proof read students’ interview questions, the students take turn peer-editing their questions as well. Students must provide feedback to their classmates on their questions using the peer review worksheet. Provide structured editing and revision time as needed. Once questions are revised, provide direct assistance to those students who require help in locating and scheduling an interview with a professional in the field.

**Day 3:** Practice Interviews. Students are paired with a partner, preferably someone who has selected the same or similar career. Circulate the room and encourage students to use appropriate body language, mature word choice, respectful tone of voice, etc... The student being interviewed should be instructed to make up their answers as best as their knowledge allows and to take this seriously so when they are practicing delivering their interview questions they feel respected as well. The student interviewer needs to practice taking notes/recording so they are prepared for their interview.

**Day 4:** Interview presentations. Students are provided class time to present their final report on their interviews. Options for reports are listed below under assessments.

**Optional Extensions**
- As a challenge to students, and as a motivational tool ask students to identify someone who works in their selected field who has a disability similar to their own. Suggestions for locating interviewees with disabilities are offered under “Additional Resources.”
- Thank you cards – This is an ideal opportunity to teach students the importance of sending a thank you card after an interview. Work collaboratively with the language arts teacher to help the students create well-written formal thank you letters to send to those they interviewed.

**Helpful Hints for Teachers**
These lessons are designed to be user friendly in a variety of academic settings. These activities could also be used as part of a career investigation unit rather than tied to specific academic areas. As soon as students have scheduled an interview, contact the interviewee yourself. Contact letter and interview evaluation forms are included under teacher resources. It may be beneficial to call the individual being interviewed as well. Some suggestions for differentiation are listed within the teacher materials section. Do not hesitate to go above and beyond the suggestions provided there. Make use of the students’ IEPs as well as the creative solutions you and your colleagues use on a daily basis. General differentiation suggestions could include modifying a worksheet or handout so there are larger spaces between questions to accommodate poor fine motor skills. Additionally, many students benefit from the addition of lines on which to write their responses. Simple accommodations like providing a child the opportunity for oral responses, a personal copy of notes and/or handouts, enlarged copies or copies on colored paper can be done with any of these activities. A suggested timeline is available under teacher resources. Incorporating the due dates and in-class activity dates onto a calendar that is sent home with the parent letter would be an ideal method of helping students organize their time and prioritize their work.

**Helpful Hints for Parents** – See Appendix D for Parent Note and Suggested Home Activities
Appendix A: Student Materials

Career Spotlight
A huge part of your high school experience will be getting ready for the next stage of your life. In class we spend a great deal of time learning about math, science, social studies, and language arts. What we don’t always see is how someone can use these topics “in the real world.” Each quarter we will be reviewing the topics we have discussed and locating jobs which are connected to these topics. After these jobs have been determined, it will be your job to find someone in one of these careers and interview them.

Project Requirements:
- Contact a professional in your chosen career.
- Schedule an interview with this individual.
- Generate a pre-approved list of questions for the professional to answer.
- Interview the individual – this can be in person, over the phone or via Skype. The interview must be recorded in some manner.
- Complete a presentation which shares the information you learned. Presentation options are listed on the next page.

Interview Requirements: You will be expected to create and ask questions which will provide you enough information to inform your classmates about this career. Some suggestions:
- Education/training requirements
- Career opportunities – where can you do this job? How “in demand” is this field?
- Working conditions
- Day-to-day responsibilities
- Positives
- Negatives
- Other...

Timeline: A calendar of all due dates is attached.
Grading: The rubric for this assignment is attached.
Good Interview/Bad Interview Comparison (Day 1, Warm-Up Option 2)

Name: _____________________________ Date: _____
Period: _______

Good Interviews vs. Bad Interviews

**Directions:** Think about newspapers, magazines and T.V. shows – what are good interview questions and what are bad interview questions. If someone were to interview you about your job, what are questions you would be okay answering and what questions would you not want to answer?

<table>
<thead>
<tr>
<th>Appropriate Interview Questions</th>
<th>Inappropriate Interview Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### PEER REVIEW WORKSHEET (Day 2)

#### Writing (Circle one per category)

<table>
<thead>
<tr>
<th>Category</th>
<th>No spelling errors.</th>
<th>Few spelling errors.</th>
<th>Many spelling errors.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spelling</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grammar</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sentence Structure</td>
<td>All sentences/questions are complete and logical.</td>
<td>Few questions that are either incomplete or do not make sense.</td>
<td>Most of the questions are incomplete or do not make sense.</td>
</tr>
<tr>
<td>Sentence Style</td>
<td>The words used in the questions are clear and connected to the career.</td>
<td>Most of the words used in the questions are clear and connected to the career.</td>
<td>There are many errors in word choice.</td>
</tr>
</tbody>
</table>

#### Organization (Circle one per category)

<table>
<thead>
<tr>
<th>Category</th>
<th>Purpose</th>
<th>Flow</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purpose</td>
<td>The purpose of all of the questions is clear.</td>
<td>The questions flow/transition from one to another in a logical order.</td>
<td>The purpose of many of the questions is unclear.</td>
</tr>
<tr>
<td>Flow</td>
<td>Most of the questions flow/transition in a logical order.</td>
<td>The transition and connection between questions is confusing or unclear.</td>
<td></td>
</tr>
</tbody>
</table>

#### Content (circle one per category)

<table>
<thead>
<tr>
<th>Category</th>
<th>Relevant to learning more about this career.</th>
<th>Not relevant to learning more about the career.</th>
<th>Not relevant to learning more about the career.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relevance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thoroughness</td>
<td>There were enough questions to provide me with a complete understanding of this career.</td>
<td>There were not quite enough questions to help me really understand this career.</td>
<td>There were not at all enough questions to help me understand this career.</td>
</tr>
</tbody>
</table>

What are some questions you have for the author after reading their interview questions?

What is one of the strongest questions?

What do you think the author should change to improve their interview?

What do you think the author should add to improve their interview?
The rubric below explains how you will be graded for this project. If you have any questions, please talk to me ASAP! 😊

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setting Up the Interview</td>
<td>The student introduced himself, explained why he wanted to interview the person, and asked permission to set up a time for an interview.</td>
<td>The student introduced himself and asked permission to set up a time for the interview, but needed reminders to explain why he wanted to do the interview.</td>
<td>The student asked permission to set up a time for the interview, but needed reminders to introduce him/herself and to tell why he wanted to interview the person.</td>
<td>The student needed assistance in all aspects of setting up the interview.</td>
</tr>
<tr>
<td>Preparation</td>
<td>Before the interview, the student prepared several in-depth and factual questions to ask.</td>
<td>Before the interview, the student prepared a couple of in-depth questions and several factual questions to ask.</td>
<td>Before the interview, the student prepared several factual questions to ask.</td>
<td>The student did not prepare any questions before the interview.</td>
</tr>
<tr>
<td>Formatting &amp; Editing</td>
<td>The student edited and organized the transcript in a way that made the information clear and interesting.</td>
<td>The student edited and organized the transcript in a way that made the information clear.</td>
<td>The student edited and organized the transcript but the information was not as clear or as interesting as it could have been.</td>
<td>The student did not edit or organize the transcript.</td>
</tr>
<tr>
<td>Politeness</td>
<td>Student never interrupted or hurried the person being interviewed and thanked him/her for being willing to be interviewed.</td>
<td>Student rarely interrupted or hurried the person being interviewed and thanked him/her for being willing to be interviewed.</td>
<td>Student rarely interrupted or hurried the person being interviewed, but forgot to thank the person.</td>
<td>Several times, the student interrupted or hurried the person being interviewed and forgot to thank the person.</td>
</tr>
<tr>
<td>Final Presentation</td>
<td>The presentation is well organized and contains accurate quotations and facts taken from the interview.</td>
<td>The presentation is well organized and contains accurate facts taken from the interview.</td>
<td>The presentation contains accurate quotations and facts taken from the interview.</td>
<td>The presentation lacks facts/quotations from the interview or they are not accurately reported.</td>
</tr>
</tbody>
</table>
**Appendix B: Teacher Materials**

*Good Interview/Bad Interview Comparison (Day 1, Warm-Up Option 2)*

**Good Interviews vs. Bad Interviews**

**Directions:** Think about newspapers, magazines and T.V. shows – what are good interview questions and what are bad interview questions. If someone were to interview you about your job, what are questions you would be okay answering and what questions would you not want to answer?

<table>
<thead>
<tr>
<th>Appropriate Interview Questions</th>
<th>Inappropriate Interview Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOME POSSIBLE GUIDING QUESTIONS FOR STRUGGLING STUDENTS:</td>
<td>This column is not only to help those students who don’t understand the difference between</td>
</tr>
<tr>
<td>- Did you have to go to college?/Do you need a bachelor’s/Masters/M.D./PhD etc.?</td>
<td>appropriate and inappropriate questions, but also provides a place for students who tend to</td>
</tr>
<tr>
<td>- Are there colleges around here that offer that program?</td>
<td>act out/be the class clown/seek attention. This provides them a forum for their inappropriate</td>
</tr>
<tr>
<td>- What classes did you take in college?</td>
<td>responses and allows you to use them as a teachable moment to those who struggle to differentiate.</td>
</tr>
<tr>
<td>- How easy/hard was it to find a job in this field?</td>
<td>- Personal questions (about family, friends, possessions, girlfriends/boyfriends) etc...</td>
</tr>
<tr>
<td>- Can you work around here with this job?</td>
<td>- Questions about salary that are not correctly phrased (politely asked or worded)</td>
</tr>
<tr>
<td>- Is it easy to get a promotion?</td>
<td>- Any question that uses inappropriate language (“Is your boss a jerk?”)</td>
</tr>
<tr>
<td>- What classes did you take in high school to help prepare you for this?</td>
<td>- Questions otherwise unrelated to the interviewee’s job</td>
</tr>
<tr>
<td>- Did you get good grades in high school?</td>
<td></td>
</tr>
<tr>
<td>- What can I do now to help me prepare for this job?</td>
<td></td>
</tr>
</tbody>
</table>
Dear Colleague,

Recently, you were contacted by a high school student in our district. They have contacted you as part of an on-going career investigation project. You have been selected because you currently work in a field of interest for this student. We would like to extend our sincerest gratitude to you for taking the time to help this learner gain first-hand insight into their chosen profession. As I’m sure you remember, a key role in the high school experience is preparing students for their transition into life after high school. Whether students choose to pursue additional post-secondary training, enter the military or workforce has a great deal to do with their experiences in high school. Knowing this, we feel that providing students with opportunities to explore career fields as they relate to the curriculum gives students the chance to see exactly how these academic standards relate to “real life.”

Many of the students conducting these interviews receive services through our special education department. For them, this interview process not only assists in learning more about future careers, but it also helps them build their communication and self-advocacy skills. For some, this interview will be a true eye-opening experience as to the realities of what it takes to be successfully employed after they graduate. With this in mind, we are looking to create a teachable moment from the interviews. Enclosed you will find an interview evaluation form and a self-addressed stamped envelope. If you could take a moment and provide us some feedback on the student’s performance, we will use this to help the student improve upon his/her skills for the next set of interviews. If you have any questions, please do not hesitate to contact me. I can be reached at the following:

e-mail: ____________________________

Phone: ____________________________

Yours in education, NAME
INTERVIEWER EVALUATION FOR: __________________________:
INTERVIEWEE Name: __________________ DATE: ____________

<table>
<thead>
<tr>
<th>KEY</th>
<th>PURPOSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>NS: NOT SATISFACTORY</td>
<td>This evaluation is to provide feedback as to how the student performed while conducting their interview. Please be honest as this review will be used in combination with the student’s classroom presentation and recording of the interview transcript to calculate their grades.</td>
</tr>
<tr>
<td>S: SATISFACTORY</td>
<td></td>
</tr>
<tr>
<td>VS: VERY SATISFACTORY</td>
<td></td>
</tr>
<tr>
<td>NA NOT APPLICABLE</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CRITERIA</th>
<th>NS</th>
<th>S</th>
<th>VS</th>
<th>NA</th>
<th>COMMENTS: (Be Specific)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONTACT: Student set up the interview in an appropriate manner: phone, email, letter, etc. Student introduced him/herself and explained why they were contacting you.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>APPEARANCE: Appropriately dressed, grooming, body language, eye contact</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BEHAVIOR: Student introduced him/herself appropriately. Students behaved in a well-mannered, polite and mature way. Did not interrupt or rush your responses. Thanked you at the close of the interview.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMMUNICATION SKILLS:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student spoke slowly and presented his/her questions in a clear and direct manner. Student repeated him/herself as needed for clarification. Student used appropriate language.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Day 2 & 3 – Peer Edit & Practice Interviews

Suggestions for Differentiation
To ensure that all students take this task seriously, be sure to incorporate a grade of some sort into both of these activities. A possible suggestion (for day 2) would be to have the students earn two grades. First, a grade on their peer review and second, a grade on the corrections they make to their own questions based on the results of the peer review. For day 3, a suggestion would be to have each student make compliments, suggestions and corrections for their partner to help improve the outcomes (A copy of this form is found under additional resources). Some students will benefit greatly from a model or think aloud of this activity. You may want to do this after having viewed a sample interview (day 1).

When pairing the students, be sure to pair students with disabilities with peers who will be able to model appropriate suggestions to them. Be very careful when pairing students with behavioral needs as they will need additional monitoring to maintain on-task activities.

Some students will need to be able to complete the peer review with an electronic copy of the evaluation sheet. You could also have one student read their interview questions and another respond to evaluation prompts orally as needed.

Suggestions for Differentiation for Interview
Many students will struggle to successfully communicate while interviewing their selected professional. Allow these students to pre-record their list of questions so that they have a safety net in case they become too nervous to conduct the interview. Additionally, some students may benefit greatly from conducting their interview via Skype or even simply through email if they are unable to communicate orally. Though this will eliminate the “recorded interview” requirement, students may attach printouts of the emails to include in their final submission. If necessary, allow students to interview a professional with a buddy, this will eliminate a great deal of anxiety for the students and it will allow them to use each other's skill base when conducting the interview.
<table>
<thead>
<tr>
<th>Sunday</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
<th>Saturday</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LABOR DAY</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>NO SCHOOL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>11</td>
<td>12</td>
<td>13</td>
<td>14</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>12 Day 1-</td>
<td></td>
<td></td>
<td></td>
<td>16</td>
<td>Day 2 – Peer</td>
</tr>
<tr>
<td></td>
<td>Career</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>review of</td>
</tr>
<tr>
<td></td>
<td>Interview</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Interview</td>
</tr>
<tr>
<td></td>
<td>Project Begins</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>questions (have</td>
</tr>
<tr>
<td></td>
<td>HOMEWORK</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 copies – 1 to</td>
</tr>
<tr>
<td>11</td>
<td></td>
<td>13</td>
<td>14</td>
<td>15</td>
<td>16</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td></td>
<td>20</td>
<td>21</td>
<td>22</td>
<td>23</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>23</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25</td>
<td></td>
<td>27</td>
<td>28</td>
<td>29</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Presentations</td>
<td>30</td>
<td>Presentations (if needed)</td>
</tr>
</tbody>
</table>
Appendix C: Assessments

**Portfolio** - Students will maintain a portfolio of all of the career interviews they conduct over the course of the year.

**Presentation Options**

**How-to- become a _______________ Brochure** – Students use the information gained from their interview to create a “how to” brochure which advertises the process needed to enter into the career selected.

**Job Description & Job Application** – Students create a formal job description flyer which could be used by a company when looking to recruit new employees. Additionally, students are to create a job application for the position they interviewed. Application form must include all of the information a company would require of an applicant to determine if they were qualified for this position.

**“Me Bag”** – Student creates a “me bag” used to introduce the interviewee & their career to the class. Similar to the beginning of the year “me bag” idea – students must fill a small bag or container with items that represent the career of the individual they interviewed. The bag should consist of at least 5-10 objects or images as well as a key or written report which explains each object.

**Resume** – Students are to create a hypothetical resume for the individual they interviewed. Must include: “objective,” “education,” “related experience,” “awards and activities” (if applicable) and “computer skills.”

**“Show and Tell”** – Students can share an editing portion of the video of their interview with their classmates with a question and answer session after the viewing of the video.

**Essay** – Students will write an informative essay outlining the information gained through their interview.

**Power Point** – Have students create a power point that depicts the information gained in their interview.

The rubric on the following page serves only as a guideline. You may want to separate the final presentation from the rubric and create a rubric solely for use with student presentations.
## Rubric

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setting Up the Interview</td>
<td>The student introduced himself, explained why he wanted to interview the person, and asked permission to set up a time for an interview.</td>
<td>The student introduced himself and asked permission to set up a time for the interview, but needed a reminder to explain why he wanted to do the interview.</td>
<td>The student asked permission to set up a time for the interview, but needed reminders to introduce himself/herself and to tell why he wanted to interview the person.</td>
<td>The student needed assistance in all aspects of setting up the interview.</td>
</tr>
<tr>
<td>Preparation</td>
<td>Before the interview, the student prepared several in-depth and factual questions to ask.</td>
<td>Before the interview, the student prepared a couple of in-depth questions and several factual questions to ask.</td>
<td>Before the interview, the student prepared several factual questions to ask.</td>
<td>The student did not prepare any questions before the interview.</td>
</tr>
<tr>
<td>Formatting &amp; Editing</td>
<td>The student edited and organized the transcript in a way that made the information clear and interesting.</td>
<td>The student edited and organized the transcript in a way that made the information clear.</td>
<td>The student edited and organized the transcript but the information was not as clear or as interesting as it could have been.</td>
<td>The student did not edit or organize the transcript.</td>
</tr>
<tr>
<td>Politeness</td>
<td>Student never interrupted or hurried the person being interviewed and thanked him/her for being willing to be interviewed.</td>
<td>Student rarely interrupted or hurried the person being interviewed and thanked him/her for being willing to be interviewed.</td>
<td>Student rarely interrupted or hurried the person being interviewed, but forgot to thank the person.</td>
<td>Several times, the student interrupted or hurried the person being interviewed and forgot to thank the person.</td>
</tr>
<tr>
<td>Final Presentation</td>
<td>The presentation is well organized and contains accurate quotations and facts taken from the interview.</td>
<td>The presentation is well organized and contains accurate quotations and facts taken from the interview.</td>
<td>The presentation contains accurate quotations and facts taken from the interview.</td>
<td>The presentation lacks facts/quotations from the interview or they are not accurately reported.</td>
</tr>
</tbody>
</table>
Appendix D: Notes for Parents

Dear Parents,

A key role in the high school experience is preparing students for their transition into life after high school. Whether students choose to pursue additional post-secondary training, enter the military or workforce has a great deal to do with their experiences in high school. Knowing the gravity of this decision we feel that providing students with opportunities to explore career fields is an opportunity which is uniquely related to the high school curriculum. Being able to see exactly how these academic standards relate to “real life” is a key piece of the school puzzle and helps tie “favorite classes” to outside interests and future careers. As we explore various units this year, your child will be tasked with selecting a career which is related to the material we are studying. They will then be asked to interview someone in this field in order to learn more about the position. Through this experience, we will be providing your child the first step toward planning for life after high school.

As we work to develop the career exploration with your child, we ask that you assist us in encouraging your son/daughter to think about what path they may take. Talk to them about their interests, their strengths and their weaknesses. Enclosed you will find some suggested activities which you can use to become a member of the team we are creating. If you have any questions, please do not hesitate to contact me.

Phone: ____________________________

E-mail: ____________________________

Yours in education,

NAME
Suggested Home Activities

- Explore college and career options together. There is a wealth of information available online, some options include:
  - http://stats.bls.gov/k12/
  - http://stats.bls.gov/oco/
  - http://www.cosi.org/educators/mentoring/cosi-academy/
  - http://knowhow2goohio.org/
  - http://www.mappingyourfuture.org/
  - http://www.myfuture.com/careers/
  - http://www.startwhereyouarevt.org/road/

- Take college visitation days (students have release days in their junior and senior years). The summer months are an excellent time for students to visit campuses and get a feel for the environment.

- Participate in Take your Child to Work days. This is great not only for your son or daughter but also for you to show them the day-to-day responsibilities of having a full time job.

- Introduce your son/daughter to friends and colleagues who work in fields that interest your child.

- Discuss your child’s academics with him/her to ensure they are taking the right classes for the career they hope to pursue.

- If your child is on an IEP, help them achieve their dreams! There are many STEMM careers which are appropriate for individuals with all levels of abilities. Be creative when exploring career options in all professional fields.
Appendix E: Additional Resources

DAY 3 OPTIONAL HANDOUT

Peer Review with Perfection!

There are three steps to good peer review:

1. **Compliment** the author
   * What are a few things that you liked about the interviewer's questions?
   * What are a few things you liked about the WAY they asked their questions?

2. Make specific **suggestions** regarding the author’s
   - Word choice
   - Organization
   - Presentation (the way they delivered their questions)

3. Mark **corrections** on your worksheet
   - Note grammar mistakes, missing question topics, concerns with speech, facial expressions, nervous habits, etc...

In addition, remember to:

- Stay positive!
- Be specific!
Additional Resources
DAY 3 OPTIONAL PEER REVIEW W.S.
Name: ________________________________ Date: ________
Period: _______________________________

Practice Interview
Directions: As you and your partner work together to practice being both the interviewer and the interviewee, you need to take a moment to provide the interviewer with feedback that will help them do a better job when it is time for their official interview.
Use your Peer Review with Perfection handout to help you complete the following:

1) **Compliment** – List at least 1 compliment for your partner.

2) **Suggestions** – What are at least 2 suggestions you have to help your partner give the best interview they can?

3) **Corrections** – Please list any mistakes you noticed or corrections that need to be made.
Additional online resources

- http://ohcis.intocareers.org/
- http://stats.bls.gov/k12/
- http://stats.bls.gov/oco/
- http://www.cosi.org/educators/mentoring/cosi-academy/
- http://knowhow2goohio.org/
- http://www.mappingyourfuture.org/
- http://www.myfuture.com/careers/
- http://www.startwhereyouarevt.org/road/

Suggestions for finding employees with disabilities

Department of Labor website -- Office of Disability Employment Policy http://www.dol.gov/odep/. They have lots of info for and on businesses hiring people with disabilities, and there could be a list of companies and contacts there.

Companies with strong track records for inclusive hiring:
From http://www.disaboomjobs.com/

Look for more suggestions at your local and regional disability and rehabilitation organizations.

- Aetna
- Cisco Systems
- Home Depot
- IBM
- Kaiser Permanente
- Marriott
- Merrill Lynch
- Proctor & Gamble
- Sodexo
- Starwood Hotels and Resorts

http://www.gettinghired.com/


http://www.opm.gov/disability/

http://www.ourpeoplework.org/
Area: Technology

STEMM Career Connection: Engineering

Title: Talk the Walk, Walk the Talk

Grade Levels: Ninth - Twelfth

Academic Content Areas: Technology and Engineering

Topics: History of technological development

Goal: Students are inspired to pursue STEMM careers.

Performance Objectives:
   Students will be able to:
   1. research and use multiple methods to communicate information about an Ohio inventor and their invention.

Big Question
What impact do inventors and the technology they developed have on the societies they lived in, today's life style, and the future?

Summary
This is a research based project. Students will become familiar with the Dayton Inventors River Walk and the inventors honored on the walk. Students will select an inventor or invention they are interested in. They will research the inventor's life and the technology associated with his/her invention.

Main Ideas
Engineers recognize and identify problems that exist in their lives and the lives of people around them. After defining the problem they begin a design process to solve these problems through inventions and innovations. The only thing not designed by engineers is nature. The impact of the inventor on our lives cannot be over stated.

Content Standards
Technology Standards
   Standard 2: Technology and Society Interaction
      Benchmark C: Interpret and evaluate the influence of technology throughout history, and predict its impact on the future.
Standard 4: Technology and Communication Applications

Benchmark A: Apply appropriate communication design principles in published and presented projects.

Benchmark B: Create, publish and present information, utilizing formats appropriate to the content and audience.

Standard 5: Technology and Information Literacy

Benchmark A: Determine and apply an evaluative process to all information sources chosen for a project.

Benchmark B: Apply a research process model to conduct research and meet information needs.

Benchmark C: Formulate advanced search strategies, demonstrating an understanding of the strengths and limitations of the Internet, and evaluate the quality and appropriate use of Internet resources.

Benchmark D: Evaluate choices of electronic resources and determine their strengths and limitations.

Social Studies Standards

History
Students use materials drawn from the diversity of human experience to analyze and interpret significant events, patterns and themes in the history of Ohio, the United States and the world.

Benchmark B: Explain the social, political and economic effects of industrialization.

Materials
- Library
- Computer with internet access
- Word processing software (“Microsoft Word”)
- Presentation software (“Microsoft Power Point”)
- Publication software (“Microsoft Publisher”)
- Printer

Preparation for Lesson
- Download and review power point presentations “Walk the Talk” and “Walk Photos”.
- Have “Talk the Walk student work sheets”, list of inventors “Dayton Inventors River Walk”, and the MLA guide or APA guide printed for the class.

Vocabulary
Definitions are provided from dictionary.com.

Innovation - something new or different introduced: numerous innovations in the high-school curriculum; the act of innovating; introduction of new things or methods.
Invention—the act of inventing; U.S. Patent Law. a new, useful process, machine, improvement, etc., that did not exist previously and that is recognized as the product of some unique intuition or genius, as distinguished from ordinary mechanical skill or craftsmanship; anything invented or devised.

Time needed
15 minutes classroom time minimum to discuss Power Point presentation “Walk the Talk.” Additional time may be used in class for student research and projects. If classroom time is not available students may complete all work outside of class.

Day One:
• Show power point presentation “Walk the Talk”
• Time permitting show power point presentation “Walk Photos”
• Handout student worksheet Talk the Walk, Walk the Talk, Project Assessment List, and the MLA or APA Quick Reference Guide
• Discuss with students how and when you expect them to conduct their research and the following due dates.
  o Research complete
  o 1st assessment due date
  o 2nd assessment due date
  o 3rd assessment due date

Optional Extensions
Many students have family or friends who work in STEMM fields and on design teams. Give them permission to use them. You will find these projects some of the most informative. Have the student conduct interviews or ask their acquaintance to speak to the class.
Use the lesson 24/7 to make a Gantt chart for the project. Have the class make a joint calendar with checkpoints or milestones using Gantt Designer. Free download is available at http://timios.net/Gantt/.

Helpful Hints for Teachers
This is easily collaborated with Social Studies, English, Science, and Technology teachers. Students may have trouble finding information on the more recent inventors. Have them research the invention and patents with the inventor’s name. If the inventor is a working engineer the student may have to write a letter or email the inventor to get information. You may have to extend due dates if the inventor is slow to respond.
Recommend you allow at least one day in a computer lab for students to start their research. It will be easier to discover which students will have trouble researching and need extra assistance.
Schedule several dates to check student progress. Give the students a calendar of these dates and what is due on each date.
Encourage students to keep a bibliography file up to date as they research.
The best season to visit the Dayton River Inventors Walk is in the spring or fall.
Helpful Hints for Parents
Local libraries usually have a research desk and research assistants who can help your student. Take your student to the library as soon as possible in the project. Help your student make a project calendar with specific due dates for tasks. Check local bus schedules and alternative transportation to the library.
Appendix A: Student Worksheet

Talk the Walk, Walk the Talk

Name: __________________________ Due Date: ____________

Complete the following:

_____ Select an inventor from the Dayton Inventors River Walk list and have your teacher approve your selection.

   Inventor’s Name: __________________________ Teacher Initials __________

_____ Conduct research to find the following information for your inventor

   • Personal information to include
     o Date and place of birth
     o Family members
     o Schools attended
     o Work place or company
     o Historical events and life style of their time

   • Technical description of invention.
     o New technologies
     o New application of old technologies

   • How the invention worked and was used.
     o Inputs and outputs

   • The impact of the invention on society.
     o How was life easier or better?

   • How the invention has changed since it was first invented
     o What is the newest model or version?

_____ Submit a bibliography in APA or MLA format of your research. Your teacher will select the format.

Use the Quick Reference Guide and the website easybib.com to assist you.

_____ Select three projects to complete from the “Project Assessment List”. Select one from each point group. A total of 100 points can be earned.

   Project A: _____________________________ Pts. ___
   Project B: _____________________________ Pts. ___
   Project C: _____________________________ Pts. ___
Total Points Earned ____

**Project Assessment List**

Pick three projects. A project from each group earns up to 100 points.

**Group A:** Each project is worth 20 points.
- Make a cover for the DVD being made about your inventor’s life.
- Make a notebook cover insert (8 ½ by 11) on your inventor.
- Make a poster about your inventor.
- Make a 3-fold sales brochure for your inventor.

**Group B:** Each project is worth 30 points.
- Make a commercial about your inventor’s device and perform it for the class.
- Make a “YouTube” video about your inventor. Show it to the class.
- Write a 2 page (double spaced) prefix for your inventor’s autobiography.
- Write a personal letter from your inventor to someone he/she would be associated with describing their invention, why it is important, and any social issue that may be important to the inventor.

**Group C:** Each project is worth 50 points.
- Write a 5-10 page report based on your research. (double spaced)
  - Cover
  - Table of contents
  - Personal information
  - Invention
  - Bibliography in proper format
- Write a technical report on your inventor’s accomplishment(s).
- Write a power point presentation based on your research.
- Write a resume for your inventor.

**Bonus:** (10 points) Take a picture of yourself on the Dayton Inventors River Walk. Add an additional 5 points if you also take a picture next to your inventor’s plaque.
## Dayton Inventors River Walk

This list contains the names of inventors associated with the Dayton, Ohio region and honored on the Dayton Inventors River Walk. A second list is provided of the region’s legions not listed on the walk.

<table>
<thead>
<tr>
<th>Name</th>
<th>Invention</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Fischer (1858)</td>
<td>Cabbage cutter</td>
</tr>
<tr>
<td>A. Geiger (1860)</td>
<td>Vapor lamp</td>
</tr>
<tr>
<td>Abbott A Lane &amp; John M. Hentzel Jr. (1991)</td>
<td>Improved firefighter’s helmet</td>
</tr>
<tr>
<td>Alfred Sinclair (1920)</td>
<td>Musical tuner</td>
</tr>
<tr>
<td>Allen B. Farquhar (1916)</td>
<td>Seeder and fertilizer distributor</td>
</tr>
<tr>
<td>Berton I. Rike (1919)</td>
<td>Garment bag container</td>
</tr>
<tr>
<td>Charles E. Taylor (1956)</td>
<td>Wright flyer engines</td>
</tr>
<tr>
<td>Charles Francis Jenkins (1894)</td>
<td>Motion picture projector</td>
</tr>
<tr>
<td>Chris &amp; Keith Meyers (1997)</td>
<td>Solar powered refrigerator for storing vaccine in 3rd world countries</td>
</tr>
<tr>
<td>Christian Shiveley (1876)</td>
<td>Differential power system that enables only one wheel to turn on an axle</td>
</tr>
<tr>
<td>Christopher Ward (1979)</td>
<td>internal car trunk release</td>
</tr>
<tr>
<td>D.E. McSherry (1869)</td>
<td>Dropping device for seeding machines</td>
</tr>
<tr>
<td>Daniel W. Schaeffer</td>
<td>Gas mask</td>
</tr>
<tr>
<td>David A. Harlow (1988)</td>
<td>Tree band to kill gypsy moth caterpillars</td>
</tr>
<tr>
<td>Dr. Jerrold Petrofsky (1980)</td>
<td>Biomedical engineering, computerized electrical stimulation for paralyzed muscles</td>
</tr>
<tr>
<td>Dr. L.E. Custer (1894)</td>
<td>Electric oven to fuse dental porcelain</td>
</tr>
<tr>
<td>Inventor/Team</td>
<td>Invention/Invention Details</td>
</tr>
<tr>
<td>---------------------------------------------------</td>
<td>------------------------------------------------------------------</td>
</tr>
<tr>
<td>Dr. Roy Joseph Plunkett (1939)</td>
<td>Teflon coating</td>
</tr>
<tr>
<td>Dr. W. F. Hochstetter (1939)</td>
<td>1st method for recycling paper</td>
</tr>
<tr>
<td>Dr. William H Church (1930)</td>
<td>Cellophane wrap</td>
</tr>
<tr>
<td>E.R. Churchwell (1949)</td>
<td>Collapsible baby crib</td>
</tr>
<tr>
<td>Eli W. Shawn &amp; Albert C. Arnett (1922)</td>
<td>Soda based compound water softener</td>
</tr>
<tr>
<td>Ermal C Fraze (1957)</td>
<td>Pop top cans</td>
</tr>
<tr>
<td>Floyd Smith (1919)</td>
<td>Free falling parachute</td>
</tr>
<tr>
<td>Fred Deweaver (1983)</td>
<td>Electric propulsion system</td>
</tr>
<tr>
<td>Fred Kohnle (1944)</td>
<td>Price labeling machine</td>
</tr>
<tr>
<td>Fredrick Hoover (1966)</td>
<td>Front wheel drive car</td>
</tr>
<tr>
<td>Geoffry Kruesi (1935)</td>
<td>Autopilot compass used in aircraft</td>
</tr>
<tr>
<td>George Lockwood (1973)</td>
<td>Semiconductor memory device</td>
</tr>
<tr>
<td>George T. Brown &amp; Lewis E. Blankley (1979)</td>
<td>Thermometer strips for taking your temperature on your forehead</td>
</tr>
<tr>
<td>George Walther (1920)</td>
<td>Cast steel wheels used for trucks and cars</td>
</tr>
<tr>
<td>Gilen W. Buchanon (1931)</td>
<td>Hair curling and wave device</td>
</tr>
<tr>
<td>Gino R. Santi (1950)</td>
<td>Aircraft ejection seat design with automatic seatbelt release and pilot separation devices</td>
</tr>
<tr>
<td>Guenther Hartfell (1989)</td>
<td>Post card that hid secret messages behind the post label</td>
</tr>
<tr>
<td>Gustav &amp; Gordon Koehler</td>
<td>Inflight refueling for the USAF</td>
</tr>
<tr>
<td>Invention</td>
<td>Inventor</td>
</tr>
<tr>
<td>---------------------------------------------</td>
<td>-----------------------------------------</td>
</tr>
<tr>
<td>Electric mouse trap</td>
<td>H. L. &amp; R.G. Ratchford (1946)</td>
</tr>
<tr>
<td>Super knocker toy</td>
<td>Hank Bower (1971)</td>
</tr>
<tr>
<td>Ticket printer and issuing machine</td>
<td>Hoakon A. Martin (1917)</td>
</tr>
<tr>
<td>Sales book with removable hard cover to duplicate sales receipts</td>
<td>Ira Reynolds (1869)</td>
</tr>
<tr>
<td>Harvester</td>
<td>J. B. McCormick (1870)</td>
</tr>
<tr>
<td>Mill spindle</td>
<td>J. C. Gentry (1839)</td>
</tr>
<tr>
<td>Silicon alloy castings</td>
<td>James A Parsons (1933)</td>
</tr>
<tr>
<td>Automated golf practice tee</td>
<td>James H. Mann (1982)</td>
</tr>
<tr>
<td>Hydraulic system to wash tracker trailer trucks</td>
<td>Joe Singleton (1990)</td>
</tr>
<tr>
<td>Parking meter enhancements</td>
<td>John B. Martin (1930)</td>
</tr>
<tr>
<td>Step ladder</td>
<td>John Balsley (1862)</td>
</tr>
<tr>
<td>Non-fissionable plutonium generator for space travel</td>
<td>John Birden &amp; Ken Jordan (1862)</td>
</tr>
<tr>
<td>Agriculture engineer developed the Moraine Honey Locust tree</td>
<td>John D. Siebenthaler (1949)</td>
</tr>
<tr>
<td>Fare register counter</td>
<td>John F. Ohmer (1895)</td>
</tr>
<tr>
<td>Low powered spark plug for use in jet engines</td>
<td>John J. “Jack” Rose (1930)</td>
</tr>
<tr>
<td>Liquid crystal display use in watches and calculators</td>
<td>John L. Janning (1974)</td>
</tr>
<tr>
<td>Rail gun to destroy nuclear missiles in the air</td>
<td>John M. Justin &amp; John P. Barber (1991)</td>
</tr>
<tr>
<td>Innovations for refrigeration and automobiles air conditioning</td>
<td>John Murphy</td>
</tr>
<tr>
<td>Name</td>
<td>Invention/Innovation</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>John Osborn (1947)</td>
<td>Patient navigated bed for paraplegics</td>
</tr>
<tr>
<td>John V. Mcmanis (1915)</td>
<td>Osteopathic table</td>
</tr>
<tr>
<td>John Vander Kam (1983)</td>
<td>Recumbent bike</td>
</tr>
<tr>
<td>John Virage (1917)</td>
<td>Signal and gate operating for railroad crossings</td>
</tr>
<tr>
<td>John Wyant (2000)</td>
<td>School backpack with zippered extensions</td>
</tr>
<tr>
<td>Joseph Hopkinson (1916)</td>
<td>Pendulum scale</td>
</tr>
<tr>
<td>Joseph R Desch (1944)</td>
<td>Code cracking machine (cracked the Japanese code in WW II)</td>
</tr>
<tr>
<td>Joseph Sabatino (1949)</td>
<td>Fishing box to hold rod, reel, and flies for fly fishing</td>
</tr>
<tr>
<td>Ken Mabee &amp; Bill Richards</td>
<td>No rub no buff car wax</td>
</tr>
<tr>
<td>Leland Clark (1950)</td>
<td>1st heart-lung machine</td>
</tr>
<tr>
<td>Levitt Luzern Custer (1930)</td>
<td>Self-propelled wheelchair</td>
</tr>
<tr>
<td>Lincoln F. Brown (1892)</td>
<td>Improved bridal bit for horses</td>
</tr>
<tr>
<td>Louis Tamburino (1982)</td>
<td>Terrain following device for aircraft on low altitude missions</td>
</tr>
<tr>
<td>Lysie Cahill &amp; Bill Giorog</td>
<td>Laser jet printer, 1st scanning system for mapping the moon</td>
</tr>
<tr>
<td>M. Mellinger (1867)</td>
<td>Cane stripper</td>
</tr>
<tr>
<td>Marc J. Moor (1991)</td>
<td>Note pads, pens, and magnetic mirrors for student’s lockers</td>
</tr>
<tr>
<td>Martin E. Sieber (1953)</td>
<td>Cigar lighter worn like a watch</td>
</tr>
<tr>
<td>Maurice Krug</td>
<td>Space food and juice for astronauts</td>
</tr>
<tr>
<td>Inventor/Maker</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Max Issacson</td>
<td>Manually operated heart lung machine</td>
</tr>
<tr>
<td>Max M. Haenet &amp; Gary N. Kilmer (1992)</td>
<td>Printing forms</td>
</tr>
<tr>
<td>Michael A. Gehron (1955)</td>
<td>“Jaws of Life” rescue device</td>
</tr>
<tr>
<td>Orville and Wilber Wright (1901)</td>
<td>1st horizontal wind tunnel and Wright Flyer</td>
</tr>
<tr>
<td>Paul Creswell &amp; Robert Kelly (1938)</td>
<td>Line painting machine for road lane lines</td>
</tr>
<tr>
<td>Percy Pierce (1919)</td>
<td>Toy airplane</td>
</tr>
<tr>
<td>Peter N. Von Schalk (1966)</td>
<td>AMU astronaut maneuvering unit backpack</td>
</tr>
<tr>
<td>Pierce D. Schenck (1912)</td>
<td>High silicone material that does not corrode</td>
</tr>
<tr>
<td>Pierre L. Crease (1968)</td>
<td>Laptop computer in a briefcase</td>
</tr>
<tr>
<td>Priscilla S. Franklin &amp; Frederick L. Jones (19180)</td>
<td>Tamper proof labels</td>
</tr>
<tr>
<td>R. M. Marshall (1861)</td>
<td>Candy rolling machine</td>
</tr>
<tr>
<td>Radames K. H. Gebel</td>
<td>“Cat-eye” night vision system</td>
</tr>
<tr>
<td>Rafael A. Genzales (1941)</td>
<td>Artificial palm tree to cool rooms</td>
</tr>
<tr>
<td>Richard Troharne (1972)</td>
<td>Water purifier to remove acids from mine water</td>
</tr>
<tr>
<td>Robert A. Gill (1996)</td>
<td>Signal locator for locating crashed aircraft</td>
</tr>
<tr>
<td>Robert Kauffman (9190)</td>
<td>Dip stick for measuring oil reservoirs</td>
</tr>
<tr>
<td>Invention Description</td>
<td>Inventor and Year</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>Traffic counter “gap counter”</td>
<td>Robert Wert (1962)</td>
</tr>
<tr>
<td>Dental repair kit for use on space missions</td>
<td>Roman Szpur (1963)</td>
</tr>
<tr>
<td>Aerosol foam carrying agent</td>
<td>Roy H. Horn</td>
</tr>
<tr>
<td>Thrill-coupling device</td>
<td>Samuel Bippus (1874)</td>
</tr>
<tr>
<td>Ticker tape machine use by Wall Street</td>
<td>Samuel Spahr Lewis (1867)</td>
</tr>
<tr>
<td>Dog leash system to secure dogs in the back of pickup trucks</td>
<td>Sandra S. Werner (1997)</td>
</tr>
<tr>
<td>“Pin-it” shirt marker</td>
<td>Sidney Orthwin (1945)</td>
</tr>
<tr>
<td>Electromagnetic signal devices for aircraft</td>
<td>Stanley B. White (1960)</td>
</tr>
<tr>
<td>Horse racing starting gate</td>
<td>Stephen Phillips (1950)</td>
</tr>
<tr>
<td>Cash register paper</td>
<td>Theodore Schirmer (1912)</td>
</tr>
<tr>
<td>Gasoline additive to eliminate knocking in engines</td>
<td>Thomas Midgley (1921)</td>
</tr>
<tr>
<td>Mail chute for tall buildings</td>
<td>Tom Payne (1884)</td>
</tr>
<tr>
<td>Soft baby carrier</td>
<td>Tracy C. Roan &amp; Amy E. Glosh (1998)</td>
</tr>
<tr>
<td>Bicycle parking brake</td>
<td>Verion D. Downing (1986)</td>
</tr>
<tr>
<td>Long distance electrical grids to bring electricity to the countryside</td>
<td>Vincent G. Apple (1919)</td>
</tr>
<tr>
<td>Adjustable spotlight</td>
<td>Walter Stiner (1921)</td>
</tr>
<tr>
<td>Glucose counter for diaetics</td>
<td>Wayne F. March (1977)</td>
</tr>
<tr>
<td>Modular arched bridge</td>
<td>William Lockwood (1986)</td>
</tr>
<tr>
<td>Name</td>
<td>Invention</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>---------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Charles F. Kettering (1940)</td>
<td>Held 140 patents from electric starters for cars to aerial torpedoes</td>
</tr>
<tr>
<td>Edward Andrews Deeds (1900)</td>
<td>Electric motors and cash registers (NCR and Delco) Dayton-Wright Airplane Company</td>
</tr>
<tr>
<td>Harold E. Talbott (1915)</td>
<td>3rd Secretary of the Air Force, Dayton’s part of the Manhattan Project</td>
</tr>
<tr>
<td>John H. Patterson (1900)</td>
<td>Factory design, 1st “daylight factory”, cash registers (NCR)</td>
</tr>
</tbody>
</table>
Appendix B: Teacher Resources
“Walk the Talk” Power Point Slides review

Dayton Inventor River Walk
- Located on Monument Avenue between Main and Riverside Drive
- Dayton Inventors River Walk begins on the corner of Main and Monument with an 8x10 plaque
- Dayton has more inventions per capita than any other city in the United States
- Tribute to over 100 different inventors
- Life-size replica of the Wright Flyer
- Bigger than life pop-top cans
- Beautiful gardens and more
- Plaques are placed on both sides of the river and across the two bridges on Main and Riverside

Inventors Inventors Inventors
- Read the list of inventors
- Select an inventor or invention that interest you
- Research the inventor
  - Personal life (family, home, school, work)
  - Society and times the inventor lived in
- Inventions
  - How did they work?
  - What technology was used?
  - How has the invention develop since then and what will it look like in the future?
  - What effect did the invention have on the lives of the people living at that time?

Deliverables
Select three projects you want to do. A maximum of 100 points can be earned.

Group A:
- Each project is worth 20 points.
  - Make a cover for the DVD being made about your inventor's life.
  - Make a notebook cover insert (8 1/2 x 11) on your inventor.
  - Make a poster about your inventor.
  - Make a 3-fold sales brochure for your inventor.

Group B:
- Each project is worth 30 points.
  - Make a commercial about your inventor's device and perform it for the class.
  - Make a "You Tube" video about your inventor. Show it to the class.
  - Write a 2 page (double spaced) paper for your inventor's autobiography.
  - Write a personal letter from your inventor to someone they/they would be associated with describing their invention, why it is important, and any social issue that may be important to the inventor.

Group C:
- Each project is worth 50 points.
  - Write a 5-10 page report based on your research. (double spaced)
    - Cover
    - Table of contents
    - Personal Information
    - Invention
    - Bibliography in proper format
  - Write a technical report on your inventor's accomplishments.
  - Write the power point presentation based on your research. Present in class.
  - Write a resume for your inventor.

Bibliography Formats
MLA - Modern Language Association
- Used primarily in English, History, general research documents
APA - American Psychological Association
- Used in the science, engineering and technology communities

Web resources:
- easybib.com
- citationmachine.net
“Walk Photo” Power Point Slides review
Appendix C: Assessments

Project Assessment List

Pick three projects. A project from each group earns up to 100 points.

**Group A:** Each project is worth 20 points.
- Make a cover for the DVD being made about your inventor’s life.
- Make a notebook cover insert (8 ½ by 11) on your inventor.
- Make a poster about your inventor.
- Make a 3-fold sales brochure for your inventor.

**Group B:** Each project is worth 30 points.
- Make a commercial about your inventor’s device and perform it for the class.
- Make a “You Tube” video about your inventor. Show it to the class.
- Write a 2 page (double spaced) prefix for your inventor’s auto biography.
- Write a personal letter from your inventor to someone he/she would be associated with describing their invention.

**Group C:** Each project is worth 50 points.
- Write a 5-10 page report based on your research. (double spaced)
  - Cover
  - Table of contents
  - Personal information
  - Invention
  - Bibliography in proper format
- Write a technical report on your inventor’s accomplishment(s).
- Write a power point presentation based on your research.
- Write a resume for your inventor.

**Bonus:** (10 points) Take a picture of yourself on the Dayton Inventors River Walk. Add an additional 5 points if you also take a picture next to your inventors plaque.
Appendix D: Quick Reference Guide APA
## Appendix E: Quick Reference Guide MLA

<table>
<thead>
<tr>
<th>Source Type</th>
<th>MLA Format</th>
<th>Example</th>
</tr>
</thead>
</table>
| Book        | Last, First M. *Book*. City Published: Publisher, Year Published. Print.  
| Chapter/Anthology | **MLA**  
Last, First M. *Section Title*. Book/Anthology. Ed. First M. Last. Edition. City Published: Publisher, Year Published. Page Range. Print.  
| Magazine     | **MLA**  
Last, First M. “Article title.” Magazine Day Month Year: Page(s). Print.  
| Newspaper    | **MLA**  
Last, First M. “Article Name.” Newspaper Day Month Year: Page(s). Print.  
| Journal      | **MLA**  
| Website      | **MLA**  
Last, First M. “Website Article.” Website. Publisher, Day Month Year. Web. Day Month Year.  
| Online Database (Journal) | **MLA**  

*Note that months in MLA are abbreviated. For example, “February” is “Feb.”*
Area: All

**STEMM Career Connection:** Computer Scientist, Biologist, Scientist

**Title:** Great Minds Survey

**Grade Levels:** Ninth - Twelfth

**Academic Content Areas:** Science, Technology, Engineering, Mathematics, and Medicine

**Topics:** Physical Science; Science and Technology; Scientific Inquiry; Data Analysis and Probability; Data Analysis and Probability

**Goal:** Students are inspired to pursue STEMM careers.

**Performance Objectives:**
- Students will:
  1. Increase their awareness of STEMM professions.
  2. Consider pursuing a STEMM career.

**Big Question**
How does this “Great Mind” demonstrate a STEMM career?

**Brief Summary**
In this lesson students will view a video of an individual who has demonstrated success in a STEMM career.

**Main Ideas**
Many individuals with a variety of backgrounds and abilities have been and continue to be successful in STEMM careers. As students watch the video based on a “Great Mind” they will record challenges and accomplishments. Students will also have an opportunity to explore STEMM careers.

**Content Standards**

**Science Grades 9-10:** Scientific Ways of Knowing
**Benchmark D:** Recognize that scientific literacy is part of being a knowledgeable citizen.

**Science Grades 9-10:** Earth and Space Sciences
**Benchmark F:** Summarize the historical development of scientific theories and ideas issues in earth and space science.

**Science Grades 9-10:** Life Sciences
Benchmark J: summarize the historical development of scientific theories and ideas issues in life science.

Science Grades 9-10: Physical Sciences
Benchmark H: Trace the historical development of scientific theories and ideas, and describe emerging issues in the study of physical science.

Scientific Ways of Knowing
Students realize that the current body of scientific knowledge must be based on evidence, be predictive, logical, subject to modification and limited to the natural world. This includes demonstrating an understanding that scientific knowledge grows and advances as new evidence is discovered to support or modify existing theories, as well as to encourage the development of new theories. Students are able to reflect on ethical scientific practices and demonstrate an understanding of how the current body of scientific knowledge reflects the historical and cultural contributions of women and men who provide us with a more reliable and comprehensive understanding of the natural world.

Science and Society

Grade Twelve
7. Describe the current and historical contributions of diverse peoples and cultures to science and technology and the scarcity and inaccessibility of information on some of these contributions.
8. Recognize that individuals and society must decide on proposals involving new research and the introduction of new technologies into society. Decisions involve assessment of alternatives, risks, costs and benefits and consideration of who benefits and who suffers, who pays and gains, and what the risks are and who bears them.

Materials
- Computer
- Survey sheet

Safety
Use only appropriate websites.

Preparation for Lesson
- Preview Great Minds video.
- Copy Great Minds survey sheet.
- Provide information to parents.

Vocabulary
Definitions provided by www.dictionary.com
STEMM – Science, Technology, Engineering, Mathematics, Medicine
Biologist – a specialist in biology
Engineer – a person trained and skilled in the design, construction, and use of engines or machines, or in any of various branches of engineering: a mechanical engineer; a civil engineer.
Geologist – a person who specializes in geologic research and study.
Geology - the science that deals with the dynamics and physical history of the earth, the rocks of which it is composed, and the physical, chemical, and biological changes that the earth has undergone or is undergoing.
**Inventor** - a person who invents, especially one who devises some new process, appliance, machine, or article; one who makes inventions.

**Physics** – the science that deals with matter, energy, motion, and force.

**Physicist** – a scientist who specializes in physics.

**Time needed**
**One day (part of a 50 minute period) for each video**
**Day One:** Introduction, Video, complete survey, share information with a friend or class, assessment

**Lesson**
Administer pretest.
Introduce video. Vocabulary can be used in introduction and assessment. Students could add their own terms to the vocabulary list.
Watch video and complete survey.
Discuss video as a class or in small groups.
Administer posttest.

**Optional Extensions**
Ask a person in a STEMM career to come speak to your students. There may be a family member or friend in a STEMM profession who would be willing to visit your class.
Have students share their Great Minds Survey with their parents/guardians.

**Helpful Hints for Teachers**
This is a short lesson. One video could be shown or students could view the series of videos. The videos could be shown as a class or students could watch the videos independently. The assessments could be assigned as homework instead of using class time.
Surveys and keys in a multiple choice format are provided for each video in the Great Minds series. [See Appendix A.]
Students working on note taking skills might benefit from a less structured survey. A generic survey with a short response format is also provided. [See Appendix C.]
Some students may need to view the video multiple times. It would be beneficial for students to work at their own pace at individual computers.
Invite professionals involved in STEMM careers to visit your students. If you cannot arrange to have STEMM professionals visit your class have students explore STEMM websites.
Provide information to parents with a schedule of days that videos will be shown in class.
Have a word wall with STEMM terms and definitions. Give students an opportunity to add terms to the word wall.

**Helpful Hints for Parents**
Visit websites for STEMM careers. If you have friends that are employed in a STEMM career ask them if they would be willing to talk to your young person. Watch for opportunities for your young person to volunteer or job shadow in a STEMM career.
Here are terms included in this video series. You might want to talk to your young person about these terms. You might also add additional terms to the list as you watch the videos.
**Vocabulary**

STEMM – Science, Technology, Engineering, Mathematics, Medicine

Biologist – a specialist in biology

Engineer - a person trained and skilled in the design, construction, and use of engines or machines, or in any of various branches of engineering: a mechanical engineer; a civil engineer.

Geologist – a person who specializes in geologic research and study.

Geology - the science that deals with the dynamics and physical history of the earth, the rocks of which it is composed, and the physical, chemical, and biological changes that the earth has undergone or is undergoing.

Inventor - a person who invents, especially one who devises some new process, appliance, machine, or article; one who makes inventions.

Physics – the science that deals with matter, energy, motion, and force.

Physicist – a scientist who specializes in physics.
Appendix A: Student Survey Sheet

Name:_________________________________________________    Date: ____________

Circle the correct answer.
Add observations in the space at the bottom of the page.

1. Who is the STEMM professional featured in this video?
   A. Isaac Newton    B. Alan Mathison Turing    C. Alexander Bell    D. Jane Goodall

2. What type of STEMM profession is represented?
   A. biologist    B. geologist    C. computer scientist    D. inventor

   B. What challenge(s) did this person have to overcome? Choose all that apply.
   A. severe stuttering    B. new kind of job    C. many failed experiments    D. unpopular job

   C. How did they overcome those challenges?
   A. Gave up    B. worked hard at their job    C. learned more    D. did not give up

   D. What are the job responsibilities of the person featured in this video?
   A. Inventing    B. research    C. helping animals    D. medical experiments

Additional Observations:
Survey Key
Answers will vary. The survey format should vary depending on the ability of the students. Some students may need to give answers orally. Write the title on the board for students to copy if needed. A multiple choice answer version might be an option.

Alan Mathison Turing (Key)

1. Who is the STEMM professional in this video?
   A. Isaac Newton   B. Alan Mathison Turing   C. Alexander Bell   D. Jane Goodall

2. What type of profession is represented?
   A. biologist   B. geologist   C. early computer scientist   D. inventor

   B. What challenges did this person have to overcome?
   A. severe stuttering   B. new kind of job   C. many failed experiments   D. unpopular job

   B. How did they overcome those challenges?
   A. Gave up   B. worked hard at their job   C. learned more   D. did not give up

   B. What were the job responsibilities of the person featured in this video? Choose all that apply.
   A. Inventing   B. research   C. helping animals   D. medical experiments

Additional observations:
Answers will vary.
Alexander Bell

Name:_________________________________________________ Date: ____________

Circle the correct answer.

Add observations in the space at the bottom of the page.

1. Who is the STEMM professional featured in this video?
   A. Isaac Newton  B. Alan Mathison Turing  C. Alexander Bell  D. Jane Goodall

2. What type of STEMM profession is represented?
   A. biologist  B. geologist  C. computer scientist  D. inventor

3. What challenge(s) did this person have to overcome? Choose all that apply.
   A. Parents could not hear well  B. new kind of job
   C. many failed experiments  D. unpopular job

4. How did they overcome those challenges?
   A. Gave up  B. worked hard at their job  C. learned more  D. did not give up

5. What are the job responsibilities of the person featured in this video?
   A. Inventing  B. research  C. helping animals  D. medical experiments

Additional observations:
**Alexander Bell (Key)**

1. Who is the STEMM professional featured in this video?
   - A. Isaac Newton  
   - B. Alan Mathison Turing  
   - C. Alexander Bell  
   - D. Jane Goodall

2. What type of STEMM profession is represented?
   - A. biologist  
   - B. geologist  
   - C. computer scientist  
   - D. inventor

3. What challenge(s) did this person have to overcome? Choose all that apply.
   - A. Parents could not hear well  
   - B. new kind of job  
   - C. many failed experiments  
   - D. unpopular job

4. How did they overcome those challenges?
   - A. Gave up  
   - B. worked hard at their job  
   - C. learned more  
   - D. did not give up

5. What are the job responsibilities of the person featured in this video?
   - a. Inventing  
   - b. research  
   - c. helping animals  
   - d. medical experiments

**Additional observations:**
Answers will vary.
Jane Goodall

Name: _______________________________ Date: ____________

Circle the correct answer.

Add observations in the space at the bottom of the page.

1. Who is the STEMM professional featured in this video?
   A. Isaac Newton  B. Alan Mathison Turing  C. Alexander Bell  D. Jane Goodall

2. What type of STEMM profession is represented?
   A. Biologist  B. Geologist  C. computer scientist  D. inventor

3. What challenge(s) did this person have to overcome? Choose all that apply.
   A. severe stuttering  B. new kind of job
   C. no formal training in career  D. unpopular job

4. How did this person overcome those challenges?
   A. Gave up  B. worked hard at their job  C. learned more  D. did not give up

5. What are the job responsibilities of the person featured in this video?
   A. Inventing  B. research  C. helping animals  D. medical experiments

Additional Observations:
Jane Goodall (Key)
1. Who is the STEMM professional featured in this video?
   A. Isaac Newton        B. Alan Mathison Turing    C. Alexander Bell        D. Jane Goodall

2. What type of STEMM profession is represented?
   A. biologist        B. geologist        C. computer scientist        D. inventor

3. What challenge(s) did this person have to overcome? Choose all that apply.
   A. severe stuttering        B. new kind of job
   C. no formal training in career        D. unpopular job

4. How did this person overcome those challenges?
   A. Gave up        B. worked hard at their job        C. learned more        D. did not give up

5. What are the job responsibilities of the person featured in this video?
   A. Inventing        B. research        C. helping animals        D. medical experiments

Additional Observations:
Answers will vary.
Afred Nobel

Name:_________________________________________________  Date: _____________

Circle the correct answer.

Add observations in the space at the bottom of the page.

1. Who is the STEMM professional featured in this video?
   A. Isaac Newton    B. Alfred Nobel    C. Alexander Bell    D. Jane Goodall

2. What type of STEMM profession is represented?
   A. Biologist    B. Geologist    C. computer scientist    D. inventor

3. What challenge did this person have to overcome?
   A. dangerous invention    B. new kind of job    C. many failed experiments    D. unpopular job

4. How did they overcome that challenge?
   A. established world prize for outstanding work    B. worked hard at their job
   C. learned more    D. did not give up

5. What are the job responsibilities of the person featured in this video?
   A. Inventing    B. research    C. helping animals    D. medical experiments

Additional Observations:
Afred Nobel (Key)

1. Who is the STEMM professional featured in this video?
   
   A. Isaac Newton    B. Alfred Nobel    C. Alexander Bell    D. Jane Goodall

2. What type of STEMM profession is represented?
   
   A. Biologist    B. Geologist    C. computer scientist    D. inventor

3. What challenge did this person have to overcome?
   
   A. dangerous invention    B. new kind of job
   C. many failed experiments    D. unpopular job

4. How did they overcome that challenge?
   
   A. established world prize for outstanding work    B. worked hard at their job
   C. learned more    D. did not give up

5. What are the job responsibilities of the person featured in this video?
   
   A. Inventing    B. research    C. helping animals    D. medical experiments

Additional Observations:
Answers will vary.
John Wesley Powell

Name:_________________________________________________ Date: ______________

Circle the correct answer.

Add observations in the space at the bottom of the page.

1. Who is the STEMM professional featured in this video?
   A. Isaac Newton   B. Alan Mathison Turing
   C. John Wesley Powell   D. Jane Goodall

2. What type of STEMM profession is represented?
   A. Biologist   B. Geologist   C. computer scientist   D. inventor

3. What challenge(s) did this person have to overcome? Choose all that apply.
   A. Physical impairment   B. new kind of job
   C. many failed experiments   D. unpopular job

4. How did they overcome those challenges?
   A. Gave up   B. worked hard at their job   C. learned more   D. did not give up

5. What are the job responsibilities of the person featured in this video?
   A. Inventing   B. research   C. helping animals   D. mapping

Additional Observations:
1. Who is the STEMM professional featured in this video?
   A. Isaac Newton  B. Alan Mathison Turing
   C. John Wesley Powell  D. Jane Goodall

2. What type of STEMM profession is represented?
   A. Biologist  B. Geologist  C. computer scientist  D. inventor

3. What challenge(s) did this person have to overcome? Choose all that apply.
   A. Physical impairment  B. new kind of job
   C. many failed experiments  D. unpopular job

4. How did they overcome those challenges?
   A. Gave up  B. worked hard at their job  C. learned more  D. did not give up

5. What are the job responsibilities of the person featured in this video?
   A. Inventing  B. research  C. helping animals  D. mapping

Additional Observations:
Answers will vary.
Isaac Newton

Name:__________________________________________ Date: ______________

Circle the correct answer.

Add observations in the space at the bottom of the page.

1. Who is the STEMM professional featured in this video?
   A. Isaac Newton    B. Alan Mathison Turing    C. Alexander Bell    D. Jane Goodall

2. What type of STEMM profession is represented?
   A. Biologist    B. Geologist    C. physicist    D. inventor

3. What challenge(s) did this person have to overcome?
   A. seizures    B. new kind of job    C. many failed experiments    D. unpopular job

4. How did they overcome those challenges?
   A. Gave up    B. worked hard at their job    C. learned more    D. did not give up

5. What are the job responsibilities of the person featured in this video?
   A. Inventing    B. research    C. helping animals    D. medical experiments

Additional Observations:
Isaac Newton (Key)
1. Who is the STEMM professional featured in this video?
   A. Isaac Newton    B. Alan Mathison Turing    C. Alexander Bell    D. Jane Goodall

2. What type of STEMM profession is represented?
   A. Biologist    B. Geologist    C. physicist    D. inventor

3. What challenge(s) did this person have to overcome?
   A. seizures    B. new kind of job    C. many failed experiments    D. unpopular job

4. How did they overcome those challenges?
   A. Gave up    B. worked hard at their job    C. learned more    D. did not give up

5. What are the job responsibilities of the person featured in this video?
   A. Inventing    B. research    C. helping animals    D. medical experiments

Additional Observations:
Answers will vary.
Appendix C: Student Survey Sheet

Name:_________________________________________________  Date: ______________
Write short responses to each question.
Add observations in the space at the bottom of the page.

1. Who is the STEMM professional featured in this video?

2. What type of STEMM profession is represented?

3. What challenge(s) did this person have to overcome?

4. How did they overcome those challenges?

5. What are the job responsibilities of the person featured in this video?

Additional Observations:
Appendix D: Assessments Part One
Pretest/Posttest

Match the term with the appropriate definition.
STEMM      Biologist    Engineer    Geologist
Inventor   Physics      Geology      Physicist

1. a specialist in biology
2. a person who specializes in geologic research and study.
3. the science that deals with matter, energy, motion, and force.
4. Science, Technology, Engineering, Mathematics, Medicine
5. the science that deals with the dynamics and physical history of the earth, the rocks of which it is composed, and the physical, chemical, and biological changes that the earth has undergone or is undergoing.
6. a person trained and skilled in the design, construction, and use of engines or machines, or in any of various branches of engineering: a mechanical engineer; a civil engineer.
7. a person who invents, especially one who devises some new process, appliance, machine, or article; one who makes inventions.
8. a scientist who specializes in physics.
**Key for Pretest/Posttest**

**Match the term with the appropriate definition.**

<table>
<thead>
<tr>
<th>STEMM</th>
<th>Biologist</th>
<th>Engineer</th>
<th>Geologist</th>
<th>Inventor</th>
<th>Physics</th>
<th>Geology</th>
<th>Physicist</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Biologist</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Physicist</td>
</tr>
<tr>
<td>Biologist</td>
<td>1. a specialist in biology</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Geologist</td>
<td>2. a person who specializes in geologic research and study.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physics</td>
<td>3. the science that deals with matter, energy, motion, and force.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STEMMM</td>
<td>4. Science, Technology, Engineering, Mathematics, Medicine</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Geology</td>
<td>5. the science that deals with the dynamics and physical history of the earth, the rocks of which it is composed, and the physical, chemical, and biological changes that the earth has undergone or is undergoing.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engineer</td>
<td>6. a person trained and skilled in the design, construction, and use of engines or machines, or in any of various branches of engineering: <em>a mechanical engineer; a civil engineer.</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inventor</td>
<td>7. a person who invents, especially one who devises some new process, appliance, machine, or article; one who makes inventions.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physicists</td>
<td>8. a scientist who specializes in physics.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Assessments Part Two

Portfolio

Students will maintain a portfolio of Great Minds in STEMM that they have researched independently. Students could use the generic survey sheet provided in Appendix C or generate a tri-fold foldable for each Great Mind. An example is provided below.

<table>
<thead>
<tr>
<th>Great Mind</th>
<th>Challenges</th>
<th>Achievements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>What challenges did this person over come?</td>
<td>What did they achieve?</td>
</tr>
</tbody>
</table>
Appendix D: Notes for Parents
Visit websites for STEMM careers. If you have friends that are employed in a STEMM career ask them if they would be willing to talk to your young person. Watch for opportunities for your young person to volunteer or job shadow in a STEMM career.

Here are terms included in this video series. You might want to talk to your young person about these terms. You might also add additional terms to the list as you watch the videos. Visit http://dictionary.reference.com/ for definitions.

Vocabulary
STEMM – Science, Technology, Engineering, Mathematics, Medicine
Biologist – a specialist in biology
Engineer - a person trained and skilled in the design, construction, and use of engines or machines, or in any of various branches of engineering: a mechanical engineer; a civil engineer.
Geologist – a person who specializes in geologic research and study.
Geology - the science that deals with the dynamics and physical history of the earth, the rocks of which it is composed, and the physical, chemical, and biological changes that the earth has undergone or is undergoing.
Inventor - a person who invents, especially one who devises some new process, appliance, machine, or article; one who makes inventions.
Physics – the science that deals with matter, energy, motion, and force.
Physicist – a scientist who specializes in physics.
Appendix E: Additional Resources
For more information about people in STEMM careers
http://www.heartlandscience.org/teachers.htm
http://stemcareer.com/

For information about more resources for STEMM careers
http://startingwright.org/

For information about careers using mathematics
http://weusemath.org/
Lab-Based Lessons
Area: Environmental Science

STEMM Career Connection: Environmental Scientist

Title: Oops! There’s an Oil Spill!

Grade Levels: Ninth - Twelfth

Academic Content Areas: Science, Technology, Engineering, Mathematics, Medicine

Topics: Physical Science; Science and Technology; Scientific Inquiry; Data Analysis and Probability

Goal: Students will design and use a method to remove oil from a body of water.

Performance Objectives: Students will:
1. design and construct a model of a body of water.
2. simulate an oil spill.
3. design a process for removing the oil from the body of water.
4. examine the impact an oil spill would have on an ecosystem.

Big Question
How can oil be removed from a body of water without causing additional damage to the ecosystem?

Brief Summary
In this investigation students will use the engineering design process to construct and use a model for the removal of oil from a body of water. Students will consider the environmental impact that their method could have on the body of water. The students will measure the amount of oil that is removed.

Main Ideas
If you have ever spilled cooking oil or had a car leak oil in your driveway you know that oil is difficult to remove. What if the oil were in a body of water? What if there were waves, wind, and rain? What if marine life were suffering because of the oil spill? What if people’s jobs were dependent on you getting the oil removed quickly? The BP Deep Water Oil Spill was covered extensively in the news. However, oil spills are not uncommon. Unlike the deep water BP oil spill that spewed from the ground at the bottom of the ocean, many oil spills occur at the surface. In this activity students will model a surface oil spill and the challenge of removing the oil.
Content Standards

Physical Science Standard
Scientific Inquiry

Students develop scientific habits of mind as they use the processes of scientific inquiry to ask valid questions and to gather and analyze information. They understand how to develop hypotheses and make predictions. They are able to reflect on scientific practices as they develop plans of action to create and evaluate a variety of conclusions. Students are also able to demonstrate the ability to communicate their findings to others.

Grade Nine
Doing Scientific Inquiry

Benchmark A: Participate in and apply the processes of scientific investigation to create models and to design, conduct, evaluate and communicate the results of these investigations.

5. Develop oral and written presentations using clear language, accurate data, appropriate graphs, tables, maps and available technology.

6. Draw logical conclusions based on scientific knowledge and evidence from investigations.

Grade Ten
Doing Scientific Inquiry

4. Draw conclusions from inquiries based on scientific knowledge and principles, the use of logic and evidence (data) from investigations.

Grade Eleven

Doing Scientific Inquiry

Benchmark A: Make appropriate choices when designing and participating in scientific investigations by using cognitive and manipulative skills when collecting data and formulating conclusions from the data.

5. Summarize data and construct a reasonable argument based on those data and other known information.

Grade Twelve

Doing Scientific Inquiry

Benchmark A: Make appropriate choices when designing and participating in scientific investigations by using cognitive and manipulative skills when collecting data. Formulate testable hypotheses. Develop and explain the appropriate procedures, controls and variables (dependent and independent) in scientific experimentation.

4. Create and clarify the method, procedures, controls and variables in complex scientific investigations.
Earth and Space Sciences
Earth Systems
Grade Eleven
Benchmark C: Explain that humans are an integral part of the Earth's system and the choices humans make today impact natural systems in the future.
11. Analyze how materials from human societies (e.g., radioactive waste and air pollution) affect both physical and chemical cycles of Earth.
12. Explain ways in which humans have had a major effect on other species (e.g., the influence of humans on other organisms occurs through land use, which decreases space available to other species and pollution, which changes the chemical composition of air, soil and water).
13. Explain how human behavior affects the basic processes of natural ecosystems and the quality of the atmosphere, hydrosphere and lithosphere.

Science and Technology
Students recognize that science and technology are interconnected and that using technology involves assessment of the benefits, risks and costs. Students should build scientific and technological knowledge, as well as the skill required to design and construct devices. In addition, they should develop the processes to solve problems and understand that problems may be solved in several ways.

Grade Nine
Benchmark A: Explain the ways in which the processes of technological design respond to the needs of society.
2. Identify a problem or need, propose designs and choose among alternative solutions for the problem.

Grade Eleven
Benchmark A: Predict how human choices today will determine the quality and quantity of life on Earth
2. Predict how decisions regarding the implementation of technologies involve the weighing of trade-offs between predicted positive and negative effects on the environment and/or humans.

Content Area: Mathematics
Measurement Standard
Students estimate and measure to a required degree of accuracy and precision by selecting and using appropriate units, tools and technologies.

Materials
- 500 milliliters of water (one per group)
- 100 milliliters of sand (one per group)
- 100 milliliters of cooking oil (one per group)
- Digital camera (one per group)
- Paper, crayons, markers (one per group) for ocean scene drawing
- Tape
- Two liter bottle with top removed (one per group)
- Coffee filters, paper towels, kitty litter, any other materials that students suggest using for removal system
- Rulers
- Microscope (one per group)
Safety
Follow all lab safety rules.
Keep floor clean and avoid having oil on the floor.
Dispose of materials properly.

Preparation for Lesson
- Copy pre-test and student lab sheets.
- Prepare materials. Remove tops from two liter bottles. Bottles should be approximately twenty centimeters or eight inches tall when measuring from the bottom of the bottle after the top is removed.

Vocabulary
Density - mass per unit volume; how many particles are present in a given area; oil has is not as dense as water
Ecosystem - all parts of an environment including living organisms and nonliving components such as water and air
Environmental impact – changes to an environment due to a project or other action
Food Chain – starts with the sun as the primary energy then a series of organisms determined by the need for food. For example, the sun provides energy for grass. The grass provides energy for the grasshopper when the grasshopper eats the grass. The grasshopper provides energy for the toad when the toad eats the grasshopper. Together they are a food chain.
Food Web – several food chains linked to each other

Time needed
Four days (50 minute periods each day)

Day One: Pretest, hook, class discussion, Journal, begin designing ocean model
Day Two: Finish designing ocean model. Construct model. Design oil removal system
Day Three: Begin testing oil removal system. Analyze data to evaluate removal system. Redesign removal system. Continue testing removal system. Discuss findings in lab groups.
Day Four: Revisit and revise journal, final discussion and wrap-up, posttest

Lesson
Introduction
Have you ever spilled cooking oil on your kitchen counter or floor? Have you ever tried to clean a spot of motor oil on a driveway? Imagine if you were trying to clean oil in a body of water. Oil spills occur on the ocean and on land. In this lesson you will use the engineer design process to design a method to clean up an oil spill on a body of water. You will test your method and redesign the method as needed.

Hook
Try to get oil off of your hands. What could you do if you could not wash your hands? Would you want to eat a sandwich that you made with your oily hands? How difficult would it be to get motor oil off of your hands? What do you need to use to remove the oil? What will you do with the waste from removing the oil? Where will that waste go?

Journal
Imagine that you are trying to remove oil from the ocean. You are far from land and conditions include rain, wind and waves. What challenges would you face?

Guiding Questions
How can oil be removed without causing more harm to the ecosystem?
How can we measure the amount of oil that we remove?
How does our model compare to the real world problem of removing oil?

**Materials**
500 milliliters of water (one per group)
100 milliliters of sand (one per group)
100 milliliters of cooking oil (one per group)
Digital camera (one per group)
Paper, crayons, markers, tape for ocean scene drawing
Two liter bottle with top removed (one per group)
Coffee filters, paper towels, kitty litter, any other materials that students suggest using for removal system

**Procedure**
Address the Big Question, “How can oil be removed from a body of water without causing additional damage to the ecosystem?”

1. Design a model of a body of water.
2. Build your model of a body of water.
3. Use the Engineer Design Process to develop a method for cleaning oil from a body of water.
4. Test your clean up method. Record your observations.

**Design Process Notes and Concept Map**
Respond to each of the steps on the format that works best for you.

Step One: Identify the problem.
Step Two: Identify criteria and constraints.
Step Three: Brainstorm possible solutions.
Step Four: Generate ideas.
Step Five: Explore possibilities.
Step Six: Select an approach.
Step Seven: Build a model or prototype.
Step Eight: Refine the design.
Optional Extensions

Visit websites about oil spills and the environmental impact. Students could also research using alternative energy choices and reducing oil consumption in their daily routine.

Helpful Hints for Teachers

Student groups can be determined before lab day in order to save class time. Remove the tops of the two liter bottles. Leave enough height for students to have room to test their oil removal method without spilling the liquid. The cut off tops can be used for funnels for other activities. Cooking oil is suggested as the oil for this lesson because it is easier to obtain and dispose of than motor oil or crude oil. Showing students a sample of motor oil might be helpful for students to have a better understanding of the quality of crude oil.


See Appendix F for a student handout for the hook. To shorten lines at the sink provide hand wipes for students to clean their hands.

Two formats are provided for students to use for the engineering design process. Students should use the format that works best for them, notes or concept map. Students choosing to use the concept map could use short phrases and/or simple diagrams to complete the map.

Allow students to examine materials when designing their clean up method. This is especially helpful for students with learning challenges and disabilities such as a visual impairment. Make sure that students with physical disabilities have access to the materials and can reach them. A shorter table and stool are helpful for some students.

Students can use the microscopes to compare water and sand samples before the pollution occurs, during the cleanup, and after using the cleanup method. See Appendix H for a microscope observation sheet. Students may want to use a digital camera to make observations. Provide parents with a copy of the rubric for the Tradeshow.

Helpful Hints for Parents

In this investigation students use the engineering design process to construct and test a model for the removal of oil from a body of water. Students will consider the environmental impact that their method could have on the body of water. The students will measure the amount of oil that is removed. Students will increase their awareness of environmental concerns as they work through this lesson.

There are five key terms in this lesson.

1. Density- mass per unit volume; how many particles are present in a given area; oil has is not as dense as water
2. Ecosystem- all parts of an environment including living organisms and nonliving components such as water and air
3. Environmental impact – changes to an environment due to a project or other action
4. Food Chain – starts with the sun as the primary energy then a series of organisms determined by the need for food. For example, the sun provides energy for grass. The grass provides energy for the grasshopper when the grasshopper eats the grass. The grasshopper provides energy for the toad when the toad eats the grasshopper. Together they are a food chain.
5. Food Web – several food chains linked to each other

Students will present their oil removal method in a brief oral presentation as part of a “Tradeshow” at the end of the lesson. Students may want to find ways to reduce the use of oil in their daily lives. Students may also want to find other ways to be more earth friendly.
Appendix A: Student Lab Sheet

Procedure
Address the Big Question, “How can oil be removed from a body of water without causing additional damage to the ecosystem?”
1. Design a model of a body of water. Use the two liter bottle, sand, water, and drawing materials.
2. Build your model of a body of water. Make a labeled drawing of your model.

3. Use the Engineer Design Process to develop a method for cleaning oil from a body of water.
   Add oil to your “ocean”.
   Measure the depth of the layer of oil.
   Record your measurement in the table below.

<table>
<thead>
<tr>
<th>Depth of oil layer before clean up starts</th>
<th>Depth of oil layer after trial one of clean up</th>
<th>Depth of oil layer after trial two of clean up</th>
<th>Depth of oil layer after trial three of clean up</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4. Test your clean up method. Record your observations. Also record the depth of the layer of oil in the table.
5. What changes could be made to your clean up method to remove more oil?
6. Adjust your method and try again.
Appendix B: Teacher Lab Sheet

Procedure
Address the Big Question, “How can oil be removed from a body of water without causing additional damage to the ecosystem?”

1. Design a model of a body of water. Use the two liter bottle, sand, water, and drawing materials. Models will have a layer of sand on the bottom with water added. Students can add sea shells or aquarium plants to their model. Students can draw an ocean scene to the outside of their model.

2. Build your model of a body of water. Make a labeled drawing of your model.

3. Use the Engineer Design Process to develop a method for cleaning oil from a body of water.

   See the Engineer Design Process sheet.
   Add oil the oil to your “ocean”.
   Measure the depth of the layer of oil.
   Record your measurement in the table below.

<table>
<thead>
<tr>
<th>Depth of oil layer before clean up starts</th>
<th>Depth of oil layer after trial one of clean up</th>
<th>Depth of oil layer after trial two of clean up</th>
<th>Depth of oil layer after trial three of clean up</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4. Test your clean up method. Record your observations. Also record the depth of the layer of oil in the table. Answers will vary.

5. What changes could be made to your clean up method to remove more oil? Answers will vary.

   Adjust your method and try again. Answers will vary.
Appendix C: Assessments Part One

Pretest/ Posttest

Answer each question. Use the word bank when needed.

Linked environmental impact nonliving living food webs sun

1. Choose the correct order of density from least to most dense. ________________

a. Brick, air, feather       b. water, oil, brick       c. air, oil, water       d. feather, air, water

2. Food chains are ______________ together to form a food web.

3. Ecosystems include ________ organisms and ____________ components such as air and water.

4. ________________ is a positive or negative change to an environment due to a project or other action.

5. Our primary energy source is the ____________.

Answer the question. Thoroughly explain your answer.

6. How does an oil spill impact an ecosystem?
Key for Pretest/Posttest
Answer each question. Use the word bank when needed.

Linked environmental impact nonliving living food webs sun

1. Choose the correct order of density from least to most dense. __________ c __________
   a. Brick, air, feather  b. water, oil, brick  c. air, oil, water  d. feather, air, water

2. Food chains are ______ Linked __________ together to form a food web.

3. Ecosystems include _____ living _____ organisms and _______ nonliving _______ components such as air and water.

4. _Environmental impact_ is a positive or negative change to an environment due to a project or other action.

5. Our primary energy source is the _____ sun _____.

Answer the following question. Thoroughly explain your answer.
6. How does an oil spill impact an ecosystem?
   Answers will vary.
   An oil spill would negatively impact an ecosystem. Organisms at all levels of a food web would be harmed. If the population of an organism on a food chain dropped then the population of the organism that depended on it for food would also change.
Assessments Part Two

Tradeshow

Students will present their oil removal method to their classmates as if they are participants at a Tradeshow. Students may choose to demonstrate their system to the class as part of their brief oral presentation.
Groups can select one student to speak on behalf of the group or take turns speaking but all members need to contribute to the presentation.
Select areas that are appropriate for your students. Not all areas must be used.

Rubric for Tradeshow

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Distinguished</th>
<th>Proficient</th>
<th>Basic</th>
<th>Unacceptable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use of Language: Grammar, Word Choice, Voice</td>
<td>-- Poised, clear articulation; proper volume; steady rate; enthusiasm; confidence; speaker is clearly comfortable in front of the group.</td>
<td>-- Clear articulation but not as polished; slightly uncomfortable at times. Most can hear presentation.</td>
<td>-- Audience occasionally has trouble hearing the presentation; seems uncomfortable.</td>
<td>-- Presenter is obviously anxious and cannot be heard or monotone with little or no expression.</td>
</tr>
<tr>
<td></td>
<td>-- Correct, precise pronunciation of terms</td>
<td>-- Student pronounces most words correctly.</td>
<td>-- Student incorrectly pronounces terms.</td>
<td>-- Student mumbles, incorrectly pronounces terms.</td>
</tr>
<tr>
<td></td>
<td>-- Selects rich and varied words for context and uses correct grammar.</td>
<td>-- Selects words appropriate for context and uses correct grammar.</td>
<td>-- Selects words inappropriate for context; uses incorrect grammar.</td>
<td>-- Selects words inappropriate for context; Uses incorrect grammar.</td>
</tr>
<tr>
<td></td>
<td>-- Presentation has no more than two misspellings and/or grammatical errors</td>
<td>-- Presentation has three misspellings and/or grammatical errors.</td>
<td>-- Presentation has four or more spelling errors and/or grammatical errors.</td>
<td>-- Cannot focus on the ideas presented. Because of difficulties with grammar and appropriate</td>
</tr>
<tr>
<td></td>
<td>-- Sentences are complete and grammatical, and they flow</td>
<td>-- Can follow the presentation, but some grammatical errors and use</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
and they flow together easily. Words are chosen for their precise meaning.

together easily. With a few exceptions, words are chosen for their precise meaning.
of slang are evident. Some sentences are incomplete/halting, and/or vocabulary is somewhat limited or inappropriate.

<table>
<thead>
<tr>
<th>Eye Contact</th>
<th>--Maintains eye contact; seldom returning to notes; presentation is like a planned conversation.</th>
<th>--Student maintains eye contact most of the time but frequently returns to notes.</th>
<th>--Some eye contact, but not maintained and at least half the time reads most of report.</th>
<th>--Student reads all or most of report with no eye contact.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal Appearance</td>
<td>--Personal appearance is completely appropriate for the occasion and the audience.</td>
<td>--For the most part, personal appearance is appropriate for the occasion and the audience.</td>
<td>--Personal appearance is somewhat inappropriate for the occasion and audience.</td>
<td>--Personal appearance is inappropriate for the occasion and audience.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Distinguished</th>
<th>Proficient</th>
<th>Basic</th>
<th>Unacceptable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audience Interaction, Questions and Answers.</td>
<td>--Encourages audience interaction. Calls on classmates by name.</td>
<td>--Encourages audience interaction.</td>
<td>--Reluctantly interacts with audience.</td>
<td>--Avoids or discourages active audience participation.</td>
</tr>
<tr>
<td></td>
<td>--Demonstrates extensive knowledge of the topic by responding confidently, precisely and appropriately to all audience questions.</td>
<td>--Demonstrates knowledge of the topic by responding accurately and appropriately addressing questions. At ease with answers to all questions but fails to elaborate.</td>
<td>--Demonstrates some knowledge of rudimentary questions by responding accurately to questions.</td>
<td>--Demonstrates incomplete knowledge of the topic by responding inaccurately and inappropriately to questions.</td>
</tr>
<tr>
<td>Audience Response</td>
<td>--Involved the audience in the presentation; held the audience's attention throughout.</td>
<td>--Presented facts with some interesting &quot;twists&quot;; held the audience's attention most of the time.</td>
<td>--Some related facts but went off topic and lost the audience.</td>
<td>--Incoherent; audience lost interest.</td>
</tr>
<tr>
<td>-------------------</td>
<td>---------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------</td>
<td>--------------------------------------</td>
</tr>
<tr>
<td>Length of Presentation</td>
<td>--Within ? minutes of allotted time +/-</td>
<td>--Within ? minutes of allotted time +/-</td>
<td>--Within ? minutes of allotted time +/-</td>
<td>--Too long or too short; ? or more minutes above or below the allotted time</td>
</tr>
</tbody>
</table>

Appendix D: Notes for Parents

Students will increase their awareness of environmental concerns as they work through this lesson. In this investigation students use the engineering design process to construct and test a model for the removal of oil from a body of water. Students will consider the environmental impact that their method could have on the body of water. The students will measure the amount of oil that is removed. Students are responsible for knowing five key terms.

1. Density - mass per unit volume; how many particles are present in a given area; oil has is not as dense as water
2. Ecosystem - all parts of an environment including living organisms and nonliving components such as water and air
3. Environmental impact – changes to an environment due to a project or other action
4. Food Chain – starts with the sun as the primary energy then a series of organisms determined by the need for food. For example, the sun provides energy for grass. The grass provides energy for the grasshopper when the grasshopper eats the grass. The grasshopper provides energy for the toad when the toad eats the grasshopper. Together they are a food chain.
5. Food Web – several food chains linked to each other

Students will present their oil removal method in a brief oral presentation as part of a “Tradeshow” at the end of the lesson. Students may want to find ways to reduce the use of oil in their daily lives. Students may also want to find other ways to be more earth friendly.
Appendix E: Additional Resources

Alternative Energy – Includes resources for elementary, middle, and secondary students
http://www.eia.gov/kids/energy.cfm?page=2

Images of oil spills around the world
http://www.bing.com/images/search?q=oil+spills+around+the+world&id=4FA094FFEE3B616809070E
D57867AACF9CB4724E&FORM=IGRE1

Videos of Oil Spills
http://www.bing.com/videos/search?q=oil+spills+around+the+world&qpv=oil+spills+around+the+wo
rld&FORM=Z7FD1#

Ocean Food Chains Charts and Images

Teacher Background Information for Crude Oil
http://www.oogeep.org/teacherstudent/educationalmaterials.html

Teacher Background Information on Ocean Food Chains
http://www.thesea.ecsd.net/ocean_food_chain.htm
Appendix F: Additional Student Sheets

Hook
1. Try to get oil off of your hands. Describe your experience.

2. What could you do if you could not wash your hands?

3. Would you want to eat a sandwich that you made with your oily hands?

4. How difficult would it be to get motor oil off of your hands?

5. What do you need to use to remove the oil?

6. What will you do with the waste from removing the oil? Where will that waste go?

Critical Thinking
1. What difference does it make if oil spills in the ocean?

2. What would happen to a food chain if producers were reduced or eliminated?

3. How would an oil spill impact the health of humans?
**Hook (Key)**

1. Try to get oil off of your hands. Describe your experience.

   *Answers will vary. The oil is hard to remove, especially if you can’t use a sink.*

2. What could you do if you could not wash your hands?

   *Answers will vary. Wiping hands with a paper towel helps.*

3. Would you want to eat a sandwich that you made with your oily hands?

   *Answers will vary. The sandwich would not taste good because it would be covered with oil.*

4. How difficult would it be to get motor oil off of your hands?

   *Answers will vary. Motor oil would be hard to get off hands.*

5. What do you need to use to remove the oil?

   *Answers will vary. Paper towels and something to break down the oil would help.*

6. What will you do with the waste from removing the oil? Where will that waste go?

   *Answers will vary. Most waste goes in a trash can. Eventually waste will end up in a landfill.*

**Critical Thinking**

1. What difference does it make if oil spills in the ocean?

   *Answers will vary. Oil spills can negatively impact ecosystems for years.*

2. What would happen to a food chain if producers were reduced or eliminated?

   *Answers will vary. The population of organisms that needed those producers for food would be reduced or eliminated.*

3. How would an oil spill impact the health of humans?

   *Answers will vary. Physical and mental health could be negatively impacted.*
Appendix G
Design Process Notes and Concept Map
Respond to each of the steps on the format that works best for you.
Step One: Identify the problem.

Step Two: Identify criteria and constraints.

Step Three: Brainstorm possible solutions.

Step Four: Generate ideas.

Step Five: Explore possibilities.

Step Six: Select an approach.

Step Seven: Build a model or prototype.

Step Eight: Refine the design.
Appendix G

Design Process Notes and Concept Map (Key)

Respond to each of the steps on the format that works best for you.

Step One: Identify the problem.
Oil is spilled in a body of water and needs to be cleaned.

Step Two: Identify criteria and constraints.
Oil is difficult to remove. Resources are limited.

Step Three: Brainstorm possible solutions.
A filter system might work.

Step Four: Generate ideas.
Try using paper towels and kitty litter together to remove oil.

Step Five: Explore possibilities.
Try using paper towels and kitty litter individually.

Step Six: Select an approach.
Try using paper towels.

Step Seven: Build a model or prototype.
Approaches will vary.

Step Eight: Refine the design.
Try using paper towels and kitty litter put together to make a layered filter.
## Appendix H
### Microscope Drawings

<table>
<thead>
<tr>
<th></th>
<th>Before the oil spill occurs</th>
<th>After the oil spill and before the clean up</th>
<th>After the clean up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sand</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Academic Skills
Area: All Content Areas

STEMM Career Connection: This activity will help prepare students for success in any post-secondary activity from a four-year college program to technical training in a field.

Title: Once is Not Enough

Grade Levels: 8th-10th

Academic Content Areas: Science, Math, Social Studies, and Language Arts

Topics: Note Taking, Study Skills, and Reading Comprehension

Goal: Students will utilize effective note taking strategies to gain understanding of a selected reading section.

Performance Objectives:
Students will:
1. Evaluate their current note taking skills.
2. Apply note taking strategies, presented by the teacher, to help them comprehend and interpret text.

Big Question
What does the process of effective note taking look like?

Brief Summary
In this activity, students will be asked to take notes over a section of text. They will then be asked to evaluate their current skills. After which, the teacher will present some suggestions for more effective note taking and demonstrate those skills. Students will then be provided with an opportunity to practice these skills.

Main Ideas
In order for students to be successful in high school and in any post-secondary activities, they must be effective note takers. It is essential that when given a large amount of information, students can identify the main points and make sense of the information within its context. This ability will help them to learn about a subject, do a job, make decisions, and accomplish tasks.
Content Standards

English Language Arts Grades 9-10

Standard: Acquisition of vocabulary

Benchmark A: Use context clues and text structures to determine the meaning of new vocabulary.

Benchmark F: Use multiple resources to enhance comprehension of vocabulary.


Benchmark A: Apply reading comprehension strategies to understand grade appropriate text.

Benchmark C: Use appropriate self-monitoring strategies for comprehension.

Materials

- Copy of a selected reading section, “What is Science?”
- Copy of Note Taking Evaluation Form
- Copy of Note Taking Notes, either document or power point form
- Highlighter
- Pencil
- Post-its of various sizes and types
- Notebook paper
- Elmo Document Camera or similar device

Preparation for Lesson

- Make student copies of the selected reading section
- Make student copies of evaluation form
- Make student copies of notes, either document or power point form
- Gather highlighters and post-its for students if necessary
- Adapt teacher copy of Note Taking Notes in a useable form for presentation

Vocabulary

Definitions by dictionary.com.

Note taking is the practice of writing pieces of information, often in an informal or unstructured manner. Notes are frequently written in notebooks, though any available piece of paper can suffice in many circumstances—some people are especially fond of Post-It notes, for instance. Note taking is an important skill for students, especially at the college level. Many different forms are used to structure information and make it easier to find later.

Paraphrase- a restatement of a text or passage giving the meaning in another form, as for clearness; rewording.

Main Idea- a statement that gives the explicit or implied major topic of a passage and the specific way in which the passage is limited in content or reference.
Supporting Detail- secondary points which may help to clarify a point, illustrate a concept or prove a point as they serve to scaffold the points which are of primary concern.

Strategy- a plan or procedure to achieve a desired end result.

Time needed
Approximately 3 entire 50 minute class periods and a portion of a 4th class period.

Lesson

Day One
Ask the students how they do on tests and discuss their responses. Then ask students how they study for tests. Introduce the topic of note taking and play Academic Skills- Miss Hannah’s Study Tips.

Assign students to demonstrate their current note taking skills by taking notes over a portion of the text “What is Science?” by the Ohio Academy of Science. Be sure to assign only a portion of the reading. Students will be assigned the remainder of the reading on another day. Allow students to interpret what it means to “take notes” over the assigned reading.

Circulate the room and make note of the strategies that students are using to take notes. This information will be used in the following day’s lesson.

Day Two
Have students evaluate their note taking skills using the Evaluation Form under Trial #1.

Using the Elmo Document Camera, ask for student volunteers to explain how they went through the process of taking notes. If desired, based on your observations on Day One, you may want to ask some students to present based on the strategy that they used. This will enable you to highlight a particular point or strategy. This is a benchmark activity for student self-assessment.

After a few students have come forward, model the way in which you would have taken notes over this reading selection. Be sure to explicitly model the strategies outlined in the notes as well as the logical thinking process one goes through in order to determine the important information from the inconsequential. Use post-its, highlighter, or other tools as you would normally. Pass these materials out to students for future use.

Day Three
Present Once is NOT Enough Notes.

Depending upon the amount of scaffolding required by your students, the last portion of this lesson could be modified as thus:

- Beginning with the next section of the reading, demonstrate again the strategies outlined in the notes. On the next portion, working with the class as a group, utilize the strategies outlined in the notes. Lastly, assign the remainder of the text, requiring that students work independently. Circulate the room, providing assistance as needed.

- Demonstrate again the strategies outlined in the notes using the next portion of the text selection. Then assign the remainder of the text, requiring that students utilize the strategies outlined in the
notes and demonstrated by the teacher. Circulate the room, providing assistance as needed.

- Assign the remainder of the text, requiring that students utilize the strategies outlined in the notes and demonstrated by the teacher. Circulate the room, providing assistance as needed.

Have students evaluate their note-taking skills using the Evaluation Form under Trial #2.

It is crucial that students work as independently as possible. However, be very aware of your students’ ability and take that into consideration when determining what is appropriate for their ability level.

**Day 4**
As a wrap-up activity, either verbally or in a written document of some sort, have students compare and reflect on their two sets of notes.

**Optional Extensions**
The reading material in this lesson could be substituted with any content reading material and used as part of the curriculum of any course.

- Students could also practice the strategies to take notes over lectures.
- Have students utilize the strategies taught in this lesson throughout the course of the school year.
- Any particular note-taking strategy such as the Cornell Method could be introduced to the students. See Appendix E.

**Helpful Hints for Teachers**

- There are numerous ways that this lesson could be modified. Please modify it to fit your needs as far as the content you are required to teach but most importantly to fit the needs of your students.
- Realize that for your students to become effective note-takers, they will need to practice the strategies outlined in the lesson throughout the year.
- Use large font text on the documents in the lesson for students with vision impairments.
- Copy reading sections and put them on separate pages or use index cards to reduce the amount of text a student can see at any given time.
- Consider grouping students into groups of two or four within this lesson to allow for more guided practice of note-taking.

**Helpful Hints for Parents**

- Encourage your child to read all types of text, whether it’s the nutrition facts on a cereal box, an operation manual for their new video game, or a trade book. Help them determine what information is important and why.
What is Science?

**SCIENCE IS A SYSTEMATIC METHOD** of continuing investigation, based on observation, hypothesis testing, measurement, experimentation, and theory building, which leads to more adequate explanations of natural phenomena, explanations that are open to further testing, revision, and falsification, and while not “believed in” through faith may be accepted or rejected on the basis of evidence.

Science is the study of the natural world that includes observable and measurable phenomena within the universe. The conclusions of scientific inquiry are objective because scientific statements can be verified or disproved by independent observers. Scientific inquiry is restricted to knowledge that can be reduced to simple declarative sentences with observable action or actions that are logically connected to observable results by valid, intermediate logic.

What is a hypothesis?

**A SCIENTIFIC HYPOTHESIS** is a declarative statement within the realm of nature in the broadest sense of this term. The proposition is therefore true or false. Scientific research establishes, confirms, verifies or validates the truth or falsity of hypotheses. Hypotheses address basic questions about the natural world and are tested by using methods that yield valid results or findings: observations and data that either confirm or deny (falsify) the declarative statement or proposition (hypothesis).

In contrast to scientific hypotheses, value statements include categories such as right or wrong, good or bad, beautiful or ugly, wise or unwise, desirable or undesirable—all of which are outside the scope of science. These are categories of ethics and values, and when combined with a belief structure, are the bases of religion. Values are the beliefs, mores and morals that hold society together because they condition and guide behavior, and may give meaning to humanity. These are areas of opinion and belief. Value statements can be used as moral imperatives such as “love thy neighbor” or as a way of expressing delight such as “What a beautiful rainbow!” Such statements are outside the realm of science.

What is a theory as used in science?

**A THEORY AS USED IN SCIENCE** is not a weak, tentative, or abstract explanation of natural phenomena. A theory is the current, highest level of scientific explanation or confidence that explains and predicts the future appearance of natural phenomena. Derived from repeated observations and hypothesis testing, a scientific theory is a robust assembly of related laws, concepts and conceptual models that objectively describe, predict, and explain natural phenomena. This definition contrasts sharply from the common vernacular use of the term theory as speculation or supposition.

Scientific theories result from repeated application of the scientific method and help to organize or explain our knowledge in a particular field. Established theories may stand for hundreds of years until new facts are discovered, tested and verified or a new hypothesis, which more closely explains the data, is developed and tested. The overthrow of settled theories or established science is popularly called a
scientific revolution or a paradigm shift. For example, the popular depiction of an atom structured like a miniature solar system is a recent victim of such a revolution in scientific theory. Now quantum physics explains that electrons are more like probability clouds surrounding an atomic nucleus than like planets orbiting a central point.

**Why is science important?**

SCIENCE IS MORE THAN A COLLECTION of what humankind knows. Science is a tool to objectively understand the ever changing, natural world in which we live. Science provides a systematic way to determine when to accept or reject a theory or concept. Scientific progress is made by applying the tenets of the scientific method—observation, experimentation, repeated hypothesis testing, and establishment of scientific theory. The application of the scientific method has enabled humanity to develop and improve our understanding of the natural world by using the pragmatism of demonstration, the rigor of mathematical and statistical analyses, and the creative insight of people from all races and cultures.

Science has changed the way we view the world and universe. When coupled with engineering, technology, and the economic system, the methods and results of scientific inquiry have profoundly affected humankind’s material and societal progress. Science provides the tools to understand and master the natural world around us. Science is a knowledge ratchet that builds upon facts, principles, laws, and theories, by advancing one or more clicks, thus enhancing and preserving knowledge for our collective human use and betterment.

Statement adopted on April 16, 2004 by The Board of Trustees of The Ohio Academy of Science
What is Science?

Science-
1. method of investigation, based on observation, hypothesis testing, measurement, experimentation, and theory building, which leads to more adequate explanations of natural phenomena...
   - these explanations may be:
     - tested further
     - revised
     - proven false
     - accepted or rejected on the basis of evidence
2. study of the natural world that includes observable and measurable stuff
3. must be objective because of the verification process of independent observers (other scientists)
4. restricted to knowledge that can be written in declarative statements with observable actions that are logically connected
   - declarative statement: A declarative sentence states an idea. It does not give a command or request, nor does it ask a question. A declarative sentence usually ends in a period. (englishplus.com)

Hypothesis-
1. declarative statement within the realm of nature
2. basic question about the natural world
3. tested through observations and data that either confirm or deny the statement
4. NOT:
   - a value statement, such as right/wrong, good/bad, etc.
   - outside the realm of science
   - values are the beliefs, mores, and morals that guide behavior and are the basis of religion
   - an opinion or belief
     - EX: “What a beautiful rainbow!”
Appendix C

Evaluate Your Present Note Taking System

After Trial #1, ask yourself:

1. Do I use complete sentences?

2. Do I use any form at all? Are my notes clear or confusing?

3. Do I capture main points and all sub points?

4. Do I streamline using abbreviations and shortcuts?

After Trial #2, ask yourself:

1. Do I use complete sentences?

2. Do I use any form at all? Are my notes clear or confusing?

3. Do I capture main points and all sub points?

4. Do I streamline using abbreviations and shortcuts?
Appendix D

Name: __________________________________________________________

Once is NOT Enough

NOTE TAKING

I. Background

Note taking is the practice of making a written record of main points and supporting details to which one may refer to later. Although note taking most commonly is used to record oral presentations, it can also be used to record information from written sources. The ability to effectively take notes will help you to learn about a subject, do a job, make decisions, and accomplish tasks.

II. Why Bother to Take Notes?

1. Taking notes helps you concentrate in class.

2. Taking notes helps you understand the material, prepare for exams, and complete assignments.

III. Before We Begin- Attention and Listening

The first step to being an effective note taker is better attention and listening skills. It is impossible to take good notes if one cannot pay attention while listening to a presentation or reading a book. Good listening skills require that one attend to basic health needs and eliminate internal and external distractions, i.e. use the restroom, make sure you are not hungry or too hot or too cold, turn off the TV, your cell phone.

IV. The Process

Taking Notes from a Textbook – write legibly and don't be concerned with spelling or grammar, compare notes with other students

1. Read a section of your textbook chapter
   • Read just enough to keep an understanding of the material. Do not take notes, but rather focus on understanding the material.

2. Review the material
   • Locate and underline or highlight the main ideas and examples of these.
   • Locate and underline or highlight unfamiliar vocabulary.
   • Paraphrase this information into your own words. This forces you to become actively involved with the material.
• Jot down questions you have while reading the material either in the text or on a post-it note. These questions can be asked later in class.

3. Write the paraphrased ideas as your notes
   • Write clearly, and leave lots of blank space in the left margin or between ideas in case you need to add information later.
   • Do not copy information directly from the textbook. Use your own words.
   • Add only enough detail to understand.
   • Use short sentences and phrases and easily remembered abbreviations and symbols. Some commonly used abbreviations and symbols:
     
     cf (compare)
     i.e. (that is)
     e.g. (for example)
     w/ (with)
     w/o (without)
     &, + (and)
     = (equals, is)

   • Mark important facts or main ideas in some manner, use an asterisk or star or underline or highlight them

4. Organize notes into some sort of logical format
   • Use outline format and/or a numbering system such as the example below:

   I. MAIN IDEA
      A. Supporting idea to I
      B. Supporting idea to I
         1. Supporting idea to B
         2. Supporting idea to B
            a) Supporting idea to 2
            b) Supporting idea to 2
Resources

Muskingum College, Center for Advancement and Learning (CAL)
http://www.muskingum.edu/~cal/database/general/attention.html

Dartmouth College, Academic Skills Center
http://www.dartmouth.edu/~acskills/

Stanford University, Center for Teaching and Learning
http://ctl.stanford.edu/
Appendix E: Additional Resources

The following table outlines common learning problems related to note taking and suggests possible strategies for students and instructors.

<table>
<thead>
<tr>
<th>LEARNING PROBLEMS</th>
<th>INDIVIDUALIZED STRATEGIES AND SUPPORTS FOR LEARNERS</th>
<th>CLASSROOM METHODS FOR INSTRUCTORS AND TRAINERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Handwriting is illegible</td>
<td>* Tape recorder and earphones</td>
<td>* Course handouts</td>
</tr>
<tr>
<td></td>
<td>* Microcomputer and word processing program</td>
<td>* Note takers</td>
</tr>
<tr>
<td>Cannot stay on-line</td>
<td>* Microcomputer and word processing program</td>
<td></td>
</tr>
<tr>
<td>Has difficulty copying letters or words</td>
<td>* Tape recorder</td>
<td>* Special arrangements for assignments and examinations</td>
</tr>
<tr>
<td></td>
<td>* Graphic organizers</td>
<td></td>
</tr>
<tr>
<td>Writes and prints in same assignment</td>
<td>* Tape recorder and earphones</td>
<td>* Special arrangements for assignments and examinations</td>
</tr>
<tr>
<td></td>
<td>* Microcomputer and word processing program</td>
<td></td>
</tr>
<tr>
<td>Has difficulty deciding what to include in meeting or lecture notes</td>
<td>* Graphic organizers</td>
<td>* Graphic organizers for class activities</td>
</tr>
<tr>
<td></td>
<td>* Point-form lists</td>
<td>* Point-form display on overhead projector</td>
</tr>
<tr>
<td></td>
<td>* Signaling and highlighting</td>
<td>* Advance organizers to show topics to be covered</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* Identification of what is most and least important</td>
</tr>
<tr>
<td>Has difficulty developing graphic organizers for pre-writing planning</td>
<td>* Sequence lists (point-form)</td>
<td>* Graphic organizers for lectures and examination questions</td>
</tr>
<tr>
<td></td>
<td>* Sequence charting</td>
<td>* Advance organizers for class work</td>
</tr>
<tr>
<td></td>
<td>* Peer tutors</td>
<td></td>
</tr>
<tr>
<td></td>
<td>* Special needs or individual counseling</td>
<td></td>
</tr>
<tr>
<td>Cannot select main ideas to include in written assignments</td>
<td>* Graphic organizers</td>
<td>* Graphic organizers for class work</td>
</tr>
<tr>
<td></td>
<td>* Sequence lists</td>
<td>* Advance organizers to show progress</td>
</tr>
<tr>
<td></td>
<td>* Signaling and highlighting</td>
<td></td>
</tr>
<tr>
<td></td>
<td>* Sentence combining</td>
<td></td>
</tr>
<tr>
<td></td>
<td>* Use of index cards</td>
<td></td>
</tr>
<tr>
<td>Has difficulty putting sentences and paragraphs together</td>
<td>* Sentence combining</td>
<td>* Feedback on assignments</td>
</tr>
<tr>
<td></td>
<td>* Peer tutors</td>
<td></td>
</tr>
<tr>
<td></td>
<td>* Graphic organizers such as sequence charting</td>
<td></td>
</tr>
<tr>
<td></td>
<td>* Use of index cards or large chart paper and markers</td>
<td></td>
</tr>
<tr>
<td>Has problems reviewing</td>
<td>* Signaling and highlighting</td>
<td>* Feedback on assignments</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Problem Description</td>
<td>Possible Solutions</td>
<td>Related Services</td>
</tr>
<tr>
<td>----------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------</td>
</tr>
<tr>
<td>Editing and self-monitoring written text</td>
<td>* Microcomputer and word processor spell check&lt;br&gt;* Tape recorder and earphones&lt;br&gt;* Peer tutors&lt;br&gt;* Editing services</td>
<td>* Refer to advisor for counseling</td>
</tr>
<tr>
<td>Pays little attention to layout, spacing, or indentation</td>
<td>* Typing and editing services&lt;br&gt;* Peer tutors</td>
<td>* Modeling in class</td>
</tr>
<tr>
<td>Writing is slow</td>
<td>* Tape recorder and earphones</td>
<td>* Audiovisual equipment</td>
</tr>
<tr>
<td>Omits capital letters and punctuation</td>
<td>* Diary for self-monitoring&lt;br&gt;* Special needs or individual counseling&lt;br&gt;* Peer tutors</td>
<td></td>
</tr>
<tr>
<td>Cannot write grammatically</td>
<td>* Special needs or individual counseling&lt;br&gt;* Typing and editorial service&lt;br&gt;* Peer tutors&lt;br&gt;* Sentence combining</td>
<td></td>
</tr>
<tr>
<td>Cannot use dictionary</td>
<td>* Special needs or individual counseling</td>
<td></td>
</tr>
<tr>
<td>Has severe spelling problems</td>
<td>* Use of Horn method&lt;br&gt;* Peer tutors&lt;br&gt;* Electronic computerized dictionaries&lt;br&gt;* Special needs or individual counseling and diary of errors / corrections&lt;br&gt;* Use of alphabetized index cards&lt;br&gt;* Editorial services</td>
<td>* Highlighting errors when evaluating written work</td>
</tr>
<tr>
<td>Spells same word different ways</td>
<td>* Microcomputer with spell check program&lt;br&gt;* Diary for self-monitoring</td>
<td></td>
</tr>
<tr>
<td>Cannot retain information heard in lecture or meeting</td>
<td>* Special needs or individual counseling&lt;br&gt;* Columnar note taking (Cornell, two-column)&lt;br&gt;* Signaling and highlighting</td>
<td>* Audiovisual and multiple methods of presentation</td>
</tr>
</tbody>
</table>

Muskingum College - Center for Advancement and Learning (CAL)
http://www.muskingum.edu/~cal/database/general/attention.html
The Cornell Note Taking System

Recall Column

--------2 1/2"--------

Reduce ideas and facts to concise jottings and summaries as cues for
Reciting, Reviewing, and Reflecting.

--------------------6"-------------------

Record the lecture as fully and as meaningfully as possible.

The format provides the perfect opportunity for following through with the 5 R's of note-taking. Here they are:

1. Record. During the lecture, record in the main column as many meaningful facts and ideas as you can. Write legibly.

2. Reduce. As soon after as possible, summarize these ideas and facts concisely in the Recall Column. Summarizing clarifies meanings and relationships, reinforces continuity, and strengthens memory. Also, it is a way of preparing for examinations gradually and well ahead of time.

3. Recite. Now cover the column, using only your jottings in the Recall Column as cues or "flags" to help you recall, say over facts and ideas of the lecture as fully as you can, not mechanically, but in your own words and with as much appreciation of the meaning as you can. Then, uncovering your notes, verify what you have said. This procedure helps to transfer the facts and ideas of your long term memory.

4. Reflect. Reflective students distill their opinions from their notes. They make such opinions the starting point for their own musings upon the subjects they are studying. Such musings aid them in making sense out of their courses and academic experiences by finding relationships among them. Reflective students continually label and index their experiences and ideas, put them into structures, outlines, summaries, and frames of reference. They rearrange and file them. Best of all, they have an eye for the vital-for the essential. Unless ideas are placed in categories, unless they are taken up from time to time for re-examination, they will become inert and soon forgotten.

5. Review. If you will spend 10 minutes every week or so in a quick review of these notes, you will retain most of what you have learned, and you will be able to use your knowledge currently to greater and greater effectiveness.

©Academic Skills Center, Dartmouth College 2001

http://www.dartmouth.edu/~acskills/
Area: Study Strategies

**STEMM Career Connection:** Applicable to all future professions

**Title:** Study Right

**Grade Levels:** Eighth - Tenth

**Academic Content Areas:** All Content Areas

**Topics:** Studying, Reading, Test Preparation

**Goal:** Students are inspired to apply new study strategies to their CORE academics.

**Performance Objectives:** Students will:
1. apply study strategies in all content areas to improve their preparation for quizzes, quests and tests.

**Big Question**
How can students improve their performance on classroom assessments?

**Brief Summary**
This set of mini-lessons, designed to be used prior to the first unit test, provide students the opportunity to employ the use of various study and learning strategies aimed at improving their mastery of study strategies for all content areas.

**Main Ideas**
It is often assumed that by high school students “know” how to use their planner, organize their classroom materials and break down a textbook chapter in order to prepare for classroom tests and quizzes. Often, this is not the case; students frequently require direct coaching in these strategies for continued success at the high school level.

**Content Standards**
**SCIENCE - Scientific Inquiry**
**K-2:** B. Design and conduct a simple investigation to explore a question.

C. Gather and communicate information from careful observations and simple investigation through a variety of methods.

**3-5:** A. Use appropriate instruments safely to observe measure and collect data when conducting a scientific investigation.
B. Organize and evaluate observations, measurements and other data to formulate inferences and conclusions.

9-10: Participate in and apply the processes of scientific investigation to create models and to design, conduct, evaluate and communicate the results of these investigations.

**Scientific Ways of Knowing**

3-5: Distinguish between fact and opinion and explain how ideas and conclusions change as new knowledge is gained.

6-8: Give examples of how thinking scientifically is helpful in daily life.

9-10: Explain how scientific inquiry is guided by knowledge, observations, ideas and questions.

**TECHNOLOGY – Technology for Productive Applications**

9-12: Identify, select and apply appropriate technology tools and resources to produce creative works and to construct technology-enhanced models.

**Technology and Communication Applications**

9-12: A. Apply appropriate communication design principles in published and presented projects.

B. Create, publish and present information, utilizing formats appropriate to the content and audience.

**ENGLISH LANGUAGE ARTS – Acquisition of Vocabulary**

8-10: Use context clues and text structures to determine the meaning of new vocabulary.

Use multiple resources to enhance comprehension of vocabulary.

**Concepts of Print, Comprehension Strategies, and Self-Monitoring Strategies**

8-10: Apply reading comprehension strategies to understand grade appropriate text.

B. Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing).

C. Use appropriate self-monitoring strategies for comprehension.

**Writing Process Standard**

8-10: Use revision strategies to improve the style, variety of sentence structure, clarity of the controlling idea, logic, effectiveness of word choice and transitions between paragraphs, passages or ideas.

D. Edit to improve sentence fluency, grammar and usage.
F. Prepare writing for publication that is legible, follows an appropriate format and uses techniques such as electronic resources and graphics.

Writing Applications

5-7: Produce informational essays or reports that convey a clear and accurate perspective and support the main ideas with facts, details, examples and explanations.

Writing Conventions

8-10: Use correct spelling conventions.

B. Use correct punctuation and capitalization.

C. Demonstrate understanding of the grammatical conventions of the English language.

Communication: Oral and Visual Standard

8-10: Use a variety of strategies to enhance listening comprehension.

Demonstrate an understanding of effective speaking strategies by selecting appropriate language and adjusting presentation techniques.

Give informational presentations that present ideas in a logical sequence, include relevant facts and details from multiple sources and use a consistent organizational structure.

Materials

- Worksheets: Warm-Up Note Sheet, Comparison Chart, book walk
- Pre-Test, Post-Test
- Note cards
- Post-it Notes
- List of 20 facts, main ideas and/or vocabulary from current unit
- Mini-worksheets from current unit (for Day 3)
- Student Journals
- Power Point (see resources below)

Preparation for Lesson

- Copy: Warm-Up Chart, Comparison Chart, Book Walk worksheet, List of facts and vocab from your current unit for each student, Pre-test, Post-test, Assessments.
- Read & review lesson activities, Power Point and assessment options
- Run video (within Power Point) to ensure speakers work
Vocabulary

Study – The application of mental faculties to the acquisition of knowledge – OR- putting mental effort into learning material/information in order to understand and gain knowledge.

Time Management – The act of making conscious decisions over the amount of time spent on specific activities in order to increase efficiency and improve productivity.

Procrastination – Putting responsibilities off until later; waiting until the last possible moment to complete a task.

Cram/Cramming – Attempting to complete all work, studying and/or assignments at the very last possible moment. This usually requires long periods of time in one or two days often resulting in a feeling of stress and panic.

Think Aloud – An activity in which someone says their thoughts and ideas aloud as they work through a task (reading, solving a problem, conducting an experiment, etc…). This is done to help others hear the problem solving process used by someone who is skilled in the activity.

Timeline

Eight days (10-20 minute per period each day. Day 2 will take 30 minutes.)

Day One: Warm-up activity, Pre-Test
Day Two: Study Strategy 1 – Alternate Settings
Day Three: Study Strategy 2 – Mixed Review
Day Four: Study Strategy 3 – Self-Testing – Part 1
Day Five: Study Strategy 3 – Self-Testing – Part 2
Day Six: Other helpful strategies
Day Seven: Reading Your Textbook
Day Eight: Wrap Up – Post Test & Project Assignments

Lessons

Day 1: Warm-Up Activity – Have the following “Dear Abby” letter on the board/Day 1 Power Point slide on the board:

“Dear (Teacher’s Name), I want to be a better student and bring up my grades. Do you have any tips for good study habits that will help me? Sincerely, Struggling Student”

Pass out the Warm-Up Note Sheet to students. Have them work with their neighbor or lab partner to brainstorm advice for Struggling Student. After a few minutes (no more than 5) have groups share their advice.

After all groups have had a chance to share, discuss common themes.

Finally, have students complete and turn in the pre-test.

Day 2: Strategy 1 – Alternate Study Settings

Hook: Tell the class you are taking a quick survey. Ask: “How many of you have been told that you should study in the same place every night?” Tally the results on the board. Tell the students we will be conducting an experiment to determine whether or not this is true.

1. Divide the class into two groups.
2. Provide each group with a list of information to learn, no more than 20 items long – preferably something applicable to the upcoming test (vocabulary terms and definitions, mathematical properties, diagrams/steps, U.S. history facts or other materials connected to your curriculum).

3. Have the “control” group stay in the classroom and study the material for 20 minutes with a 5 minute break.

4. Have the “test” group study in the classroom for 10 minutes and 10 minutes in a different location (library, cafeteria, etc...).

5. Gather the students back into the room and administer a quiz over the material to all students.

6. Determine as a group which group performed better on the quiz.

**Day 3: Strategy 2 – Mixed Review**

*Hook:* As students walk in, pass out a single note card to each student. Have the Day 2 Power Point on the board as students enter: “Think of the hardest sports/band/dance/theater (etc...) practice you have ever had. After you have brainstormed, write down all of the things you did that made it so tough.” Provide the students time to share their experiences and collect note cards.

*Hook Wrap up:* “Do you think this is true about studying too?” Tally results on the board. We are going to do another experiment to determine if studying different things together helps you do better on tests.

1. Divide the students into two groups. If using the same groups as in Day 2, be sure to switch roles, the control group is now the test group and vice versa.

2. Spend 10 minutes teaching/reviewing a concept connected to this chapter (ex: finding the volume of a cylinder).

3. Have the control group work on a problem set that covers only this concept.

4. Have the test group work on a problem set that covers this topic and previously learned topics (ex: find the volume, find the height, find the radius, find the area of the base)

5. After students complete worksheets, assess student retention, recall and comprehension of the material.

6. Determine which group performed better on the quiz/assessment.

7. Homework: Students must create a 10 question practice test for the upcoming test.

**Day 4: Strategy 3 – Self-Tests**

*Hook:* Have the Power Point on the board ready as the students walk in. Tell them there will be a pop quiz and click to the next slide. Collect the papers and review the answers.

1. Collect the students’ homework from the night before.

2. Divide students into two groups.
3. For the control group, tell them they have the next 15 minutes to study material for the upcoming test.

4. For the test group, pass out a practice test (from the homework collected) to each student in the group and tell them they need to complete the practice test in the next 15 minutes.

5. Collect practice tests and remind all students that this lesson will be continued tomorrow.

**Day 5: Strategy 3 – Self-Tests Continued**

**Hook:** Pop Quiz! Have the students use the same piece of paper from the day before. Students should recognize that 5 of the 7 questions are the same as those from yesterday. Collect papers, review answers and ask: “Why was today's test easier than yesterday's?”

1. Pass out a short practice test to all students (both control group and test group). Provide 15 minutes to complete the test.

2. After completion have the students respond in their journals to the following prompt:

   “Which group do you think will have scored better on the test (study group or practice-test group)? Give at least two reasons to support your answer.”

**Day 6: Other Helpful Strategies**

**Hook:** Ask the students, “What is your favorite section of the newspaper?” There will likely be two frequently occurring responses – Sports and Comics. “Since we have already looked at how studying can be like sports, let’s see how comics can help us study.”

1. Ask students to think back to Struggling Student. Remind them that we now have 3 tested strategies to share with this student.

2. Pass out the “Good v. Bad” comparison chart and have students fill in the 3 strategies.

3. On the board/overhead – guide the students through power point comic strips to help prompt ideas of other “good study habits” v. “bad study habits.”

4. On the board, complete a model comparison chart as students brainstorm ideas based on the comics.

**Day 7: Using your Textbook to Study**

**Hook:** Using a quote from Fahrenheit 451, get students discussing negative experiences with textbooks and what qualities make texts such a struggle.

1. Have students pull out their textbooks and leave them closed. Pass out the book-walk worksheet. Ask them to work with a neighbor to locate the following information:

   a. Author/Editor
   b. Table of Contents
   c. Index
   d. Glossary
   e. Copyright Date
   f. Publisher
   g. City of Publication
2. Once pairs are finished, have students open their text to the current chapter.

3. Pass out a small pile of Post-It notes to each student.

4. Have students place one Post-It at the beginning of the glossary and the beginning of the index to increase ease of access throughout the year.

5. Select a section of the current chapter to model a Think Aloud and marking the text (using Post-Its).

6. Begin by reading the passage aloud to the students. Periodically stop, and orally complete sentences such as:
   - So far, I've learned...
   - I don't know that word, I think I'll check the glossary.
   - This made me think of...
   - That didn't make sense.
   - I think ___ will happen next.
   - I reread that part because...
   - I was confused by...
   - I'm going to mark this to ask about in class tomorrow.
   - I think the most important part was...
   - That is interesting because...
   - I wonder why...
   - I just thought of..

7. As you come to areas of the text which reflect main ideas, vocabulary, or concepts which are “confusing” during your think aloud, model marking these sections with your post-it-notes. Show students how to write their questions on the post-it for later clarification with you. Additionally, they can mark “main idea,” “vocabulary” and “unknown words” in a similar manner.

8. After completing the section allow time for a question and answer period

**Day 8: Wrap-Up**

1. Share the Dr. Seuss quote with the students before passing out the post-test.

2. Have students complete post-test.

3. Pass out final assessment. Discuss guidelines for selection, grading, due date, etc...

**Optional Extensions**

**Day 1** – Have students post their suggestions to the NY Times Blog: “Is Everything You’ve Been Taught About Study Habits Wrong?” @ http://learning.blogs.nytimes.com/2010/09/08/is-everything-youve-been-taught-about-study-habits-wrong/

**Day 2** – Have students journal their thoughts on the outcome of the experiment. Why do they feel that one group did better than the other? What does this suggest about their current study habits? What does it suggest about the changes that need to be made for future study sessions?

**Day 3** – Have the students write a brief comparison paper explaining how preparing for a test and preparing for an extra-curricular or sport are the same.

**Days 4 & 5** – Have students locate the textbook website and take a chapter practice tests. Have them print the tests they may complete.
Day 6 - Have students locate another comic strip which reflects good and/or bad study habits. Have them write a brief paragraph which explains the study habit being demonstrated.

Day 7 – Book Walk Extension – Have the students write a works cited entry for their textbook.

Think Aloud Extension - Have students pair up and conduct a reciprocal think aloud with their partners. Split the next section of the chapter into two chunks and have one student practice the think aloud process while his/her partner observes and takes notes. Then, have students switch roles.

Helpful Hints for Teachers
These mini-lessons are designed to be user friendly in a variety of academic settings. Do not feel the need to create new material to help complete these activities, instead, make use of material you already have which is tied to your current unit.

Many of these activities relate to specific skills that many students have never received direct instruction in. You may find that returning to these activities before tests will serve as an excellent refresher for your students.

Some suggestions for differentiation are listed within the teacher materials section. Do not hesitate to go above and beyond the suggestions provided there. Make use of the students’ IEPs as well as the creative solutions you and your colleagues use on a daily basis.

Simple accommodations like providing a child a personal copy, an enlarged copy or a copy on colored paper can be done with any of these activities.

Helpful Hints for Parents – See Appendix D for Parent Note and Suggested Home Activities
### Study Strategy Warm-Up

**Directions:** Complete the following chart in order to help give advice to Struggling Student.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A. What study practices have been suggested – or required – over the years by your parents and teachers?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B. Have any of the strategies or advice not worked for you?</td>
</tr>
<tr>
<td></td>
<td>If so, what was it, and why didn't it work?</td>
</tr>
<tr>
<td></td>
<td>What did you do instead?</td>
</tr>
<tr>
<td>C. What habits do you practice?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>D. Looking at boxes A-C, list your top two pieces of advice for Struggling Student. <strong>(Be ready to share these with the class!)</strong></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>What works for you?</td>
</tr>
<tr>
<td></td>
<td>What doesn't?</td>
</tr>
</tbody>
</table>
Study Habits, the Good, the Bad, and the Ugly!

**Directions:** As you read through the comic strips, determine some of the good and bad study habits you see. List each in the appropriate column.

<table>
<thead>
<tr>
<th>Bad Study Habits</th>
<th>Good Study Habits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Book Walk

Directions: Use your textbook to locate the following information.

1. What is the title of this book? _______________________________
   Where did you find this answer? _______________________________

2. Does this book have? Author Editor Both

3. What is the name of the author and/or editor? _______________________________
   Where did you find this answer? _______________________________

   Where did you find this answer? _______________________________

5. What city was this book published in? _______________________________
   Where did you find this answer? _______________________________

6. What is the copyright date for this book? _______________________________
   Where did you find this answer? _______________________________

7. On what page does the table of contents begin? ________ end? ________

8. What information is found in the table of contents?
   _______________________________

9. On what page does the glossary begin? ________ End? ________

10. What information is found in the glossary? _______________________________

11. On what page does the index begin? ________ End? ________

12. What information is found in the index? _______________________________
**Appendix B: Teacher Materials**

**Study Strategy Warm-Up (DAY 1)**

**Directions:** Complete the following chart in order to help give advice to Struggling Student.

<table>
<thead>
<tr>
<th>A. What study practices have been suggested – or required – over the years by your parents and teachers?</th>
<th>B. Have any of the strategies or advice not worked for you?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provide prompts to groups that are struggling.</td>
<td>This should be YES for EVERY STUDENT.</td>
</tr>
<tr>
<td>- Have a set study place</td>
<td>If so, what was it, and why didn’t it work?</td>
</tr>
<tr>
<td>- Study a little bit each night</td>
<td>ANSWERS WILL VARY</td>
</tr>
<tr>
<td>- Read the chapter</td>
<td>What did you do instead?</td>
</tr>
<tr>
<td>- Review your notes</td>
<td>ANSWERS WILL VARY – STUDENTS MAY SURPRISE YOU WITH THEIR CREATIVE SOLUTIONS</td>
</tr>
<tr>
<td>- Don’t study with distractions (no T.V., no iPod, no cell phone, no laptop)</td>
<td></td>
</tr>
<tr>
<td>- Ask questions when you’re confused, not the night before the test</td>
<td></td>
</tr>
<tr>
<td>- Do practice problems</td>
<td></td>
</tr>
<tr>
<td>- Complete the study guide</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>C. What habits do you practice?</th>
<th>D. Looking at boxes A-C, list your top two pieces of advice for Struggling Student. <em>(Be ready to share these with the class!)</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>Again, prompt students as needed – “Do you...?”</td>
<td>Hopefully, each group will have at least 1 suggestion which has not been made by other groups. Be prepared to provide guiding questions to those groups who say “all of mine are up there.” Use suggestions in boxes A &amp; C</td>
</tr>
<tr>
<td>- Do your homework every night?</td>
<td></td>
</tr>
<tr>
<td>- Use your homework notebook to help you plan your time?</td>
<td></td>
</tr>
<tr>
<td>- Ask questions when you don’t understand?</td>
<td></td>
</tr>
<tr>
<td>- Read the chapter?</td>
<td></td>
</tr>
<tr>
<td>- Do you use the teacher’s scheduled help sessions?</td>
<td></td>
</tr>
<tr>
<td>- Have you checked the class’s website? Etc...</td>
<td></td>
</tr>
<tr>
<td>What works for you? <strong>ANSWERS WILL VARY</strong></td>
<td></td>
</tr>
<tr>
<td>What doesn’t? <strong>ANSWERS WILL VARY</strong></td>
<td></td>
</tr>
</tbody>
</table>

**Suggestions for Differentiation – *(Day 1)* - Be alert to the student pairings you create – this will allow you to pair students with special needs with a model peer. If needed, read the prompts aloud to help foster comprehension. Assign one student as the writer if you have a student who struggles with fine motor, spelling or written expression. Provide a model of what it looks like when a “habit doesn’t work” for you so that students understand what they should be putting in their answers. Be sure to use a habit that is not related to studying so that students don’t just copy down your model.
**DAY 2 & 3**

**Suggestions for Differentiation (cont’d)** – *(Day 2)* Provide students with a smaller list of items to study. Additionally, provide audio versions of the material to be studied so that students can listen to it on a computer or CD. When giving the quiz, be sure to use a modified format/presentation. *(Both days)* **MAKE SURE TO SPLIT STUDENTS WITH DISABILITIES EVENLY BETWEEN THE TWO GROUPS!!** Always provide the option of oral or typed responses when working on in-class activities and assignments. Be sure to circulate the room while students are working in groups, periodically stop and check-in with students with disabilities to ensure they are keeping up and understanding the activity. *(Day 3)* Provide students with a modified format worksheet (less questions, word banks, formulas, etc...)

**DAY 2 OUTCOMES** – New research indicates that the students who studied in two different areas SHOULD do better on the test. You may find that this is not the case with all of your class periods. The logic behind this study suggests that when students study in two different (but equally well equipped locations) they are better able to transfer their knowledge to different settings. *(Hence eliminating “but I knew it at home” frustration for students).*

**DAY 3 OUTCOMES** – The students completing the mixed review should perform better than those who did the same sort of problems. When students are given the opportunity to repeat the same procedure over and over again, they often do not learn how to apply the concept, rather, they memorize the process. This does not allow them to demonstrate true learning and understanding. By providing the student with a mixed review, they cannot repeat the same procedure over and over until the worksheet is complete. Rather, they must remain vigilant to what the next question will ask them to do.
DAY 4 & DAY 5 Pop-Quiz Keys

DAY 4
1. A
2. A
3. C
4. D
5. A

DAY 5
1. A
2. D
3. A
4. C
5. C
6. D
7. A

Suggestions for Differentiation – (Days 4 & 5) - Many students with disabilities experience great test anxiety. To help alleviate this, be sure to tell students that these quizzes will not count toward their class grades. Additionally, some students will benefit from having the questions read aloud. You could also provide a printout of the slide which has the quiz on it so that the students can simply circle/highlight their answers. If a printout is provided, an option could be eliminated from the question to narrow their choice. Additionally, these quizzes could be proctored over the computer making use of a screen reader, enlargement software or a modified keyboard or mouse.

DAYS 4-5 OUTCOMES – The students who have taken the practice test of the first day should perform better on the whole-group practice test. Practice tests simulate the real testing environment and require students to take the activity more seriously than most would when given independent “study” time. Using practice tests is a strong study strategy which hopefully students will learn needs to be incorporated into their current battery of study methodologies.
**Study Habits, the Good, the Bad, and the Ugly! (DAY 6)**

**Directions:** As you work through the comic strips, determine some of the good and bad study habits you see. List each in the appropriate column.

<table>
<thead>
<tr>
<th>Bad Study Habits</th>
<th>Good Study Habits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passive learning in class (not participating)</td>
<td>Study Environment – mix it up, but keep it quiet**</td>
</tr>
<tr>
<td>Cramming the night before a test → leads to not getting enough sleep</td>
<td>Mixed Review – study all different types of information from the unit, not just one**</td>
</tr>
<tr>
<td>Procrastination = stress</td>
<td>Give yourself practice tests/Have others quiz you**</td>
</tr>
<tr>
<td>Bad attitude</td>
<td>Studying a little bit each night</td>
</tr>
<tr>
<td>School work is not a priority</td>
<td>Being well-rested</td>
</tr>
<tr>
<td>Studying with distractions (list examples: Facebook, iPod, cell phone, T.V., video games, etc...)</td>
<td>Using time management skills</td>
</tr>
<tr>
<td>Not studying AT ALL</td>
<td>Setting priorities – most difficult = finish first</td>
</tr>
</tbody>
</table>

**From the first 4 days of strategies**

**Other suggestions you may want to provide**
DAY 7

Book Walk

1. What is the title of this book? **ANSWERS WILL VARY**
   Where did you find this answer? **Cover/Title Page**

2. Does this book have? **AUTHOR** **EDITOR** **BOTH**

3. What is the name of the author and/or editor? **ANSWERS WILL VARY**
   Where did you find this answer? **Title Page/Author Section/Introduction (VARIES)**

4. What company published this book? **ANSWERS WILL VARY**
   Where did you find this answer? **Cover/Title Page**

5. What city was this book published in? **ANSWERS WILL VARY**
   Where did you find this answer? **Title Page**

6. What is the copyright date for this book? **ANSWERS WILL VARY**
   Where did you find this answer? **Copyright page/back of Title Page**

7. On what page does the table of contents begin? **VARIES End? ** **VARIES**

8. What information is found in the table of contents?
   **A list of the chapters within the book that includes chapter titles, subtitles, and the page number where each chapter begins.**

9. On what page does the glossary begin? **VARIES End? ** **VARIES**

10. What information is found in the glossary? **Definitions of key terms (listed in alphabetical order) found in the text.**

11. On what page does the index begin? **VARIES End? ** **VARIES**

12. What information is found in the index?
    **An alphabetical list of topics found within the text and the page number which the topic is located within the text. Often includes names and concepts.**
**Suggestions for Differentiation Book Walk** – If necessary, provide student with a book in which these locations are already tabbed. Some students may benefit from being able provide their answers orally (either to you or to their partner). The book walk worksheet can be presented via computer with use a screen reader, enlargement software or modified keyboard/mouse. Use judgment when making partners to ensure that students with disabilities are paired with an empathetic classmate.

**Suggestions for Differentiation Think Aloud** – Some students will struggle with tracking on the page as you read aloud. Provide an overlay to help them keep up with you as you read. Additionally, walk around the room as you read/mark your text as this will help students remain focused on the activity. Encourage students to mark their texts as you mark your own, this will not only give them the guided practice of marking their text, but it will help to keep them engaged in the process.

Some students may struggle with writing their questions on Post-It notes, for these students, provide different color Post-It notes and a "key" (For example: yellow = main idea, pink = vocabulary, blue = question I have, green = word I don’t know). This will simplify the process for them and keep the student working on the same activity as his/her peers.

If the student uses an e-book, teach them how to use the highlight function to mark the various areas. A printout of the chapter could also be made available on colored paper or in various font sizes.
Appendix C: Assessments

Part One - Pretest/Posttest

Name: _________________________ Date: _______

Period: _______

Study Strategy Pre-Test A

Directions: Place an X in the box beside each number that describes you.

1. I can find the main idea in a paragraph I read for all of my textbooks. †

2. I can find the important information in the paragraphs I read for all of my textbooks. †

3. I can find these parts of a book:
   a. Title †
   b. Author/editor †
   c. Publisher †
   d. City of publication †
   e. Copyright date‡

4. I can use the following parts of my textbooks:
   a. Preface †
   b. Introduction †
   c. Table of contents †
   d. Chapter headings †
   e. Highlighting †
   f. Italicized words †
   g. Footnotes †
   h. Captions †
   i. Glossary †
   j. Index †
   k. Appendices ‡

5. I can use a dictionary to help me with my homework. †

6. I can use other tools such as: other books (textbook, or not), encyclopedias, newspapers, magazines, Internet, maps, etc...to help find information I need. †

7. I can remember the information I read in my textbooks. †

8. I can understand the information in maps, graphs, tables, pictures and charts that are found in my textbooks. †

9. I can take notes or highlight the important information I read from my books. †

10. I can write a summary of the material that I read about. †
11. I can read and understand:

   a. Novels
   b. Biographies
   c. Poetry
   d. Textbooks
   e. Websites

12. I can understand the different kinds of vocabulary for my different classes.

13. I do my homework every night that it is given.

14. I do homework in the same place every night.

15. I do homework wherever I land.

16. I usually have my cell phone and iPod with me when I study.

17. I tend to study in front of the T.V.

18. I remember to bring all of my materials home to do my homework.

19. I remember to bring my finished homework back to school.

20. I listen to and follow directions that my teacher gives at school.

21. I feel that I have strong study skills that I use to get ready for tests.

22. I don’t usually study for tests.

23. I study for tests, but I don’t feel like I do a very good job.

24. I often cram my studying into one night before big tests.

25. I try to break my studying up over at least a week.

26. I ask my parents/friends/siblings to quiz me before tests.

27. I try to get a good night’s sleep before a test.

28. I stay up all night studying when I know I have a big test.

29. I think I am a good reader.

30. I think I am a good student.
Pre-Test B

Name: ______________________________    Date: __________

Period: __________________

Study Skills Inventory

Directions: Read each statement and consider how it applies to you. If it does apply to you, check Y. If it does not apply to you, check N. The purpose of this inventory is to find out about your own study habits and attitudes.

1. Y__ N__ I spend too much time studying for what I am learning.

2. Y__ N__ I usually spend hours cramming the night before an exam.

3. Y__ N__ If I spend as much time on my social activities as I want to, I don't have enough time left to study, or when I study enough, I don't have time for a social life.

4. Y__ N__ I usually try to study with the radio, iPod, computer and TV turned on.

5. Y__ N__ I can't sit and study for long periods of time without becoming tired or distracted.

6. Y__ N__ I go to school regularly, but I usually doodle, daydream, text or fall asleep.

7. Y__ N__ My class notes are sometimes difficult to understand later.

8. Y__ N__ I usually seem to get the wrong material into my class notes.

9. Y__ N__ I don’t review my class notes periodically throughout the semester in preparation for tests.

10. Y__ N__ When I get to the end of a chapter, I can’t remember what I’ve just read.

11. Y__ N__ I don’t know how to pick out what is important in the text.

12. Y__ N__ I can't keep up with my reading assignments, and then I have to cram the night before a test.

13. Y__ N__ I lose a lot of points on essay tests even when I know the material well.

14. Y__ N__ I study enough for my test, but when I get there my mind goes blank.

15. Y__ N__ I often study in a haphazard, disorganized way under the threat of the next test.

16. Y__ N__ I often find myself getting lost in the details of reading and have trouble identifying the main ideas.
17. **Y__ N__** I rarely change my reading speed in response to the difficulty level of the selection, or my familiarity with the content.

18. **Y__ N__** I often wish that I could read faster.

19. **Y__ N__** When my teachers assign papers I feel so overwhelmed that I can't get started.

20. **Y__ N__** I usually write my papers the night before they are due.

21. **Y__ N__** I can't seem to organize my thoughts into a paper that makes sense.

Use the categories listed below to “score” your inventory.

If you have answered "yes" to two or more questions in any category, you may need more information/help in those categories.

If you have one "yes" or less in a category, you are probably proficient enough in these areas.

- Time Scheduling - 1, 2, and 3
- Concentration - 4, 5, and 6
- Listening & Note taking - 7, 8, and 9
- Reading - 10, 11, and 12
- Exams - 13, 14, and 15
- Reading - 16, 17, and 18
- Writing Skills -19, 20, and 21
**Pre-Test C**

Name: ________________________________  
Period: ________________  
Date: _____________

**Study Skills:**  

**What do you know?**

**Directions:** Read each statement about studying below. Then, determine if the statement is true or false. Mark your answer on the line.

- 1. It is better to study for 25 minutes/day for 5 days than to study for 2 hours the night before the test.
- 2. The best place to study in your house is somewhere where you have easy access to: the TV, cell phones, iPods, game systems, computers and the kitchen.
- 3. The same study strategies work equally well for all different types of tests.
- 4. Notes are a good tool for studying.
- 5. Reading the textbook is not necessary for success on the test.
- 6. Most textbook websites do not have any helpful hints for preparing for a test.
- 7. It is important (and necessary) to schedule study time, just like you would a dentist appointment.
- 8. Strong textbook reading strategies and good note taking skills are part of good study habits.
- 9. Staying up late and cramming for your exams will result in better overall test grades.
- 10. Getting a good night’s sleep the night before an exam will not help you feel more prepared for your test.
- 11. Time management, organization, memory and concentration are all important tools for studying.
- 12. In order to become a good studier you have to PRACTICE studying.
- 13. You do not need to study in the same place every time you study.
- 14. Setting study goals will help you accomplish more with your studying.
- 15. It is good to reward yourself and take breaks when you study well and meet your goals.
Study Strategy Post-Test

Directions: Answer the following questions to the best of your ability.

1. The three study strategies we experimented with in class were:
   a. 
   b. 
   c. 

2. The strategy I thought was the most helpful was __________________________ because it helped me to: __________________________________________________________________
   ______________________________________________________________________________________________________________
   ______________________________________________________________________________________________________________

3. List at least 4 other study strategies we discussed in class:
   a. ________________________________________________________________
   b. ________________________________________________________________
   c. ________________________________________________________________
   d. ________________________________________________________________

4. Two of the most helpful parts of the textbook are:
   a. 
   b. 
   because, ____________________________________________________________
   ____________________________________________________________________

214
5. When I find parts of my textbook that are confusing, here are two things I can do to help:
   
a. _________________________________

b. _________________________________

6. I think this study strategies unit was helpful. TRUE -or- FALSE
   
   Explain why: _________________________________
   _________________________________
   _________________________________
Key for Pretest/Posttest
There are no right or wrong answers for the first two pre-test options. The purpose of this assessment is to provide you and the students with insight into the areas where they require additional guidance and instruction. These can be used to help you determine which of the 6 lessons will need to be taught and which require more time and attention than others. The pre-tests could also be used again as the follow-up to the study strategy unit to determine where students feel they have made growth over the course of the week. Ideally, the true post-test for this unit should be the chapter/unit test you have been preparing students for with these activities.

Pre-Test C Key

1. T  
2. F  
3. F  
4. T  
5. F  
6. F  
7. T  
8. T  
9. F  
10. F  
11. T

Post-test Key

1. The three study strategies we practiced in class were:
   (1) alternate study settings, (2) Mixed Review, (3) Self-tests

2. ANSWERS WILL VARY.

3. ANSWERS WILL VARY, some examples:
   - Break studying into short chunks
   - Get a good night’s sleep
   - Eat a good breakfast/lunch
   - Ask questions
   - Ask for a study guide
   - Use the textbook website
   - Make flashcards for vocabulary
   - Have friends/family quiz you
   - Read & Reread your textbook

4. ANSWERS MAY VARY – “Best answers:”
   - Index – makes finding a specific topic very easy and fast.
   - Table of Contents – helps locate the start of the current chapter.
   - Glossary – provides definitions for unknown terms.

5. Mark the book with a Post-it and ask the teacher the next day; check my notes; check the textbook website; ask a classmate

6. ANSWERS WILL VARY
Assessments Part Two

Portfolio

Students will maintain a portfolio of artifacts generated from the Starting Wright project. The following ideas can be incorporated into either:

- **Index Card Approach** - Students select from a list of projects with various levels of difficulty and point value.

- **Tic Tac Toe** – Assessments are arranged on a tic-tac-toe board and students must select 3 activities which are connected in a straight line.

1. Students create and illustrate a “Dos and Don’ts” brochure with tips for effective study habits, and make them available in the school library or on the school Web site.

2. Students create a presentation of study “Dos and Don’ts” and share the presentation to a younger grade level.


4. Students create a poster which illustrates the 3 study strategies discussed in class.

5. Students choose one or more strategies to implement into their own study practice. They keep a journal over the course of a unit, quarter or semester, chronicling their use of the habit(s) and the results in the form of quiz, test and course grades.

6. Have students interview an adult in their life (parent, teacher, grandparent, etc...). They are to investigate what study strategies these adults used, find out what worked, what did not, what advice that adult has to share, etc. Students need to submit their interview questions, documentation of answers (written or recorded) and their final summary paper.

7. Students create a webcast to be posted on the district website which shares the “Dos and Don’ts” of studying. Students must create a script for this to be approved before recording the webcast.

8. Have students create their own comic strips reflecting good study strategies. Each comic needs to be paired with a brief explanation of the study strategy being demonstrated.

9. To make the home connection, have students select 2-3 vocabulary terms, or study strategies and explain them to their parents/adults at home. Provide students with a form which they can complete with their parents to demonstrate that they have completed this activity.

10. Students will schedule a one-on-one time to meet with the teacher to demonstrate a complete think-aloud of a chapter/section of a chapter. Text must include post-it notes that the student is able to discuss with the teacher.
Appendix D: Notes for Parents

Dear Parents,

As we embark on a new school year, (Enter Name of School) feels that it is extremely important, not only to teach your children the benchmarks and standards outlined in the Ohio CORE, but also the skills and strategies which will assist them in demonstrating mastery of this material. As we begin the year, we will be taking pieces of class time to help coach students in various study strategies to help provide them guidance in how to best prepare for assignments, quizzes, tests and projects.

We understand that students do not always know how to prepare themselves for the tasks which will be presented at the high school level. Additionally, many have never received direct instruction in these strategies. In order for students to "buy into" and make use of skills such as getting organized for school, taking effective notes, mastering complex textbooks, or writing brilliant answers to essays, they need a more global picture of how organization and study skills can help them. Study strategies will not work unless students use them. Yet in order for students to have access to a program of study skills, parents, school administrators, and especially educators must be committed to the view that organization and study skills are important pieces of the “school” puzzle.

As we work to enhance these skills with your child, we ask that you assist us in the role of “study coach” when your son or daughter brings home assignments. Talk to them about their classroom responsibilities, ask them when due dates will be, and most importantly, listen to what your child says – their answers will provide great insight into their successes and struggles. Enclosed you will find some suggested activities which you can use to become a member of the study team we are creating. If you have any questions, please do not hesitate to contact me.

Yours in education, NAME
Suggested Home Activities

- **Maintain a set schedule** – Provide your child with a set study time and at least two different places to study. Recent research suggests that by having more than one study location, students are better able to generalize the material they study. This means that when they are sitting in a testing environment, they are less likely to “blank” on the test. Additionally, routine will help ease the nightly homework & study struggle.

- **If concentration/focus is a concern** - Use a timer and gradually increase the amount of time your child works before taking a break; this will help your child see the “light at the end of the tunnel” and will gradually increase his/her stamina when working on academic tasks.

- **Don’t allow your child to study for too long!** Sounds opposite of what a teacher might say? Cramming is not effective for long term understanding. Students need to do a little each day building up to an exam. This allows the brain time to process each part rather than attempt to squeeze everything in at once...a virtual guarantee that it will all fall out!

- **Provide the “right” equipment** – If organization is a struggle for your child, keep a homework “tool box” in the study area. Keeping all of these supplies in the set study area will help to shorten study time as your child will not have to repeatedly get up to look for materials. Some suggested equipment: pens, pencils, paper, highlighters, post-it notes, erasers, stapler, hole-punch, dictionary and thesaurus, spell check (Franklin), note cards, etc...

- **A dry erase calendar** – Children benefit from visual reminders, by helping your child maintain an up-to-date calendar you will be providing guidance to them on establishing priorities and organization of time.
• **Provide encouragement and positive feedback** – Often, homework and studying are unpleasant events which many teens avoid. By high school students have had plenty of negative encounters with school work and have learned that giving up is sometimes easier than trying. Positive words go a long way toward helping keep your son/daughter on track for a positive high school experience.

• **Encourage variety** – Think about studying like you would a workout for an athlete – practices require strength training, stamina, skills drills and speed. Studying for tests is a workout for the brain. By using different study methods your child will be able to retain the information better. So if your son/daughter chooses to review the chapter tonight, take a moment and provide them a verbal quiz tomorrow. Self-tests are a terrific study strategy because they mimic the real deal. Other methods of study include: using flashcards, the textbook websites which offer a variety of online questions, test-prep, audio text, practice tests, games and chapter summaries and reviewing or rewriting notes.
Appendix E: Additional Resources
- Power Point
Area: Research

STEMM Career Connection: This activity will help prepare students for a career of their choice in a STEMM field.

Title: Believe It or Not?

Grade Levels: 9th, 10th

Academic Content Areas: Science, English Language Arts, and Technology

Topics: Internet Research, Assessing Sources

Goal: Students will critically assess internet resources.

Performance Objectives:
Students will:
1. draw logical conclusions based on information and evidence presented by the designated web pages.
2. determine whether the web page should be considered a credible source of information.
3. analyze the sources’ validity.

Big Question
When using the internet for research, how do you know whether the source you are using is a credible and reliable source on your topic of study?

Brief Summary
In this activity, students will compare two websites that concern a similar topic of interest to determine which could be used in an academic research paper.

Main Ideas
In our ever-changing technologically based society, it is crucial for individuals to develop scientific habits of mind and critical thinking skills, and the ability to solve problems. To accomplish this, students need to critically evaluate multiple sources of information and the validity of claims about a given topic, product, person, and or viewpoint.

Content Standards
Science Grades 9-10
Standard: Scientific Inquiry

Benchmark A: Participate in and apply the process of scientific investigation to create models and to design, conduct, evaluate and communicate the results of these investigations.

English Language Arts Grades 8-10

Standard: Research

Benchmark B: Evaluate the usefulness and credibility of data and sources.

Technology Grades 9-10

Standard: Technology and Information Literacy

Benchmark A: Determine and apply an evaluative process to all information sources chosen for a project.

Benchmark D: Evaluate choices of electronic resources and determine their strengths and limitations.

Materials

- Computer or iPad with internet access
- Student copies of Website Evaluation

Preparation for Lesson

- Obtain the use of computers or iPads for the class.
- Download the news story “Study: Multiple Stab Wounds May be Harmful to Monkeys” from The Onion News Network. WARNING: This website will be blocked by your school filters as it is generally not appropriate. http://www.theonion.com/video/study-multiple-stab-wounds-may-be-harmful-to-monke.14150/
- Copy Website Evaluation for students.
- Your school librarian should be able to provide links to the various sites so that students may forgo typing in the web addresses on the Website Evaluation Worksheet.

Vocabulary

Definitions provided by dictionary.com

Accuracy - the condition or quality of being true, correct, or exact; freedom from error or defect; precision or exactness; correctness.

Authority - the power to determine, adjudicate, or otherwise settle issues or disputes; jurisdiction; the right to control, command, or determine.

Objective - not influenced by personal feelings, interpretations, or prejudice; based on facts; unbiased: an objective opinion.
Currency - a time or period during which something is widely accepted and circulated.

Bias - a particular tendency or inclination, especially one that prevents unprejudiced consideration of a question.

Time needed
Each of the sections outlined below, with the exception of Day Two, need not necessarily take an entire class period but could be modified as needed to fit part of a class period. In addition, some sections could be omitted.

Day One:
- Show the “Myth Busters Raw: Creaming the Cube” video clip.
- Using the Discussion Guide, discuss with the students their reactions to the video clip.
- Show “Study: Multiple Stab Wounds May be Harmful to Monkeys” from The Onion News Network.
- Using the Discussion Guide, discuss with the students their reactions to the video clip.

Day Two:
- View the Starting Wright Academic Skills video clip - Miss Hannah, Internet Research Tips and 8.
- Discuss assignment, Website Evaluation, providing possible answers, as needed. For example, an author’s motivation might be to sell a product such as a book or share new information that has come to light as a result of research on a topic.
- Students use the remaining class time to evaluate the websites and complete the assignment.

Day Three:
- Discuss students’ thoughts on the credibility of the two websites and their conclusions. Review the answers to the Website Evaluation Worksheet.

Optional Extensions
- To build upon this activity, present a direct instruction lesson on how to use certain criteria to evaluate sources of information or create activities to teach the vocabulary.
- Students need a lot of practice evaluating media before they are able to demonstrate this ability on their own. Allow them to practice this skill using different topics and web sites.
- To extend this activity, provide a general topic or question and have students locate and then evaluate internet sources using a blank rubric.
- Use this activity to help prepare students for completing a larger research project.

Helpful Hints for Teachers
- Allow students access to digital copies of the worksheets so that they may type their answers.
- Allow students to work in groups will lead to more discussion of the websites.
- Demonstrate a “guided practice” on Day Two by going through the rubric questions with a different website covering a different topic.

Helpful Hints for Parents
- While with your child, for example watching television, discuss with them information provided on programs and whether it is believable or not. This can be done for advertisements as well as for programming.
Appendix A: Discussion Guide

Believe It or Not?
Discussion Guide

Myth Busters Raw: Creaming the Cube

- Allow students to express their initial reactions to the clip.

  Ask: “What did you think?”

- Explain to the students that the clip has been “faked”. When the clip was aired on television, the Myth Busters, Adam and Jamie, explained how they had simply played the clip backwards. It appears as though they are solving the puzzle but instead they are actually scrambling the cube. Students can search this on YouTube from home for more information.

  Ask: “Why did they think it was real?”

  “Did they realize it had been faked?”

  “What made them realize it had been faked?”

  “What made the video clip believable?”

Study: Multiple Stab Wounds May be Harmful to Monkeys

- Allow students to express their initial reactions to the clip.

  Ask: “What did you think?”

- Explain that The Onion News Network is NOT a credible news source despite its appearance. The Onion is an entertainment newspaper and a website featuring satirical articles reporting on international, national, and local news.

  Ask: “Why did they think it was real?”

  “Did they realize it had been faked?”

  “What made them realize it had been faked?”

  “What made the video clip believable?”

Wrap-up

After the above discussion, wrap-up with leading students to the conclusion that not all our varied sources of media are credible and that it is critical to view these sources with a skeptical mind.

Ask: “When using the internet for research, how do you know whether the source you are using is a credible and reliable source on your topic of study?”
Appendix B: Website Evaluation

Name: __________________________________________________________

Believe It or Not?
Website Evaluation

DIRECTIONS: The following two web pages cover a similar topic, “Who built the Egyptians pyramids?” but differ greatly. Using the rubric, evaluate the websites listed below by skimming the information to determine whether these sources are credible. Complete the following Conclusion Question.

<table>
<thead>
<tr>
<th>QUESTIONS</th>
<th>WEBSITE #1</th>
<th>WEBSITE #2</th>
</tr>
</thead>
</table>

Who is/are the author(s)?

Is the author an authority on the subject?

How do you know?

Is the source providing accurate information?

How did you determine the accuracy of the information?

QUESTIONS | WEBSITE #1  | WEBSITE #2  |
-----------|-------------|-------------|
**Conclusion Question:**

Remember Occam’s Razor, "The simplest explanation for some phenomenon is more likely to be accurate than more complicated explanations." Using this line of reasoning and the completed rubric, which website do you believe to be credible? Explain your thinking.

________________________________________________________________
________________________________________________________________
________________________________________________________________
________________________________________________________________
________________________________________________________________
________________________________________________________________
________________________________________________________________
________________________________________________________________
________________________________________________________________
## Appendix C: Teacher Website Evaluation Worksheet

### Believe It or Not?
Website Evaluation

**DIRECTIONS:** The following two web pages cover a similar topic, “Who built the Egyptians pyramids?” but differ greatly. Using the rubric, evaluate the websites listed below by skimming the information to determine whether these sources are credible. Complete the following Conclusion Question.

*NOTE: Answers will vary*

| QUESTIONS | **Website #1**
|-----------|---------------------------------|
|           | http://jcolavito.tripod.com/lostcivilizations/id10.html | **Website #2**

<table>
<thead>
<tr>
<th>Who is/are the author(s)?</th>
<th>Jason Colavito</th>
<th>Jonathan Shaw of Harvard Magazine, an affiliate of Harvard University, writes about Archaeologist Mark Lehner.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is the author an <strong>authority</strong> on the subject?</td>
<td>No</td>
<td>Jonathan Shaw- no Archeologist Mark Lehner Ph. D., over 30 years’ experience in Egypt - yes</td>
</tr>
<tr>
<td>How do you know?</td>
<td>He is listed only as an author and editor. He has written in the science fiction and horror genre. An additional link to his biography gives an error message. Website is on Tripod.com, where anyone can make a web page.</td>
<td>Following links to both individuals gives their credentials.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Is the source providing accurate information?</th>
<th>Recounts a conspiracy theory of a part-time amateur pyramidologist. You could fact check on another website or resource. By their nature conspiracy theories are not widely accepted by academic communities and draw conclusions without enough supporting evidence.</th>
<th>Yes</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Objective vs. Biased</th>
<th>Not objective, this person has no authority in this subject area.</th>
<th>Objective, this is a professional journalist writing about the findings of an expert in the field of archeology.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is the resource <strong>current</strong>?</td>
<td>Copyright 2000-2003 is the only date associated with the web page. It is located at the bottom left corner of the article.</td>
<td>July-August 2003, dated.</td>
</tr>
<tr>
<td>How did you make this determination?</td>
<td>The date is located at the top of article.</td>
<td></td>
</tr>
</tbody>
</table>

**Conclusion Question:**

Remember Occam's Razor, "The simplest explanation for some phenomenon is more likely to be accurate than more complicated explanations." Using this line of reasoning and the completed rubric, which website do you believe to be credible? Explain your thinking.

Students should come to the conclusion that Website #2 is credible, while Website #1 is not. If the students read both articles carefully, they will find that Website #1 is convoluted and it is difficult to comprehend the viewpoint being expressed by the author. Website #2 is written in a manner that clearly expresses the point of Mark Lehner, a professional in the field of archeology. Website #1 is not written by an authority in contrast to Website #2 which is written by an authority.
Appendix E: Additional Resources

Cornell University Library- Five Criteria for Evaluating Web Pages
http://olinuris.library.cornell.edu/ref/research/webcrit.html

Duke University Libraries- Evaluating Web Pages
http://library.duke.edu/services/instruction/libraryguide/evalwebpages.html

Discovery School’s Kathy Shrock’s Guide for Educators- Critical Evaluation Surveys
http://school.discoveryeducation.com/schrockguide/evalhigh.html
Personal Skills
Area: Technology, Communication, Career and Post-Secondary Prep

**STEMM Career Connection:** Applicable to all future professions which require post-secondary education of any type

**Title:** Filling Your Toolbox

**Grade Levels:** Eighth – Twelfth

**Academic Content Areas:** All content areas

**Topics:** Self-Advocacy, Post-Secondary Transition, Independence

**Goal:** Students are inspired to learn more about the resources available to them as they enter post-secondary programs for STEMM careers.

**Performance Objectives:**
Students will:
1. explain the resources available to them both currently (in their high school/community) and in the future (college of choice).

**Big Questions**
What tools are available to students with disabilities which will help them as they pursue education and training in STEMM fields?
Who are the key resource providers within the school?
Why is it important to know where to get information?

**Brief Summary**
The concept of accommodations and modifications is typically only vaguely understood by students with disabilities (and often their parents). When described as tools, or a tool box, students are better able to make a connection to real life and how these resources help them succeed. These two activities are designed to help students understand what resources and tools are available to them as they complete their high school education and prepare for their transition to post-secondary programming.

**Main Idea**
Students will expand upon their communication skills and build their knowledge base of educational resources which are directly related to their success in both high school and beyond. Most high school students and their parents do not realize the challenges that lay ahead as they dream of going to college. For students with disabilities this can be compounded by their academic and physical needs. Students need to learn how to locate and use the tools available to them in all settings as this will help them...
prepare for the independence necessary for success in college. These scavenger hunts are an engaging way for students to begin to develop their self-advocacy skills for adulthood.

**Content Standards**

**TECHNOLOGY**

**Standard 3: Technology for Productivity Applications** - Students learn the operations of technology through the usage of technology and productivity tools. Students use computer and multimedia resources to support their learning. Students understand terminology, communicate technically and select the appropriate technology tool based on their needs. They use technology tools to collaborate, plan and produce a sample product to enhance their learning and solve problems by investigating, troubleshooting and experimenting using technical resources.

B. Identify, select and apply appropriate technology tools and resources to produce creative works and to construct technology-enhanced models.

**Standard 4: Technology and Communication Applications** - Students use an array of technologies and apply design concepts to communicate with multiple audiences, acquire and disseminate information and enhance learning. Students acquire and publish information in a variety of media formats. They incorporate communication design principles in their work. They use technology to disseminate information to multiple audiences. Students use telecommunication tools to interact with others. They collaborate in real-time with individuals and groups who are located in different schools, communities, states and countries. Students participate in distance education opportunities which expand academic offerings and enhance learning.

A. Communicate information technologically and incorporate principles of design into the creation of messages and communication products.

B. Create, publish and present information, utilizing formats appropriate to the content and audience.

**Standard 5: Technology and Information Literacy** - Students engage in information literacy strategies, use the Internet, technology tools and resources, and apply information-management skills to answer questions and expand knowledge. Students become information-literate learners by utilizing a research process model. They recognize the need for information and define the problem, need or task. Students understand the structure of information systems and apply these concepts in acquiring and managing information. Using technology tools, a variety of resources are identified, accessed and evaluated. Relevant information is selected, analyzed and synthesized to generate a finished product. Students evaluate their information process and product.

C. Formulate advanced search strategies, demonstrating an understanding of the strengths and limitations of the Internet, and evaluate the quality and appropriate use of Internet resources.

D. Evaluate choices of electronic resources and determine their strengths and limitations.

**ENGLISH LANGUAGE ARTS**

**Research Standard** - Students define and investigate self-selected or assigned issues, topics and problems. They locate, select and make use of relevant information from a variety of media, reference and technological sources. Students use an appropriate form to communicate their findings.

B. Compile, organize and evaluate information, take notes and summarize findings.

C. Organize information from various resources and select appropriate sources to support central ideas, concepts and themes.

D. Communicate findings, reporting on the substance and processes orally, visually and in writing or through multimedia.

**Communication: Oral and Visual Standard** - Students learn to communicate effectively through exposure to good models and opportunities for practice. By speaking, listening and providing and interpreting visual images, they learn to apply their communication skills in increasingly sophisticated...
ways. Students learn to deliver presentations that effectively convey information and persuade or entertain audiences. Proficient speakers control language and deliberately choose vocabulary to clarify points and adjust presentations according to audience and purpose.

A. Use a variety of strategies to enhance listening comprehension.
C. Select and use effective speaking strategies for a variety of audiences, situations and purposes.
E. Give informational presentations that present ideas in a logical sequence, include relevant facts and details from multiple sources and use a consistent organizational structure.
G. Give presentations using a variety of delivery methods, visual displays and technology.

Materials
- Student Directions Sheet
- Scavenger hunt worksheets
- Computers (day 2 & college scavenger hunt)
- Phone (optional for college scavenger hunt)
- Camera, video camera, iPod
- Starting Wright video clip – Personal Skills (www.startingwright.org)
- DO-IT Invisible Disabilities and Post-Secondary Education video (www.washington.edu/doit/Video)

Preparation for Lesson
- Copy: Student Direction Sheet and Scavenger hunt worksheet
- Modify the direction sheet and due dates as appropriate
- Send home parent letter and project calendar
- Preview and download Starting Wright video clip – Personal Skills (min. 5:10-6:10)
- Preview and download DO-IT video – select appropriate section for classroom setting (min. :20-3:52 and 7:00-14:15 are directly connected to this lesson)

Vocabulary

Self-Advocacy – an individual’s ability to effectively communicate, convey, negotiate or assert his or her own interests, desires, needs, and rights. It involves making informed decisions and taking responsibility for those decisions. (VanReusen et al., 1994)

Self-Disclose - sharing information with others which they would not normally discover about us. It involves risk and vulnerability for the person sharing the information”. In other words self-disclosure is the process by which we let ourselves be known to others. Specifically, it is the sharing of information regarding one’s disability with the school/university and its constituents. (http://counsellingcentral.com/counselling-definition-of-the-week-self-disclosure/)

Office of Disability Services – (EXAMPLE) - This office is committed to providing the special support services that students with disabilities require to be successful. Services may also be provided to students who have temporary disabilities such as a broken arm which prevents taking notes in class. http://www.findlay.edu/offices/adminoffices/academicsupportcenter/academiccounseling/glossary.htm
IDEA – a United States federal law that governs how states and public agencies provide early intervention, special education and related services to children with disabilities. It addresses the educational needs of children with disabilities from birth to age 18 or 21 (U.S. Code, Section 1432 & US Code, Section 1412)

ADA – The Americans with Disabilities Act (ADA) was signed into law under President George H W Bush in 1990. It applies to all private and state-run businesses, employment agencies and unions with more than fifteen employees. The goal of the ADA is to make sure that no qualified person with any kind of disability is turned down for a job or promotion, or refused entry to a public-access area. (http://www.disabled-world.com/disability/ada/ada.php#ixzz1RcaofEcl)

Auxiliary Aids - services or devices that enable persons with impaired sensory, manual, or speaking skills to have an equal opportunity to participate in, and enjoy the benefits of, programs or activities conducted by the agency (http://definitions.uslegal.com/a/auxiliary-aids/)

Timeline
The amount of time needed will vary according to student population; a suggested timeline is offered here. 2-3 non-consecutive days in class. Scavenger hunt should be completed outside of the classroom. If presentations are not being done, this is a 1 day in-class commitment.

- **Day One**: Hook, discussion and description of assignment (full period)
- **Day Two (after scavenger hunts are completed)**: In-class independent presentation work (full period)
- **Day Three**: Presentation of scavenger hunt findings (full period)

Lesson
**Day 1 Hook**: Have the following question(s) written on the board:

1. What tools do you need to change the oil in your car?
2. What tools do you need to bake a cake?

As students enter the classroom, pass out a notecard and ask them to write their answer to the board questions on one side of their notecard.
Show the video clips in the following order: DO-IT Invisible Disabilities and Postsecondary Education (:20-3:52), Starting Wright Personal Skills (5:10-6:10), DO-IT (7:00-14:15).
Have students flip over their cards and ask them to answer the following question. “Thinking about the videos we’ve just seen and your own school experiences, what tools do you need to be a successful student?”
Have students pass in their notecards and discuss the need for the correct tools to do specific jobs.
Suggestions for guiding questions:
- Why are the tools needed to change the oil different than the tools needed to bake a cake?
- What do we mean by tools to be successful in school? (Hint: think about what you saw in the video).
- Are the tools for high school the same as the tools for college? Why or why not?
- How do you make sure you have the tools you need? (This question could branch into a related but separate discussion and/or lesson on ADA and IDEA)
- What tools and resources do you think are available to help you while you’re in high school?
- How do you get the tools and resources you need when you are ready to go on to college?
Explain and pass out the assignment and scavenger hunt worksheets. Provide students the timeline for due dates.

**Day 2 (optional):** Students are provided class time to construct their presentations based on their findings.

**Day 3 (optional):** Individuals and/or teams present their findings to the class.

**Optional Extensions**
Invite parents in for an open house/parent night. Have the students present their findings as part of the open house.
Have students help contact local agencies and universities to create a resource library for the school. Or, invite these local agencies and schools in for a transition night to help inform parents and community members of the resources available to students with disabilities.
Have students upload their presentations onto the district website or present them to underclassmen.

**Helpful Hints for Teachers**
Many districts, based on size and financial resources, offer a wide variety of resources to students with disabilities. The questions listed in this scavenger hunt offer a sample of the most commonly offered services. Be sure to read over this list carefully to make sure that everything included is offered by your school. Additionally, if there are important resources missing, be sure to add them in prior to the lesson. Finally, in the teacher material section, the “key” for the underclassmen scavenger hunt may not accurately reflect the answers for your building. District employees wear many hats; hopefully the key will provide you with some guidance for determining the actual response appropriate for your district. Additionally, the college-based scavenger hunt does not have a complete answer key as the answers will vary widely based on the post-secondary institution the student selects to research.
Some students will benefit greatly from teacher guidance and leading questions. Other students may do better to work in pairs, having the students divide up the questions so that each is responsible for only a portion of the information.
Some suggestions for differentiation are listed within the teacher materials section. Please adapt to meet the needs of your students. Make use of the students’ IEPs as well as the creative solutions you and your colleagues use on a daily basis. Simple accommodations like providing a child a personal copy, an enlarged copy or a copy on colored paper can be done with any of these activities.
A suggested timeline is available under teacher resources. Incorporating the due dates and in-class activity dates onto a calendar that is sent home with the parent letter would be an ideal method of helping students organize their time and prioritize their work.

**Helpful Hints for Parents** – See Appendix D for Parent Note and Suggested Home Activities.
Appendix A: Student Materials
Directions Sheet

Filling Your Toolbox

Scavenger Hunt
It is important that you know where to find the help that you need. By completing this scavenger hunt you will be locating information on the different types of help available to you. For upperclassmen, you are already aware of the help available here, however, it is time for you to locate the help you will need after high school. You will be conducting this research outside of class time. A calendar of due dates is listed below.

While locating these resources, you will need to document your findings. You may use a camera or a video camera to help you keep track of your information. You will need to record the names and locations of everything you find.

After you have located all of your answers for the scavenger hunt, you will select one of the following projects to create and present to your classmates.

Presentation Options

- **Create a newspaper “Student Wanted” Ad** – Select at least 3 of the resources you located and created a “student wanted” ad for each. This ad will be the reverse of a “help wanted” ad, it will advertise the opening for students to come and receive the help offered by this resource.
- **Bulletin Board** – Create a bulletin board (in either the classroom or hall) which depicts the various resources available to students.
- **Brochure** – Create a tri-fold brochure which summarizes the resources available. This must include pictures and be created electronically.
- **Commercial** – Create and record a “resource” commercial which advertises your findings. A script must be approved before you record.
- **Photo Dictionary** – Use the photos of the various resource providers/locations to create a photo dictionary of resources. This must be created electronically.
- **Poem or Song** – Write a poem or song which details the resources available. Final drafts must be typed.
- **Essay** – Write an informative essay outlining the resources available to them.
- **Power Point** – Create a power point that depicts the resources available. Must include pictures and be a minimum of 10 slides long.
- **Map** – Create a map of the campus (high school or their selected university) which identifies the location of all of the services found. Students must include a key with this map.

Timeline and Due Dates

Tuesday, September 6 – Scavenger Hunt assigned
Friday, September 9 – Presentation option selected & reported to teacher
Tuesday, September 13 – In-class work day on presentations
- Scavenger hunt answer checked by teacher, completion grade collected
- Sign up for presentation time slot

Friday, September 16-Tuesday, September 20 – In-class presentations
Filling Your Toolbox

 Directions: Using appropriate resources, answer the following questions. Accuracy of information and correct spelling are expected. For some questions you need to give both the job title and the name of the person.

- Who is the school principal?
- Who is the superintendent of the school district?
- Who is/are the assistant principal(s) of the school and what areas are they in charge of?
- What are the names of the various academic departments of the school and who is the department chair for each department?
- Who do you go to if you are in a sport but you have eligibility problems?
- Who do you go to if you are not feeling well?
- Who is the best person to see if you need information about: college entrance, your schedule, and your GPA?
- If you needed help with activities such as hand writing, cutting, and keyboarding who would you go to?
- If you need extra help with a class, who do you go to? (There are several answers for this question.)
- If you require help with activities such as walking, running, using the stairs, and carrying your books, who would you go to?
- If you have lost your copy of your ETR (MFE) where would you get a second copy? (There is more than one correct answer.)
- Who is the person you would go to if you need to register for the ACT with accommodations?
• If you do not know the accommodations in your IEP, who should you go see?

• If you need help with job training, job shadowing, and job placement, who can help you?

• If you struggle with language, either in your writing or in your speaking (For example, you speak with a stutter or mispronounce words, or you never remember word endings when you write) who would you need to see to get help with this?

• If it is time for you to be retested, who does the testing with you?

• If you have a hearing impairment and receive help with your hearing aids, sign language, and communication with teachers, who helps you?

• If you need services to help with your sight, who provides this help?

• What are 3 tools that are provided to you on your IEP?
  
  o Name the person you asked for this information.

• If you needed a test read to you, what tool or person is available to help you?

• If you need worksheets blown up, or need to see the computer screen in a bigger font, what do you do?

• Where do you go for extended time on tests?

• If you are struggling to write your essay for Language Arts class, where do you go for help?

• If you need a copy of the class notes, or modified notes, where do you get them?

• Imagine that you want to become more active in your school: Name at least 3 school clubs that sound interesting to you and give the name of their advisers or the people in charge.

BONUS – YOU MUST ANSWER THE QUESTION AND TELL WHERE YOU GOT YOUR ANSWER!

• What is the approximate student body population?

• When was the school built? What is the school address?

• What is the school mascot?
Directions: Now that you are preparing for college, it is even more crucial that you have the right tools in your toolbox. Using your selected university (their website, email, phone, or based on a personal visit), answer the following questions. Accuracy of information and correct spelling are expected. For some questions you need to give both the job title and the name of the person.

- What is the university you are investigating? (Give the name and the website.)
- What is the difference between special education in high school and “disability services” in college?
- Whose responsibility is it to arrange accommodations for you in college?
- What is an auxiliary aid?
- What is the name of the office where you self-disclose your disability status?
- When do you need to apply and/or register for services?
- Other than the office where you first turn in your IEP and ETR, who else do you need to tell about your disability?
- When during the school year do you need to self-disclose your disability?
- Where do you go to if you are not feeling well or need to have weekly allergy shots, breathing treatments, etc.?
- Who is the best person to see if you need information about your schedule?
- If you are getting occupational therapy in high school, what services will be available to help you on campus?
- If you need extra help studying for classes or completing homework, where do you go? (There are several answers for this question.)
• If you are getting physical therapy in high school, what services will be available to help you on campus?

• If you need accommodations for testing, where do you go?

• If you need help when writing an essay or report for class, where do you go for help?

• If you are getting speech therapy in high school, what services will be available to help you on campus?

• What services will be available to you if you have a hearing impairment or are deaf?
  o How do you get connected with these services?

• If you have a visual impairment or are blind, what services will be available to you?
  o How do you get connected with these services?

• If you need help taking notes in class, what type of help might be available to you on campus?

• If you need worksheets enlarged, or need screen magnification, what do you do?

• What options are available to you for recreational purposes? Name at least three organizations and/or activities that you are interested in participating in on campus.

BONUS – YOU MUST ANSWER THE QUESTION AND TELL WHERE YOU GOT YOUR ANSWER!

• What is the approximate student body population?

• When was the school built? What is the school address?

• What is the school mascot?
Appendix B: Teacher Materials

Suggestions for differentiation – some students will benefit greatly from a different presentation method. Provide them with an electronic copy of the directions & Scavenger Hunt Activity worksheet. Additionally, some students will benefit from having lines added so there is space for them to write down their answers directly onto the worksheet. Other students may need to record their answers using their audio recording feature on their iPod or a tape recorder. When viewing the videos for Day 1, be sure to enable the closed caption feature. Have students jot down questions or ideas they have while viewing to help them prepare to participate in the discussion. Some students may benefit from having the guiding questions for the discussion in advance – have copies available as needed.

During the scavenger hunt, some students may need more structure. Chunk the list of questions into smaller groups and provide these students with more frequent deadlines, say 3-5 questions daily. Be sure to check in with these students frequently to monitor their progress. If a student has a visual impairment, be sure to have them work with a peer to remain safe while navigating the campus. If a student has a hearing impairment, again, have them work with either a peer or their interpreter. If a student has a physical impairment, you may need to ensure that they can safely access all of the resources they must locate. Additionally, they may require additional time to complete the scavenger hunt due to their physical limitations. These students may benefit from emailing teachers, services providers and/or universities in order to best communicate their questions.

Modify, adapt or change the presentation options to best suit the needs of the student population you serve. If students struggle with computer use or require graphic organizers to plan their projects, be sure to provide all necessary materials.
<table>
<thead>
<tr>
<th>Sunday</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
<th>Saturday</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>LABOR DAY NO SCHOOL</td>
<td>Scavenger Hunt Assigned</td>
<td></td>
<td></td>
<td>Students select presentation method</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>12</td>
<td>13</td>
<td>14</td>
<td>15</td>
<td>16</td>
<td>17</td>
</tr>
<tr>
<td>In-class work day Scavenger Hunt questions checked for</td>
<td></td>
<td></td>
<td></td>
<td>Scavenger Hunt Presentations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>19</td>
<td>20</td>
<td>21</td>
<td>22</td>
<td>23</td>
<td>24</td>
</tr>
<tr>
<td>Scavenger Hunt Presentations</td>
<td>Scavenger Hunt Presentations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>26</td>
<td>27</td>
<td>28</td>
<td>29</td>
<td>30</td>
<td></td>
</tr>
</tbody>
</table>
Filling Your Toolbox (KEY)

Directions: THESE ARE SUGGESTED ANSWERS ONLY. ANSWERS WILL VARY BY BUILDING/DISTRICT!

- Who is the school principal? VARIES
- Who is the superintendent of the school district? VARIES
- Who is/are the assistant principal(s) of the school and what areas are they in charge of? VARIES
- What are the names of the various academic departments of the school and who is the department chair for each department? VARIES
- Who do you go to if you are in a sport but you have eligibility problems? ATHLETIC DIRECTOR, STUDY TABLE MONITOR
- Who do you go to if you are not feeling well? SCHOOL NURSE, SECRETARY
- Who is the best person to see if you need information about: college entrance, your schedule, and your GPA? COUNSELOR
- If you needed help with activities such as hand writing, cutting, and keyboarding who would you go to? OCCUPATIONAL THERAPIST
- If you need extra help with a class, who do you go to? (There are several answers for this question.) CLASSROOM TEACHER, INTERVENTION SPECIALIST, TUTOR...
- If you require help with activities such as walking, running, using the stairs, and carrying your books, who would you go to? PHYSICAL THERAPIST, PE TEACHER, ADAPTED PE TEACHER
- If you have lost your copy of your ETR (MFE) where would you get a second copy? (There is more than one correct answer.) SCHOOL OFFICE, INTERVENTION SPECIALIST, SCHOOL PSYCHOLOGIST
- Who is the person you would go to if you need to register for the ACT with accommodations? COUNSELOR
- If you do not know the accommodations in your IEP, who should you go see? INTERVENTION SPECIALIST, CASE MANAGER
• If you need help with job training, job shadowing, and job placement, who can help you? VOSE, BVR COUNSELOR, OWA/OWE TEACHER, TRANSITION COORDINATOR, JOB COACH

• If you struggle with language, either in your writing or in your speaking (for example, you speak with a stutter or mispronounce words, or you never remember word endings when you write) who would you need to see to get help with this? SPEECH LANGUAGE PATHOLOGIST

• If it is time for you to be retested, who does the testing with you? SCHOOL PSYCHOLOGIST

• If you have a hearing impairment and receive help with your hearing aids, sign language, and communication with teachers, who helps you? HEARING ITINERANT, HEARING INTERVENTION SPECIALIST

• If you need services to help with your sight, who provides this help? VISION ITINERANT, VISION INTERVENTION SPECIALIST

• What are 3 tools that are provided to you on your IEP? VARIES
  - Name the person you asked for this information. INTERVENTION SPECIALIST

• If you needed a test read to you, what tool or person is available to help you? INTERVENTION SPECIALIST, TUTOR, AIDE, SCREEN READER SOFTWARE, CD-ROM

• If you need worksheets blown up, or need to see the computer screen in a bigger font, what do you do? ZOOM TEXT, SCREEN MAGNIFIER, COPY MACHINE ELARGEMENT

• Where do you go for extended time on tests? RESOURCE ROOM, TUTORING ROOM, INTERVENTION ROOM...

• If you are struggling to write your essay for Language Arts class, where do you go for help? CLASSROOM TEACHER, INTERVENTION SPECIALIST, TUTOR, RESOURCE ROOM, TUTORING/INTERVENTION ROOM
• If you need a copy of the class notes, or modified notes, where do you get them?
  CLASSROOM TEACHER, INTERVENTION SPECIALIST, TEACHER WEBSITE

• Imagine that you want to become more active in your school: Name at least 3 school clubs that sound interesting to you and give the name of their advisers.
  VARIES

**BONUS – YOU MUST ANSWER THE QUESTION AND TELL WHERE YOU GOT YOUR ANSWER!**

• What is the approximate student body population?  VARIES

• When was the school built? What is the school address?  VARIES

• What is the school mascot?  VARIES
Directions: THESE ANSWERS WILL VARY WIDELY BASED UPON THE POST-SECONDARY OPTION THE STUDENT HAS SELECTED. BE PREPARED TO HELP THE STUDENT LOCATE CONTACT INFORMATION FOR THEIR SELECTED UNIVERSITY TO HELP THEM INVESTIGATE THESE RESOURCES.

- What is the university you are investigating? (Give the name and the website.) 
  VARIES

- What is the difference between special education in high school and “disability services” in college? 
  DIFFERENT LAW – IDEA v. ADA, NOT MANDATORY...

- Whose responsibility is it to arrange accommodations for you in college? 
  “MINE” – THE STUDENT’S

- What is an auxiliary aid? SERVICES OR DEVICES THAT ENABLE PERSONS WITH IMPAIRED SENSORY, MANUAL, OR SPEAKING SKILLS TO HAVE AN EQUAL OPPORTUNITY TO PARTICIPATE IN, AND ENJOY THE BENEFITS OF, PROGRAMS OR ACTIVITIES CONDUCTED BY A GIVEN AGENCY

- What is the name of the office where you self-disclose your disability status? 
  WILL VARY – OFFICE OF DISABILITY SERVICES, OFFICE OF STUDENT SERVICES (Most common)

- When do you need to apply and/or register for services? VARIES, but, BEFORE CLASSES BEGIN, or, IMMEDIATELY AFTER BEING ACCEPTED

- Other than the office where you first turn in your IEP and ETR, who else do you need to tell about your disability? PROFESSORS

- When during the school year do you need to self-disclose your disability? TO OFFICE OF DISABILITY SERVICES – IMMEDIATELY TO PROFESSORS – AT THE START OF EACH TERM

- Where do you go to if you are not feeling well or need to have weekly allergy shots, breathing treatments, etc.? CAMPUS STUDENT HEALTH CENTER

- Who is the best person to see if you need information about your schedule? ADVISOR

- If you are getting occupational therapy in high school, what services will be available to help you on campus? VARIES
• If you need extra help studying for classes or completing homework, where do you go? (There are several answers for this question.) **SA SESSIONS, TUTORS, STUDY GROUPS, ...**

• If you are getting physical therapy in high school, what services will be available to help you on campus? **VARIES**

• If you need accommodations for testing, where do you go? **VARIES, TESTING CENTER, OFFICE OF DISABILITY SERVICES**

• If you need help when writing an essay or report for class, where do you go for help? **WRITING LAB, TUTOR**

• If you are getting speech therapy in high school, what services will be available to help you on campus? **VARIES**

• What services will be available to you if you have a hearing impairment or are deaf? **VARIES**
  o How do you get connected with these services? **VARIES**

• If you have a visual impairment or are blind, what services will be available to you? **VARIES**
  o How do you get connected with these services? **VARIES**

• If you need help taking notes in class, what type of help might be available to you on campus? **VARIES**

• If you need worksheets enlarged, or need screen magnification, what do you do? **VARIES**

• What options are available to you for recreational purposes? Name at least three organizations and/or activities that you are interested in participating in on campus. **VARIES**

**BONUS – YOU MUST ANSWER THE QUESTION AND TELL WHERE YOU GOT YOUR ANSWER!**

• What is the approximate student body population? **VARIES**

• When was the school built? What is the school address? **VARIES**

• What is the school mascot? **VARIES**
Appendix C: Assessments

**Portfolio** - Students will maintain a portfolio of all of the resources they locate to make use of throughout the course of the year.

**Presentation Options** – Present the following options to the students as possible ways to document and share the information they located. Select as many or as few as are appropriate for your students.

- **Create a newspaper “Student Wanted” Ad** – Select at least 3 of the resources you located and created a “student wanted” ad for each. This ad will be the reverse of a “help wanted” ad, it will advertise the opening for students to come and receive the help offered by this resource.
- **Bulletin Board** – Have students create a bulletin board, in either the classroom or hall, which depicts the various resources available to students.
- **Brochure** – Students will create a brochure which summarizes the resources available to them.
- **Commercial** – Students will create and record a “resource” commercial which advertises their findings.
- **Photo Dictionary** – Students will use the photos of the various resource providers/locations to create a photo dictionary of resources.
- **Poem or Song** – Students will write a poem or song which details the resources available.
- **Essay** – Students will write an informative essay outlining the resources available to them.
- **Power Point** – Have students create a power point that depicts the resources available.
- **Map** – Have the students create a map of the campus (high school or their selected university) which identifies the location of all of the services found. Students must include a key with this map.
Dear Parents,

A key role in the high school experience is preparing students for their transition into life after high school. For students with disabilities, this requires more than simply taking the right classes and applying to a college of their choice. Students will need to learn appropriate self-advocacy skills and communication skills to prepare them for their future responsibilities. They need to learn their personal strengths and weaknesses so they are able to communicate their needs to future professors and employers. Students require structured practice to develop these skills. They must learn they cannot rely solely on others to do this for them. Additionally, students with disabilities need to understand the laws which govern their rights.

Through this upcoming unit, we will be providing your child the first step toward developing the self-advocacy skills which will last them a lifetime. The transition from high school to college can be a difficult time for any student, we want to ensure that everyone involved in this transition understands the changes which are about to take place. To do this, your students will be tasked with a resource scavenger hunt. We want to know, “Does your learner know where to go to get the help he/she needs?” Underclassmen (9-10th graders) will begin investigating the resources available to them in their own school. Upperclassmen (11th-12th graders) will begin investigating the resources which will be available at their selected university.
To ensure a successful transition, it is crucial that the relationship you have with your child is based on an underlying trust and respect for your child as someone who is capable of learning how to manage his or her own life. It may require a giant leap of faith to trust that your child has all the resources needed to deal with the unfamiliar challenges of postsecondary education. Nonetheless, universities treat students as legal adults. It is important to do all you can to reinforce your faith in your child’s ability to manage life at school. Now is the right time for you to begin this discussion with your child. What are their future plans? Where do they see themselves in terms of employment training and post-secondary education? It is never too early to begin this dialogue. It may reveal that your child requires additional practice in order to ensure their ability to use these self-advocacy skills when they are truly needed. Enclosed you will find a copy of the scavenger hunt questions your child will need to answer in addition to some suggested topics to facilitate this discussion with your child. If you have any questions, please do not hesitate to contact me.

Yours in education,

NAME
Suggested Home Discussions

Below you will find some difficult questions regarding your child's transition from high school. Some of these questions are meant for you, the parent, while others are meant to facilitate a dialogue between your child and yourself. If you find there are questions you do not know the answers to, a list of on-line resources have been provided below. Additionally, the school has other resources which will be beneficial to you as you explore these changes.

- Do you understand the difference in services between high school and college? Does your child?
- Do you understand that the IEP expires after high school graduation? Does your child?
- Do you know the documentation needed to determine eligibility for services at post-secondary institutions? Does your child?
- Are you aware of the different laws which protect your child once they graduate from high school? Is your child aware of these different laws as well?
- Have you explored the way universities will communicate information regarding scheduling, billing, grades, etc... with your child? (Parents lack legal entitlement once the student turns 18, most are not aware that all information will be directed to the enrolled student only.)
- Have you explored what resources are available for parents from the university?
• Have you worked to help your child practice his/her self-advocacy skills within their community?
• Have you set up an appointment with the Office of Disability Services at the school your learner is planning to attend?
• Is your child knowledgeable of the resources they currently receive?
• Have you discussed what resources are truly beneficial to your child’s learning needs?
• Have you discussed the possibility of transitioning from a local community college to a 4-year college or university after they have completed the general education courses required in a smaller classroom and campus setting?
• Does your child have an accurate understanding of his/her academic strengths and weaknesses?
• Have you made a campus visit and practiced navigating the terrain?
• Have you reached out to others who have had successful transitions to use as role models and support networks?

**On-line Resources**

http://www.pacer.org/
http://www.ncset.org/
http://www2.ed.gov/about/offices/list/ocr/transition.html
http://www.wrightslaw.com/info/college.index.htm
http://www.wrightslaw.com/info/sec504.transition.ocr.pdf
Area: Personal Skills, Time Management

STEMM Career Connection: Project Management

Title: 24/7

Grade Levels: Tenth - Twelfth

Academic Content Areas: Technology, English Language Arts

Topics: Time management and scheduling tools.

Goal: Students will be able to read and interpret a Gantt chart.

Performance Objectives:
Students will:
1. develop skills necessary to complete a weekly planner for college course schedules.

Big Question
How are scheduling skills utilized in the planning and execution of projects and in the daily management of time? How can this benefit the student in school?

Brief Summary
Time management of personnel assets is essential in the successful operation of industry. These skills can also greatly assist students in the successful completion of their course of studies. Students will learn how industry uses Gantt charts to plan and monitor the progress of projects and relate how this tool can be adapted for their use in school projects. Students will also create weekly planners for a typical college student with specific course requirements and study times.

Main Ideas
Gantt charts are used by project managers to plan projects. Tasks are listed in rows with a bar representing each start and end date. As a project progresses the bars are filled in to show the current status of the project. Engineers very often work several projects simultaneously and must manage their time between several tasks. Developing individual plans managing how much time is dedicated to each project is an essential tool for success.
Content Standards

Technology
Standard 5: Technology and Information Literacy
Students engage in information literacy strategies, use the Internet, technology tools and resources, and apply information-management skills to answer questions and expand knowledge.

Benchmark A: Determine and apply an evaluative process to all information sources chosen for a project.

English and Language Arts
Reading: Reading Process: Concepts of Print, Comprehension Strategies and Self-Monitoring Strategies

Materials
- Pretest/Posttest
- Weekly planner blank (two per student)
- Gantt Charts worksheet (one per student)
- College Schedule worksheet (one per student)

Preparation for Lesson
- Copy pretest and posttest. (one per student)
- Copy student worksheets. (one per student)
- Copy weekly planner blanks (two per student)

Vocabulary
Gantt chart - a chart showing, in horizontal lines, activity planned to take place during specified periods, which are indicated in vertical bands

Man-hour - a unit of measurement based on an ideal amount of work accomplished by one person in an hour.

Milestone - a significant event or stage in the life, progress, development, or the like of a person, nation, etc.

Personnel - a body of persons employed in an organization or place of work.

Project – a set of specific activities (tasks) ending in a desired accomplishment

Time Management - the analysis of how working hours are spent and the prioritization of tasks in order to maximize personal efficiency in the workplace

White space - time not scheduled in a schedule. Also referred to as free time.
Time needed

Day One: (50 minutes) Pretest, discussion on Gantt charts, pass out Gantt worksheets
Day Two: (20 minutes) Review Gantt worksheets, pass out Weekly Planner blanks
Day Three: (20 minutes) Analyze data collected by students, discuss college course study requirements, pass out College Schedule worksheet
Day Four: (50 minutes) Final discussion and wrap-up, posttest

Teacher Instructions

Day 1
• Administer Pre-Test
• Discussion
  ▪ What is a Gantt chart and how is it used in industry?
  ▪ How could a Gantt chart be used on a school project?
  ▪ Free Gantt chart software at http://timios.net/Gantt/
• Hand out student worksheet on Gantt charts

Day 2
• Review answers to Gantt chart worksheet
• Pass out weekly planner blanks (one per student). Student should record all activities for one complete week.

Day 3
• Have student analyze their weekly planner for how much time they spend doing things like
  ▪ Studying
  ▪ Watching TV
  ▪ Eating
  ▪ Sleeping
  ▪ Gaming
• Discussion
  ▪ How much time should you spend studying outside of class in college?
    o Easy courses: 2 hours for every hour in class
    o Typical courses: 3 hours for every hour in class
    o Hard courses: 4 hours for every hour in class
• Hand out College Schedule worksheet

Day 4
• Collect college schedule weekly planners
• Posttest
Optional Extensions
- Have students make a Gantt chart for a school project or research paper
- Have students analyze their current weekly schedule and write a proposed plan to increase their proficiency or add a new activity like working out.

Helpful Hints for Teachers
The scheduled Day 1, Day 2, Day 3, and Day 4 are not designed to be sequential calendar days. Time between these days should be allowed for the students to complete their activities outside of the classroom. A suggested schedule may be:
  - Day 1 - Allow 3 days for worksheets
  - Day 2 – Allow 7 to 8 days to complete weekly activity log
  - Day 3 – Allow 3 days to complete activities

Gantt charts (see figure below) are planning tools used to coordinate and track the tasks required to complete a project. Specific tasks are listed in rows. Dates run across the top of the chart. Each task's start date and end date are represented by the beginning and ending of a bar. As the project progresses the bar is filled in representing a percentage of completeness. It is important that the bars are not filled in based on date but progress of the task. Tasks can run concurrently. Tasks that require the completion of another task to begin should not overlap. Milestones are checkpoints where the progress of a project is evaluated.
Students can make Gantt charts by hand on graph paper. Blank Gantt charts are available in Appendix B. Several website offer free Gantt chart programs. TIMIOS Gantt Designer is a free Gantt chart program that is relatively easy and free. It can be downloaded at http://timios.net/Gantt/.

The management of time is a critical skill for students. Colleges recommend students spend 2 hour studying outside of class for every hour in class if the class is easy. Three hours for average classes, and four hours for hard classes. The schedule used in the lesson is the fall schedule for a computer science major at the University of Cincinnati. Students should fill out a weekly schedule using the guidelines in the worksheet or may include their own activities and interest. Students with disabilities should adapt the schedule to include extra time needed due to their handicaps.

The student schedule is given below.
<table>
<thead>
<tr>
<th>Course ID</th>
<th>Course Title</th>
<th>Credit</th>
<th>Days</th>
<th>Time</th>
<th>Room</th>
</tr>
</thead>
<tbody>
<tr>
<td>15PHYS203</td>
<td>General Physics III</td>
<td>4.00</td>
<td>MWF</td>
<td>10:00a-10:50a</td>
<td>H</td>
</tr>
<tr>
<td>15PHYS213</td>
<td>General Physics Laboratory III</td>
<td>1.00</td>
<td>T</td>
<td>10:30a-12:50p</td>
<td></td>
</tr>
<tr>
<td>18CJ321</td>
<td>American History</td>
<td>3.00</td>
<td>H</td>
<td>6:30p-9:10p</td>
<td></td>
</tr>
<tr>
<td>20CS271</td>
<td>Discrete Computational Structures I</td>
<td>3.00</td>
<td>MWF</td>
<td>1:00p-1:50p</td>
<td></td>
</tr>
<tr>
<td>23 FAA224</td>
<td>Basic 3D Animation</td>
<td>4.00</td>
<td>TH</td>
<td>2:00p-4:50p</td>
<td></td>
</tr>
</tbody>
</table>

**Helpful Hints for Parents**

Have the entire family keep a record of how they spend their time for one week. Bring the schedules together and find where more time can be added for family activities.

As a student with a disability, your child will find that they need to allow for more time for certain things than other students. For example, it might take them an hour to get ready for class in the morning and 20 minutes to get from class to class during the day.

Discuss with your student the special needs they will have to consider when they are on their own. Doctor visits, time to get from one part of campus to another, daily medications, exercise, laundry, and allergies are all things to consider. These extra things that your SwD will have to consider could impact how they schedule classes. For example, if your student needs 20 minutes to get from one building to another and there is only 10 minutes between the end of one class and the start of another they will not be able to schedule back to back classes.

Save this activity and have your student do it with their schedule when they go to college. Check the reasonableness of the schedule. Make sure not only study times are covered, but times for personal fitness, laundry, TV, relaxing etc.

Walk the campus with your student. Find each building they have classes in. Have a map ready and mark the routes for each day. If your student has a physical disability, check that buildings and rooms are assessable.

259
Appendix A: Student worksheets

Gantt Charts

Name: _______________________________

The chart above is called a Gantt chart. Gantt charts are used to organize the work needed to be completed in a project. Each task or job is given a row. A date line above the bars shows when each task should begin and end. As work is done the bars are colored in to represent the percent each task is complete. This Gantt chart is for a design project of a bicycle rack used in apartments. Answer the following questions based on the Gantt chart above.

1. When must the project be complete and ready to present to the customer?

2. What dates are CAD modeling and Technical Drawings being done at the same time?

3. On what day should half of the technical drawings be complete?

4. If the prototype build requires 150 man-hours of work, how many shop technicians will it take to complete the task on time. Saturday and Sunday are not work days, and each technician works an 8 hour day.

Extra credit: Create a Gantt chart for a project you are working on at home or in school.
# Gantt Chart

Name:_________________  Project:_________________

Period:________________  Due Date:_______________

Beginning Date:__________  Ending Date:_________

| Task/Goal | M | T | W | T | F | S | S | M | T | W | T | F | S | S | M | T | W | T | F |
|           |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|           |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|           |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|           |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|           |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|           |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|           |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|           |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|           |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |

261
<table>
<thead>
<tr>
<th>Time</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
<th>Saturday</th>
<th>Sunday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Midnight</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 AM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 AM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 AM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 AM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 AM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 AM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 AM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 AM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 AM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 AM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11 AM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 PM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 PM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 PM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 PM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 PM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 PM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 PM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 PM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 PM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 PM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 PM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11 PM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
College Schedules

Name: ________________________

Different from high school, where you sit in class all day, in college you will have classes at different times on different days with non-scheduled times in between. You will need to schedule times to eat, sleep, study and do all the things necessary in your life. Colleges typically recommend you spend the following amount of time studying.

<table>
<thead>
<tr>
<th>Type course</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Easy courses</td>
<td>2 hours for every hour in class</td>
</tr>
<tr>
<td>Intermediate or average courses</td>
<td>3 hours for every hour in class</td>
</tr>
<tr>
<td>Hard classes</td>
<td>4 hours for every hour in class</td>
</tr>
</tbody>
</table>

Anthony is a college student studying Computer Science to become a game programmer. Next semester he has the following schedule.

<table>
<thead>
<tr>
<th>Course ID</th>
<th>Course Title</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>15PHYS203</td>
<td>General Physics III</td>
<td>4.00</td>
</tr>
<tr>
<td>15PHYS213</td>
<td>General Physics Laboratory III</td>
<td>1.00</td>
</tr>
<tr>
<td>18CJ321</td>
<td>American History</td>
<td>3.00</td>
</tr>
<tr>
<td>20CS271</td>
<td>Discrete Computational Structures I</td>
<td>3.00</td>
</tr>
<tr>
<td>23FAA224</td>
<td>Basic 3D Animation</td>
<td>4.00</td>
</tr>
</tbody>
</table>

For Anthony, General Physics III will be an average course and is schedules for 4 hours a week. American History is a general knowledge class. It will be easy and meets for 3 hours a week. Discrete Computational Structures is an average class, and meets 3 hours a week. Basic 3D Animation is a hard class. It meets 4 hours a week.

Calculate how much time Anthony needs to study by filling in the following chart.

<table>
<thead>
<tr>
<th>Course/Hours</th>
<th>Difficulty</th>
<th>Hours needed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total Hours Needed For Study =
Anthony needs to make a weekly planner accounting for class time, study time, and the list of priorities he wrote below.

- Sleep 8 hours a night
- Working out 3 times a week for 1 ½ hours.
- Play video games 1 hour four days a week.
- Eat supper with friends for 1 hour. All other meals take 30 minutes
- Go out Friday and Saturday nights from 6 PM till 2
- Study group Monday and Wednesday 3 till 4 (Counts as study time)
- Laundry 1 ½ hours once a week
- Call Mom once a week so she doesn’t call me every day.
- Watch Royal Pains Wednesdays from 9 till 10 and Burn Notice Thursday from 9 till 10
Using Anthony's list of activities, the University's class schedule and the recommended amount of study complete a weekly schedule for Anthony.

<table>
<thead>
<tr>
<th>Time</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
<th>Saturday</th>
<th>Sunday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Midnight</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 AM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 AM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 AM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 AM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 AM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 AM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 AM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 AM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 AM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 AM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11 AM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 PM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 PM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 PM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 PM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 PM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 PM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 PM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 PM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 PM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 PM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 PM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11 PM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix B: Teacher Lab Sheet

Gantt Charts

Name: _______________________________

The chart above is called a Gantt chart. Gantt charts are used to organize the work needed to be completed in a project. Each task or job is given a row. A date line above the bars shows when each task should begin and should end. As work in done the bars are colored in to represent the percent each task is complete. This Gantt chart is for a design project to design a bicycle rack to be used in apartments.

Answer the following questions based on the Gantt chart above.

1. When must the project be complete and ready to present to the customer?
   - July 5, 2011

2. What dates are CAD modeling and Technical Drawings being done at the same time?
   - July 18, 2011 till July 26, 2011

3. On what day should half of the technical drawings be complete?
   - July 26, 2011 (middle of bar)

4. If the prototype build requires 150 man-hours of work, how many shop technicians will it take to complete the task on time? Saturday and Sunday are not work days, and each technician works an 8 hour day.

   Work days = 6.5
   Work hours per technician = 6.5X8 = 52 hours
   Technicians needed 150/52 = 2.88
   3 technicians will be needed to complete the job.

---

<table>
<thead>
<tr>
<th>Course/Hours</th>
<th>Difficulty</th>
<th>Hours needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physics III/4</td>
<td>Average</td>
<td>12</td>
</tr>
<tr>
<td>American History/3</td>
<td>Easy</td>
<td>6</td>
</tr>
<tr>
<td>Discrete Computational</td>
<td>Average</td>
<td>9</td>
</tr>
</tbody>
</table>

---

266
<table>
<thead>
<tr>
<th>Structures/3</th>
<th>3 D Animation/4</th>
<th>Hard</th>
<th>16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Hours Needed For Study =</td>
<td></td>
<td></td>
<td>41</td>
</tr>
<tr>
<td>Time</td>
<td>Monday</td>
<td>Tuesday</td>
<td>Wednesday</td>
</tr>
<tr>
<td>-------</td>
<td>--------</td>
<td>---------</td>
<td>-----------</td>
</tr>
<tr>
<td>Midnight</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 AM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 AM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 AM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 AM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 AM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 AM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 AM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 AM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 AM</td>
<td>BREAK FAST</td>
<td>BREAK FAST</td>
<td></td>
</tr>
<tr>
<td>10 AM</td>
<td>PHY</td>
<td>PHY</td>
<td>PHY</td>
</tr>
<tr>
<td>11 AM</td>
<td>STORY</td>
<td>PHY</td>
<td>STUDY</td>
</tr>
<tr>
<td>12 PM</td>
<td>LUNCH</td>
<td>LUNCH</td>
<td>LUNCH</td>
</tr>
<tr>
<td>1 PM</td>
<td>DISCRETE</td>
<td>DISCRETE</td>
<td>DISCRETE</td>
</tr>
<tr>
<td>2 PM</td>
<td>STUDY GROUP</td>
<td>3D</td>
<td>STUDY GROUP</td>
</tr>
<tr>
<td>3 PM</td>
<td></td>
<td>EXERCISE</td>
<td>EXERCISE</td>
</tr>
<tr>
<td>4 PM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 PM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 PM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 PM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 PM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 PM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 PM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11 PM</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: The image contains a weekly schedule with various activities scheduled throughout the day. The activities include study, exercise, meals, and leisure activities such as video games and parties.
Appendix C: Assessment

Name: **Answer Key**

1. Make a Gantt chart for the following project tasks.

<table>
<thead>
<tr>
<th>Tasks</th>
<th>Start Date</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reasearch</td>
<td>April 15</td>
<td>5 days</td>
</tr>
<tr>
<td>Outline</td>
<td>April 21</td>
<td>3 days</td>
</tr>
<tr>
<td>Write</td>
<td>April 24</td>
<td>14 days</td>
</tr>
</tbody>
</table>

| TASK | 4/15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 5/1 | 2 | 3 | 4 | 5 | 6 | 7 |
|------|------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Reasearch |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Outline    |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Write      |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |

2. How much time would you be expected to study for the following classes in college?

- Calculus III, a hard class that meets 4 hours a week
  \[4 \times 4 = 16 \text{ hours}\]
- Introduction to Basket Weaving, an easy course meeting for 2 hours a week
  \[2 \times 2 = 4 \text{ hours}\]
Appendix C: Assessment
Name: __________________________

1. Make a Gantt chart for the following project tasks.

<table>
<thead>
<tr>
<th>Tasks</th>
<th>Start Date</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research</td>
<td>April 15</td>
<td>5 days</td>
</tr>
<tr>
<td>Outline</td>
<td>April 21</td>
<td>3 days</td>
</tr>
<tr>
<td>Write</td>
<td>April 24</td>
<td>14 days</td>
</tr>
</tbody>
</table>

2. How much time would you be expected to study for the following classes in college?
   - Calculus III, a hard class that meets 4 hours a week
   - Introduction to Basket Weaving, an easy course meeting for 2 hours a week
**Alternate Assessments**

- Have students submit a Gantt chart of a project they are planning.
- Have students develop a weekly schedule using the classes provided and their own activities

**Appendix E: Additional Resources**
Free Gantt chart software download Gantt Designer at [http://timios.net/Gantt/]
Area: Personal Skills

Title: Going Pro

Grade Levels: Ninth - Tenth

Academic Content Areas: English

Topics: Reading and Writing

Goal: Students recognize how proactive behaviors can be beneficial in self-advocacy.

Big Question
How does taking a proactive attitude help you overcome obstacles?

Brief Summary
Students will analyze and reflect on the poem There’s a Hole in My Sidewalk by Portia Nelson. Students will discuss the difference between reactive and proactive behavior in different scenarios. After completing a self-study, students will develop a personal plan on how to become proactive in their education.

Main Ideas
Students who can self-advocate and respond to various situations in a proactive way will perform better in high school and college than their peers who do not.

Content Standards
Reading Process: Concepts of Print, Comprehension Strategies and Self-Monitoring Strategies
1. Apply reading comprehension strategies, including making predictions, comparing and contrasting, recalling and summarizing and making inferences and drawing conclusions.

2. Answer literal, inferential, evaluative and synthesizing questions to demonstrate comprehension of grade-appropriate print texts and electronic and visual media.

Reading Applications: Informational, Technical and Persuasive Text
1. Identify and understand organizational patterns (e.g., cause-effect, problem-solution) and techniques, including repetition of ideas, syntax and word choice, that authors use to accomplish their purpose and reach their intended audience.

4. Assess the adequacy, accuracy and appropriateness of an author’s details, identifying persuasive techniques (e.g., transfer, glittering generalities, bait and switch) and examples of propaganda, bias and stereotyping.

5. Analyze an author’s implicit and explicit argument, perspective or viewpoint in text.

**Writing Applications**

2. Write responses to literature that organize an insightful interpretation around several clear ideas, premises or images and support judgments with specific references to the original text, to other texts, authors and to prior knowledge.

**Materials**

- Student worksheets

**Preparation for Lesson**

- Copy student worksheets – one for each student.

**Vocabulary**

**Reactive Behavior** - behavior which results from outside stimuli usually driven by impulse and emotion

**Self-advocacy** - the ability to speak-up for yourself. You are able to ask for what you need and make choices which affect your life.

**Proactive Behavior** – behavior resulting from logical choices based on ones values

**Time needed**

Two fifty minute periods.
**Lesson**

**Day One:** The pretest/posttest is designed to give students immediate insight into their growth. There are two columns for answers. The first is for before the lesson and the second is for after the lesson. Give the students 10 minutes to complete the pre-lesson part and collect. **Do not grade.**

Show the power point presentation *Reactive vs. Proactive* (about 15 minutes).

Discuss the difference between reactive behavior and proactive behavior. Discuss the sample problem "Behind Your Back". Have the students designate each choice of action as reactive or proactive.

7/14/2011

Handout student worksheets. Students who need extra time should complete assignment at home.

**Day Two:** Form students into small groups to compare their work and answers. Ask each group to have a list of three situations they would consider holes in their sidewalks.
Bring the class together to compile a list of the holes in their sidewalk and discuss what proactive behaviors would allow them to go down another street. Allow 15 minutes at the end of class for the post lesson test. Hand out the same test the students took yesterday. Students are not to erase any answers from yesterday, but should complete the second column correcting answers they believe may be wrong.

Optional Extensions
http://youtu.be/0yi7ffPwd6k is a YouTube video of the poem There’s a Hole in My Sidewalk in American Sign Language. If you have a student who knows ASL have them make a video of Invictus.

Everyone has their own holes in their sidewalk. Peer pressure, anger problems, physical handicaps, and bullies are a few your students may relate to. Have students work in groups to present the five chapters of There’s a Hole in My Sidewalk as it relates to one of their problems. A video or short play works well. Students can complete the optional worksheet on self-advocacy.

Helpful Hints for Teachers
The lesson is designed for students to analyze problems and find proactive solutions. Avoid giving or judging solutions. Stress that the students need to be self-advocates.

Helpful Hints for Parents
The lesson is designed for students to analyze problems and find proactive solutions. Avoid giving or judging solutions. Stress that the students need to be self-advocates.
Appendix A: Student worksheets
There’s A Hole In My Sidewalk
  – by Portia Nelson

Chapter One

I walk down the street.
There is a deep hole in the sidewalk.
  I fall in.
  I am lost... I am helpless.
  It isn’t my fault.
  It takes forever to find a way out.

Chapter Two

I walk down the same street.
There is a deep hole in the sidewalk.
  I pretend I don’t see it.
  I fall in again.
I can’t believe I am in the same place.
  But it isn’t my fault.
  It still takes a long time to get out.

Chapter Three

I walk down the same street.
There is a deep hole in the sidewalk.
  I see it is there.
  I still fall in... it’s a habit.
  My eyes are open.
  I know where I am.
It is my fault... I get out immediately.

Chapter Four

I walk down the same street.
There is a deep hole in the sidewalk.
  I walk around it.

Chapter Five

I walk down another street.
There's A Hole In My Sidewalk
– by Portia Nelson

Chapter One
I walk down the street. There is a deep hole in the sidewalk. I fall in. I am lost... I am helpless. It isn't my fault. It takes forever to find a way out.

Chapter Two
I walk down the same street. There is a deep hole in the sidewalk. I pretend I don't see it. I fall in again. I can't believe I am in the same place. But it isn't my fault. It still takes a long time to get out.

Chapter Three
I walk down the same street. There is a deep hole in the sidewalk. I see it is there. I still fall in... it's a habit. My eyes are open. I know where I am. It is my fault... I get out immediately.

Chapter Four
I walk down the same street. There is a deep hole in the sidewalk. I walk around it.

Chapter Five
I walk down another street.
Reactive vs. Proactive

Name: _____________________________________

Read each situation below. Mark the different behaviors as reactive (R) or proactive (P). Circle what you think you would do or write a different choice. (You are not graded on what you decide you would do.)

1. You studied for the Pre-calculus test and before taking the test you felt very good. Unfortunately when the test was returned, you got a C+. You...

   ____ complain to everyone that the teacher is stupid and can’t teach.

   ____ tell your mom you should have gotten an A, but the teacher doesn’t like you.

   ____ ask the teacher when you can meet to discuss what you don’t understand.

   ____ talk to your friend, who got an A, and ask to study together the next time.

   ____ think that’s just the way you are, besides neither of your parents went to college.

2. For weeks you have been making new friends. Wednesday is senior skip day and they all want to skip school. Your Social Studies teacher has scheduled a test and if you skip the class your grade will be lowered to a D. Your friends have started making fun of you because you worry about your grades. You...

   ____ tell them to have a good time, but you can’t go.

   ____ go with them.

   ____ get mad at them and tell them you don’t want to be friends any more.

   ____ ask your parents to write an excuse for you saying you are sick.

   ____ plan another day to spend time with your friends that doesn’t conflict with school.
Read the poem *There's a Hole in My Sidewalk* by Portia Nelson. This poem is also titled *Autobiography in Five Short Chapters*. Write a paragraph describing how the character is being reactive or proactive in the different chapters.

_________________________________________________________________________________________________

_________________________________________________________________________________________________

_________________________________________________________________________________________________

_________________________________________________________________________________________________

_________________________________________________________________________________________________

_________________________________________________________________________________________________

_________________________________________________________________________________________________

_________________________________________________________________________________________________

_________________________________________________________________________________________________

_________________________________________________________________________________________________

What kind of holes do you see in your sidewalk, and what are the different streets you could walk down?

_________________________________________________________________________________________________

_________________________________________________________________________________________________

_________________________________________________________________________________________________

_________________________________________________________________________________________________

_________________________________________________________________________________________________

_________________________________________________________________________________________________
"Invictus"
by William Ernest Henley

Out of the night that covers me,
Black as the Pit from pole to pole,
I thank whatever gods may be
For my unconquerable soul.

In the fell clutch of circumstance
I have not winced nor cried aloud.
Under the bludgeoning of chance
My head is bloody, but unbowed.

Beyond this place of wrath and tears
Looms but the Horror of the shade,
And yet the menace of the years
Finds, and shall find me, unafraid.

It matters not how strait the gate,
How charged with punishments the scroll,
I am the master of my fate;
I am the captain of my soul.

In the movie *Invictus*, Nelson Mandela gives the poem *Invictus* to the South American Rugby team. He tells the team captain it inspired him in prison. Discuss how this poem is similar to *There is a Hole in My Sidewalk*. 
Self-advocacy

Name: _________________________________________

We all have weaknesses and incapacibilities. Some are physical, like when we need to use a wheelchair. Some are intellectual, like having problems reading technical references.

List three things you wish you could do better.

_________________________________________________________________________________________________
_________________________________________________________________________________________________
_________________________________________________________________________________________________

________________________

Pick the one you would like to improve first. List other people who can help you do better in this area. Think about such people as friends, counselors, teachers, parents, etc.

_________________________________________________________________________________________________
_________________________________________________________________________________________________
_________________________________________________________________________________________________

List how you are going to contact at least two people to get help.

_________________________________________________________________________________________________
_________________________________________________________________________________________________
_________________________________________________________________________________________________

List things you can do to help yourself. Think about such things as changing habits, time management, physical workouts, study habits, etc.

_________________________________________________________________________________________________
_________________________________________________________________________________________________
_________________________________________________________________________________________________
_________________________________________________________________________________________________

_________________________________________________________________________________________________
Appendix C: Pretest/ Posttest

Name: ___________________________

Read the problem below. Mark the different responses as reactive (R) or proactive (P).

You have been friends since third grade, but recently your friend has been a real Debbie Downer. Nothing is ever right. Your high school, the town you live in, and your parents all suck. This has become very depressing and you are starting to be negative too. Your parents have asked you if everything is ok because they are worried about you. You have no other friends.

<table>
<thead>
<tr>
<th>Pre-lesson Answer</th>
<th>Post-lesson Answer</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Debbie downer is the only friend you can make, so you will go negative too.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>You decide to put notes in your notebook and locker reminding you to be more positive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>You can’t take it anymore so you breakup with your friend.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>You try to find something good about everything your friend says is bad.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>You sit down and talk to your friend about the problem and why they are so negative all the time.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>You decide to make more friends who are more positive and fun to be with.</td>
</tr>
</tbody>
</table>
Key for Pretest/Posttest

Name: __________________________

Read the problem below. Mark the different responses as reactive (R) or proactive (P).

You have been friends since third grade, but recently your friend has been a real Debbie Downer. Nothing is ever right. Your high school, the town you live in, and your parents all suck. This has become very depressing and you are starting to be negative too. Your parents have asked you if everything is ok because they are worried about you. You have no other friends.

<table>
<thead>
<tr>
<th>Pre-lesson Answer</th>
<th>Post-lesson Answer</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>R</td>
<td>Debbie downer is the only friend you can make, so you will go negative too.</td>
</tr>
<tr>
<td>P</td>
<td>P</td>
<td>You decide to put notes in your notebook and locker reminding you to be more positive</td>
</tr>
<tr>
<td>R</td>
<td>R</td>
<td>You can't take it anymore so you breakup with your friend.</td>
</tr>
<tr>
<td>P</td>
<td>P</td>
<td>You try to find something good about everything your friend says is bad.</td>
</tr>
<tr>
<td>P</td>
<td>P</td>
<td>You sit down and talk to your friend about the problem and how the two of you can be more fun.</td>
</tr>
<tr>
<td>P</td>
<td>P</td>
<td>You decide to make more friends who are fun to be with.</td>
</tr>
</tbody>
</table>
College Preparation
Area: Personal Skills; College Prep

STEMM Career Connection: All careers that require post-secondary education

Title: Phone Tag – You’re It!

Grade Levels: Ninth - Twelfth

Academic Content Area: Science, Technology, Engineering, English, Mathematics

Topics: Research, Reading Process

Goal: Students will complete requirements to apply to programs of study for pursuing STEMM careers at a college of their choosing.

Performance Objectives: Students will:
1. investigate and complete requirements for applying to college.
2. find information including but not limited to contact names, email addresses, deadlines, and phone numbers.
3. design or select a system to keep track of information.
4. use and maintain their information system.

Big Question
How do I get accepted into a postsecondary program to get the education I need for a STEMM career?

Brief Summary
In this investigation students will use the engineering design process to design and use an information system to apply to a postsecondary program. Students will use their system to record and organize information. Students will contact the school of their choosing and address requirements to be accepted in a program of interest to them.

Main Ideas
Applying for a postsecondary program can be challenging. Students need to take a proactive approach to advocate for themselves. Students need to relentlessly play phone tag if necessary. The student who wants to pursue a career of their choosing is for all practical purposes “it” in the phone tag process of applying for post-
secondary education. Gathering, organizing, and maintaining information is paramount to finding an appropriate program and completing requirements to be accepted into the program. This lesson helps equip students to advocate for themselves in this process while building a resource for this task.

**Content Standards**

**Scientific Inquiry**

Students develop scientific habits of mind as they use the processes of scientific inquiry to ask valid questions and to gather and analyze information. They understand how to develop hypotheses and make predictions. They are able to reflect on scientific practices as they develop plans of action to create and evaluate a variety of conclusions. Students are also able to demonstrate the ability to communicate their findings to others.

**Grade Nine**

*Doing Scientific Inquiry*

**Benchmark A:** Participate in and apply the processes of scientific investigation to create models and to design, conduct, evaluate and communicate the results of these investigations.

5. Develop oral and written presentations using clear language, accurate data, appropriate graphs, tables, maps and available technology.

6. Draw logical conclusions based on scientific knowledge and evidence from investigations.

**Grade Ten**

*Doing Scientific Inquiry*

4. Draw conclusions from inquiries based on scientific knowledge and principles, the use of logic and evidence (data) from investigations.

**Technology**

**Standard 5: Technology and Information Literacy**

Students engage in information literacy strategies, use the Internet, technology tools and resources, and apply information-management skills to answer questions and expand knowledge.
Students become information-literate learners by utilizing a research process model. They recognize the need for information and define the problem, need or task. Students understand the structure of information systems and apply these concepts in acquiring and managing information. Using technology tools, a variety of resources are identified, accessed and evaluated. Relevant information is selected, analyzed and synthesized to generate a finished product. Students evaluate their information process and product.

**Benchmark B:** Apply a research process model to conduct research and meet information needs.

**Grade Nine**
1. Determine the essential questions and plan research strategies.
2. Select and evaluate appropriateness of information from a variety of resources, including online research databases and Web sites to answer the essential questions.

**Grade Ten**
1. Select the essential question to be examined by the research.
2. Identify sources most likely to have the needed information and determine subjects and keywords to be used in searching magazine databases and other electronic reference resources.
3. Evaluate information and select relevant and pertinent information found in each source, and maintain accurate records of sources used.
4. Organize and analyze information, finding connections that lead to a final product.

**Grade Eleven**
1. Select essential questions for research and use a recognized or personally developed model to conduct independent research.
2. Identify, evaluate information and select relevant and pertinent information found in each source.

**English Language Arts**

**Standard: Research**

Students define and investigate self-selected or assigned issues, topics, or problems. They locate, select and make use of relevant information from a variety of media, reference, and technological sources. Students use an appropriate form to communicate their findings.

**By the end of the 8 - 10 program:**
A. Formulate open-ended research questions suitable for investigation and adjust questions as necessary while research is conducted.
B. Evaluate the usefulness and credibility of data and sources.
C. Organize information from various resources and select appropriate sources to support central ideas, concepts and themes.

**By the end of the 11 - 12 program:**

A. Formulate open-ended research questions suitable for inquiry and investigation and adjust questions as necessary while research is conducted.
B. Compile, organize and evaluate information, take notes and summarize findings.
C. Evaluate the usefulness and credibility of data and sources and synthesize information from multiple sources.
E. Communicate findings, reporting on the substance and processes orally, visually and in writing or through multimedia.

**Standard: Reading Process - Concepts of Print, Comprehension Strategies and Self-Monitoring Strategies Standard**

Students develop and learn to apply strategies that help them to comprehend and interpret informational and literary texts. Reading and learning to read are problem-solving processes that require strategies for the reader to make sense of written language and remain engaged with texts. Beginners develop basic concepts about print (e.g., that print holds meaning) and how books work (e.g., text organization). As strategic readers, students learn to analyze and evaluate texts to demonstrate their understanding of text. Additionally, students learn to self-monitor their own comprehension by asking and answering questions about the text, self-correcting errors and assessing their own understanding. They apply these strategies effectively to assigned and self-selected texts read in and out of the classroom.

**By the end of the 8 - 10 program:**

A. Apply reading comprehension strategies to understand grade-appropriate text.
B. Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing).
C. Use appropriate self-monitoring strategies for comprehension.

**By the end of the 11 - 12 program:**

A. Apply reading comprehension strategies to understand grade-appropriate texts.
B. Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing).
C. Use appropriate self-monitoring strategies for comprehension.
Mathematics

High School Conceptual Category: Number and Quantity Domain

Reason quantitatively and use units to solve problems

1. Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
2. Define appropriate quantities for the purpose of descriptive modeling.
3. Choose a level of accuracy appropriate to limitations on measurement reporting quantities

Materials
- Paper/Notebook/Binder
- Dividers
- Pencil or Pen
- Post It notes
- Computers
- iPod or iPad
- Phone

Safety
Remind students to be careful to only give personal information such as Social Security number to legitimate organizations. Store all confidential information in a secure place.

Preparation for Lesson
- Copy the student pages.
- Visit websites.

Vocabulary
ACT – a national admissions examination with testing in Mathematics, Science, Reading, Writing and English

FAFSA - Completing the Free Application for Federal Student Aid (FAFSA) is the first step in applying for federal student aid. Students file the FAFSA to apply for federal grants, employment (Federal Work Study) and loans. Most states and schools also use the results of the FAFSA to determine their financial aid awards. The FAFSA is an annual application and students must meet eligibility requirements to receive federal student aid and meet satisfactory academic progress.
requirements. The FAFSA is available January 1st prior to the academic year. Wright State University's FAFSA deadline to apply is February 15th before the fall semester begins.

Financial Aid – funds to attend a post-secondary education program; for additional information visit http://www.wright.edu/financialaid/students/undergraduate.html

Grade Point Average (GPA) – the average of earned grades; most post-secondary programs have a minimum required grade point average

Official Transcript- a copy of the high school transcript that includes an official seal

Student services - Services designed to assist students with disabilities in meeting all academic requirements at a university

Summary of Performance (SOP) - a summary completed during the twelfth grade year of strengths and challenges of students with disabilities; the summary of performance is completed together with the student and an Intervention Specialist.

Time needed
At least five days to begin the process
(Time to complete the application will vary from student to student.)
Day One: Administer pretest. Have students respond in a journal to the big question, “How do I get accepted into a postsecondary program to get the education I need for a STEMM career?” Discuss the importance of a post-secondary education. Include vocabulary in the discussion. Consider options for a method of organizing and maintaining information. Students will use an engineering design process to choose a binder or folder to store all documents for applying to school.
Day Two: Students will visit the web site of the post-secondary institution that they are interested in attending. Students should write down fees that they will need to pay and consider a budget.
Day Three: Plan a campus visit. Evaluate the College Bound Binder. Redesign the College Bound Binder if needed to improve the resource tool.
Day Four: Visit the campus of interest to the students.
Day Five: Have a final discussion and wrap-up. Assess College Bound Binder.
Student Information

Phone Tag-You’re It!
Introduction: Have you ever played phone tag? You try and try to reach someone on the phone and cannot seem to connect. You might even leave a message in hopes that they will return your call. You call back again and still do not get to talk to the person that you are trying to reach. If you really need to talk to the person you keep trying until you talk to them. You cannot give up. Sometimes applying to a post-secondary program is like phone tag. You need to be persistent and not give up no matter how many forms you have to complete. In this lesson you will design and use a system to help you to complete the application process. A well-organized binder can be a useful tool to help you complete the tedious process of applying to a college or other post-secondary program. After all, in this phone tag you are it.

Day One: Choose a binder or folder, your College Bound Binder (CBB) to store all of your documents for applying to a post-secondary program. Binders come in a variety of sizes. Choose a binder that works best for you. You want to select a binder that has enough pockets to store all of your important documents and forms. A flash drive might also be helpful for saving electronic documents. Keep everything together. Have a designated area in your house or on your desk to store your College Bound Binder. Keep your binder organized. Use a binder with sections or dividers. Label the sections. Also include a calendar, paper, and pen or pencil. A highlighter and post it notes might also be helpful.

Day Two: Visit the web site of the post-secondary institution that you are interested in attending. Examples of three schools that support students with disabilities include:

- University of California Berkley
- University of Illinois at Urbana-Champaign
- Wright State University

Additional schools are listed in Appendix F.

You should check the requirements for acceptance to the school before your ninth grade year if possible. Wright State University offers an online College Preparatory Curriculum Completion form at http://www.wright.edu/admissions/apply/new.html. This form serves as a checklist for a student and their guidance counselor to plan the student’s course schedule or examine the student's transcript. Find out what services are available for students with disabilities. Many schools are supportive of students with these types of challenges. Consider attending another school if the school does not have services for students with disabilities. Visit http://www.wright.edu/students/dis_services/ for information about services at Wright State University.
**Day Three:** Some schools offer field trips for exploring post-secondary education. Ask your guidance counselor if your school offers this type of field trip. If your school does not offer this type of field trip then you can plan your own campus visit. Visit [http://www.wright.edu/admissions/visit/](http://www.wright.edu/admissions/visit/) for more information about visiting Wright State University.

As you plan your college visit write down questions that you need to address. Put a copy of your questions in your College Bound Binder.

While on campus include a stop in the office that serves students with disabilities. Call ahead and make an appointment. Contact information should be on the school website. Record contact information and the date of your appointment in your College Bound Binder.

Visit the department that you hope to attend and any labs that you would potentially use.

Include a campus map in your College Bound Binder as well as information about parking. Highlight places you plan to visit. Keep in mind that you may have to walk quite a bit on campus. Wear comfortable shoes. Handicap spaces may be marked on the map. If not, staff members in the office of disability services may be able to help you locate handicapped parking. Give yourself enough time to reach any offices without being late where you have appointments.

**Day Four:** Visit the campus of the school that you would like to attend. Many high schools allow students to make college visits during their senior year. Check with your guidance counselor or principal to find out your school’s policy about college visits.

Many schools require new students to participate in a new student orientation. New Student Orientation is an additional visit to the school after you have been accepted. Visit [http://www.wright.edu/orientation/2011/](http://www.wright.edu/orientation/2011/) for information about Wright State University’s orientation. Some campuses with students with disabilities offer an additional orientation for students with a disability.

**Day Five:** Update your College Bound Binder. Make sure that you keep your binder organized. Put papers in the appropriate sections such as financial aid, housing, schedule, and disability service information.

**Vocabulary**

**ACT** – a national admissions examination with testing in Mathematics, Science, Reading, Writing and English

**FAFSA** - Completing the [Free Application for Federal Student Aid (FAFSA)](http://www.fafsa.ed.gov/) is the first step in applying for federal student aid. Students file the FAFSA to apply for federal grants, employment (Federal Work Study) and loans. Most states and schools also use the results of the FAFSA to determine their financial aid awards. The FAFSA is an annual application and students must meet [eligibility requirements to receive federal student aid](http://www.fafsa.ed.gov/) and meet [satisfactory academic progress requirements](http://www.fafsa.ed.gov/). The FAFSA is available January 1<sup>st</sup> prior to the academic year. Wright
State University’s FAFSA deadline to apply is February 15th before the fall semester begins.

**Financial Aid** – funds to attend a post-secondary education program; for additional information visit
http://www.wright.edu/financialaid/students/undergraduate.html

**Grade Point Average (GPA)** – the average of earned grades; most post-secondary programs have a minimum required grade point average

**Official Transcript** - a copy of the high school transcript that includes an official seal

**Student services** - Services designed to assist students with disabilities in meeting all academic requirements at a university

**Summary of Performance (SOP)** - a summary completed during the twelfth grade year of strengths and challenges of students with disabilities; the summary of performance is completed together with the student and an Intervention Specialist.
Optional Extensions

Visit businesses with STEMM careers. If you cannot visit the actual business visit the websites.

Have students print the course of study to learn about course requirements and prerequisites for their chosen program of study.
Students should review their completed binder with their parent or guardian.
Ask parents and guardians for feedback from using these suggestions.
Have students complete other Starting Wright lessons such as “24/7” for improving time management.

Helpful Hints for Teachers

Students who are interested in attending a post-secondary program will appreciate this lesson. Some students may not envision themselves attending a post-secondary program. Career surveys are available for students who are uncertain about a career that they might want to pursue. Have a guidance counselor visit the class to talk to them about education options and process for application. Local STEMM industries may have staff that would be willing to visit your students to talk to them about STEMM careers. Some schools offer mentors whose experience can encourage students who lack vision for their future. When students participate in STEMM labs they are usually more willing to consider STEMM careers.

Students sometimes have interesting ideas about the requirements for applying to a post-secondary program. Their responses to the big question, “How do I get accepted into a postsecondary program to get the education I need for a STEMM career?” will serve as benchmark for the learning experience gained in this lesson. Have students date their journal response and store it in their binder. Students can read their response later in the process and reflect on how much they have learned from their starting point. This could be especially helpful if a student becomes discouraged.

The vocabulary list could be used for an assessment tool before and after the lesson. See Appendix F for a printable vocabulary list to give students. There is room at the bottom of the page for students to add to the list. See Appendix C, Part One for a vocabulary test. Linking instruction with assessment is valuable for increasing student understanding. Students may not be familiar with the terms at the beginning of the lesson but will be very familiar with the vocabulary by the end of the lesson.

The College Bound Binder could serve as another assessment tool and a resource. See Appendix C, Part Two for more information. Appendix C also includes a rubric for the College Bound Binder.

The junior year of high school is a very important year for applying to a post-secondary program, especially if the student is hoping to get a scholarship. Find out dates and deadlines and discuss this information with your students. Post a calendar in the classroom with deadline dates. Contact the office of disability services at a post-secondary institution in your area. Ask them about bringing a group of
students on a field trip for a tour of their school. This type of field trip might be just
the kind of eye opener a student needs to start planning for their future. Have
students who cannot physically visit a campus take a virtual tour. Parents and
guardians would also benefit from virtual tours. See the home page of the school for
more information about a virtual tour.

Helpful Hints for Parents
Applying to a post-secondary program can be a challenging, drawn out process, like
playing phone tag with a repairman. The College Bound Binder will be a valuable
tool and resource for getting through that process. Even though the College Bound
Binder will be a valuable tool, remember that your young person must advocate for
themselves in order to be successful. As you visit post-secondary programs it is
important to maximize your young person’s time on campus. Allow them to ask
questions. If you have questions that do not get asked and answered you can call the
contact person later and address your concerns.
Encourage your young person to use an organization system that is useful to them. If
the organization tool is not useful to the young person then they will probably not
use it. Make copies of all important documents and completed forms. Placing
documents in the labeled sections of the College Binder can keep important papers
safely stored and available when needed. It is equally important to have a
designated place in your house to store the College Bound Binder, like on top of a
desk.
Allow more time to complete forms than you think it will take. Some forms are more
time consuming then they appear to be.
Your high school guidance counselor has helpful information about post-secondary
options including important information about application deadlines. Many
guidance counselors include scholarship information in school newsletters or on the
school website.
Post-secondary schools offer online information for parents. See Appendix E for a
list of school websites. Here are examples of helpful links on the Wright State
University website to help you practice.
http://www.wright.edu/
http://www.wright.edu/visit/
http://www.wright.edu/admissions/info/
For information about financial aid at Wright State University visit:
http://www.wright.edu/financialaid/information/parents/index.html
For information about the WSU Office of Disability Services visit:
http://www.wright.edu/students/dis_services/
Students applying for college are required to take an entrance exam, usually the
ACT. Students sometimes qualify for testing accommodations. Additional
information is available online.
For information about the ACT visit:
Appendix A: Student Lab Sheet

College Bound Binder Design
You will need an organization system that works for you. Use the design engineering process to develop your organization system. NASA offers a helpful concept map showing eight simple steps.

Design Process Notes and Concept Map
Respond to each of the steps on the format that works best for you.
Step One: Identify the problem.

Step Two: Identify criteria and constraints.

Step Three: Brainstorm possible solutions.

Step Four: Generate ideas.

Step Five: Explore possibilities.

Step Six: Select an approach.

Step Seven: Build a model or prototype.

Step Eight: Refine the design.
Engineer Design Process

1

2

3

4

5

6

7

8
Appendix B: Teacher Lab Sheet

College Bound Binder Design
You will need an organization system that works for you. Use the design engineering process to develop your organization system. NASA offers a helpful concept map showing eight simple steps.

Students will use either the notes or concept map. It does not matter which one they use as long as they use the design process.

Design Process Notes and Concept Map
Respond to each of the steps on the format that works best for you.

Step One: Identify the problem.
I need to apply to some kind of school after I finish high school. It looks complicated and I am not very organized.

Step Two: Identify criteria and constraints.
I need to correctly fill out forms and turn forms in by the deadlines. I don’t want to lose important papers. I am busy. I don’t have a lot of extra money to spend on some kind of storage system. I don’t have someone to help me.

Step Three: Brainstorm possible solutions.
Keep papers together in a binder; use a calendar; save electronic information on a flash drive

Step Four: Generate ideas.
Use an inexpensive binder with sections; always keep the binder in the same place

Step Five: Explore possibilities.
Check out office supplies in stores; ask someone I know (a teacher) how they keep up with a lot of papers

Step Six: Select an approach.
Buy a binder, dividers, paper, pen, and calendar. A calendar could be printed from a computer.

Step Seven: Build a model or prototype.
Put the binder together. Mark dividers with labels such as admissions, ACT information, Housing, financial aid, student services, and miscellaneous.

Step Eight: Refine the design.
Start putting papers in the binder. If something does not work change it.
Appendix C: Assessments Part One

Pretest/Posttest Vocabulary Test

Match the terms with the correct definition.

ACT GPA Summary of Performance
Official transcript FAFSA Student Services

____________________ 1. Must be completed in order to receive financial aide

____________________ 2. An admission examination

____________________ 3. Document that outlines academic strengths and challenges and lists accommodations that help a student succeed

____________________ 4. Grade point average for classes taken; most post-secondary programs have a minimum acceptable grade point average

____________________ 5. A record of completed courses with an official seal

____________________ 6. Services designed to assist students with disabilities in meeting all academic requirements at a university
**Pretest/ Posttest Key**

Match the terms with the correct definition.

<table>
<thead>
<tr>
<th>ACT</th>
<th>GPA</th>
<th>Summary of Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>FAFSA</td>
<td>GPA</td>
<td>Student Services</td>
</tr>
</tbody>
</table>

1. Must be completed in order to receive financial aide

2. An admission examination

Summary of Performance 3. Document that outlines academic strengths and challenges and lists accommodations that help a student succeed

4. Grade point average for classes taken; most post-secondary programs have a minimum acceptable grade point average

5. A record of completed courses with an official seal

6. Services designed to assist students with disabilities in meeting all academic requirements at a university
Assessments Part Two

College Bound Binder
Students will maintain a binder of artifacts generated from the application process. Teachers may determine any point value they might want to assign to the finished College Bound Binder. A rubric with suggested point values is provided. Points are earned based on how well the student achieved each goal. Guiding questions for each section could be helpful for students to generate their binder, parents to support their young person’s application, and for teachers to assess the binder. Each set of questions is based on a section of the rubric.

Student selected materials and designed College Bound Binder.

Is the binder large enough to hold your papers?

Are dividers included and labeled?

Is a campus map in the binder?

Are contact names and email addresses in the binder?

Is a calendar included in the binder?

Are paper, post it notes, a pen, and a flash drive included in the binder?

Are there any other additions to the binder that improve how user friendly your binder is to you?

Student maintained their binder.

Are papers in the appropriate section? Is the binder stored in a designated area?

Student completed application forms.

Are papers completed correctly? Does student have information about costs?

Student met deadlines.

Does student have information about costs?

Have papers been submitted on or before the deadline?

Student is prepared to begin a post-secondary program.

Has the application process been completed?

Has the student been notified of acceptance into a post-secondary program?
College Bound Binder Rubric

Students will design, use, and maintain a binder for completing the application process for a secondary program.

Not all areas need to be used for all students. Select areas that are relevant to the individual.

Be sure to provide positive feedback when appropriate. Also give specific suggestions to students about areas that they need to complete.

<table>
<thead>
<tr>
<th></th>
<th>Beginning</th>
<th>Developing</th>
<th>Accomplished</th>
<th>Exemplary</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student selected materials</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>and designed College Bound</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Binder.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student selected and designed an appropriate tool for storing and organizing artifacts reflecting a beginning level of performance.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student selected and designed an appropriate tool for storing and organizing artifacts reflecting development and movement toward mastery of performance.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student selected and designed an appropriate tool for storing and organizing artifacts reflecting mastery of performance.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student selected and designed an appropriate tool for storing and organizing all accumulated artifacts for completing the application process reflecting the highest level of performance.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student maintained their binder.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student maintained their binder reflecting a beginning level of performance.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student maintained their binder reflecting development and movement toward mastery of performance.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student maintained their binder reflecting mastery of performance.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student maintained their binder reflecting the highest level of performance.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student completed application forms.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student completed application forms reflecting a</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student completed application forms reflecting</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student completed application forms reflecting the highest level</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student met deadlines.</td>
<td>Student met deadlines reflecting a beginning level of performance.</td>
<td>Student met deadlines reflecting development and movement toward mastery of performance.</td>
<td>Student met deadlines reflecting mastery of performance.</td>
<td>Student met deadlines reflecting the highest level of performance.</td>
<td></td>
</tr>
<tr>
<td>-----------------------</td>
<td>---------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------</td>
<td>-------------------------------------------------</td>
<td>---------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Student is prepared to begin a post-secondary program.</td>
<td>Student is prepared to begin a post-secondary program reflecting a beginning level of performance.</td>
<td>Student is prepared to begin a post-secondary program reflecting development and movement toward mastery of performance.</td>
<td>Student is prepared to begin a post-secondary program reflecting mastery of performance.</td>
<td>Student is prepared to begin a post-secondary program reflecting the highest level of performance.</td>
<td></td>
</tr>
</tbody>
</table>
Appendix D
Questions to Ask the Office of Disability Services (ODS) or Student Services Office

Visiting a college’s Office of Disability Services (ODS), Student Services Office or speaking with their disability coordinator is a great way to learn about services that college could provide you with to help you succeed. It is important that you feel comfortable with the ODS staff and find out what types of services they have provided for students with similar disabilities and what you are expected to do in order to receive services. Below is a list of questions you might want to consider asking the representative you visit.

1. What do I need to do to determine my eligibility for services?

2. Have you had any students with disabilities similar to mine? If so, what types of services do you provide to help them succeed?

3. If I am eligible for services, what am I legally entitled to receive?

4. How is working with your office different than working with my high school teacher and counselor?

5. Do I have to pay anything for services?

6. Who should I inform about the services that I require?

7. Tell me how you would help me handle a situation where I needed an academic accommodation and a faculty member was uncooperative.

8. How do I schedule services?
Appendix E

LISTING OF OHIO UNIVERSITIES/COLLEGES

Links to their office of disability services

*This list can also be found at www.startingwright.org

Ashland University, Ashland, Ohio; Disability Services
Baldwin-Wallace College, Berea, Ohio. Disability Services
Belmont Technical College, St. Clairsville, Ohio. Student Services
Bluffton College, Bluffton, Ohio; 504/ADA Coordinator
Bowling Green State University, Bowling Green, Ohio; Disability Services
Bowling Green State University, Firelands Campus, Huron, Ohio. Disability Services
Capital University, Columbus, Ohio. Disability Services
Case Western Reserve University, Cleveland, Ohio. Disability Resources
Cedarville College, Cedarville, Ohio; The Cove: Disability Services
Central Ohio Technical College, Newark, Ohio. Office of Disability Services
Central State University, Wilberforce, Ohio. Disability Services
Chancellor University, Cleveland, Ohio. Accessibility and Disability Services
Chatfield College, Fayetteville, Ohio. Disability Services
Cincinnati Christian University, Cincinnati, Ohio.
Cincinnati State and Technical College, Cincinnati, Ohio. Student Services
Clark State Community College, Springfield, Ohio; Disability Services
Cleveland Institute of Electronics, Cleveland, Ohio.
Cleveland State University, Cleveland, Ohio; Office of Disability Services
College of Mount Saint Joseph, Cincinnati, Ohio. Disability Services
The College of Wooster, Wooster, Ohio; Disability Services
Columbus State Community College, Columbus, Ohio; Disability Services
Cuyahoga Community College (CCC), Cleveland
Cuyahoga Community College, Cleveland, Ohio. Disability Services
Defiance College, Defiance, Ohio. Accessibility Services
Denison University, Granville, Ohio. Academic Support and Enrichment Center
 DeVry Institute of Technology, Columbus, Ohio. Student Services
Edison State Community College, Piqua, Ohio; Disability Support Services
ETI Technical College, Niles, Ohio.
Franciscan University of Steubenville, Steubenville, Ohio. Academic/Disability Services
Heidelberg College, Tiffin, Ohio; Disability Services
Hiram College, Hiram, Ohio; Services for Students with Disabilities
Hocking Technical College, Nelsonville, Ohio. Access Center Office of Disability Services
Jefferson Technical and Community College, Steubenville, Ohio. Access Ability Resource Center (ARC)
John Carroll University, University Heights, Ohio. Disability Services
Kent State University, Kent, Ohio; Student Accessibility Services
Kent State University, Ashtabula, Ashtabula, Ohio. Student Accessibility Services
Kent State University, East Liverpool Campus, East Liverpool, Ohio. Student Accessibility Services
Kent State University, Geauga, Burton Township, Ohio. Student Accessibility Services
Kent State University, Salem Campus, Salem, Ohio. Coordinator of Student Disability Services
Kent State University, Stark Campus, Canton, Ohio. Student Accessibility Services
Kent State University, Trumbull Campus, Warren, Ohio. Student Disability Services
Kent State University, Tuscarawas, New Philadelphia, Ohio. Disability Services
Kenyon College, Gambier, Ohio. Disability Services
Lake Erie College, Painesville, Ohio. Student Success Center
Lakeland Community College, Kirtland, Ohio. Services for Students with Disabilities
Lima Technical College, Lima, Ohio.
Lorain County Community College, Elyria, Ohio. Office for Special Needs Services
Lourdes College, Sylvania, Ohio. Accessibility Services
Malone University, Canton, Ohio. Student Accessibility Services
Marietta College, Marietta, Ohio. Disability Services
Marion Technical College, Marion, Ohio. Student Resources Center
Miami-Jacobs, Dayton
Miami University, Oxford, Ohio; Office of Disability Resources
Miami University, Hamilton Campus, Hamilton, Ohio; Office of Disability Services
Miami University, Middletown Campus, Middletown, Ohio; Office of Disability Services
Mount Union College, Alliance, Ohio.
Mount Vernon Nazarene University, Mount Vernon, Ohio. Disability Services
Muskingum College, New Concord, Ohio.
Northcentral Technical College, Mansfield, Ohio. Accommodation Services
Northeastern Ohio Universities College of Medicine, Rootstown, Ohio; Disabilities and Accommodations
Northwest State Community College, Archbold, Ohio. Office of Accessibility
Notre Dame College of Ohio, South Euclid, Ohio. Academic Support Center
Oberlin College, Oberlin, Ohio; Office of Disability Services
Old Dominican College, Columbus, Ohio. Office of Disability Services
Ohio Northern University, Ada, Ohio; Disability Services
The Ohio State University, Columbus, Ohio. Office of Disability Services
The Ohio State University, Agricultural and Technical Institute, Wooster, Ohio. Office of Disability Services
The Ohio State University, Lima Campus, Lima, Ohio; Office for Disability Services
The Ohio State University, Mansfield Campus, Mansfield, Ohio; Office of Disability Services
The Ohio State University, Marion Campus, Marion, Ohio. Office of Disability Services
The Ohio State University, Newark Campus, Newark, Ohio. Office of Disability Services
Ohio University, Athens, Ohio; Office of Disability Services
Ohio University, Chillicothe Campus, Chillicothe, Ohio. Student Support Services
Ohio University, Eastern Campus, St. Clairsville, Ohio. Disability Services
Ohio University, Southern Campus, Ironton, Ohio. Learning Services
Ohio University, Lancaster Campus, Lancaster, Ohio.
Ohio University, Zanesville Campus, Zanesville, Ohio.
Ohio Wesleyan University, Delaware, Ohio; Learning Disabilities Assistance Center
Otterbein College, Westerville, Ohio; Disability Services
Owens State Community College, Oregon, Ohio.
Owens State Community College, Findlay Campus, Findlay, Ohio.
The Pontifical College Josephinum, Columbus, Ohio.
Shawnee State University, Portsmouth, Ohio. Disability Services
Sinclair Community College, Dayton, Ohio. Disability Services
Southern Ohio College, Cincinnati, Ohio.
Southern State Community College, Hillsboro, Ohio. Disability Services
Stark State College, Canton, Ohio. Disability Support Services
Terra Community College, Fremont, Ohio. Disability Services
Tiffin University, Tiffin, Ohio. Disability Services
Union Institute and University, Cincinnati, Ohio.
University of Akron, Akron, Ohio. Office of Accessibility
University of Akron, Wayne College, Orrville, Ohio. Smucker Learning Center
University of Cincinnati, Cincinnati, Ohio. Disability Services
University of Cincinnati, Clermont College, Batavia, Ohio.
University of Cincinnati, OMI College of Applied Science, Cincinnati, Ohio.
University of Cincinnati, Raymond Walters College, Blue Ash, Ohio. Disability Services
University of Dayton, Dayton, Ohio. Disability Services
University of Findlay, Findlay, Ohio. Disability Services
University of Northwestern Ohio, Lima, Ohio. Student Services
University of Rio Grande, Rio Grande, Ohio. Accessibility
The University of Toledo, Toledo, Ohio. Academic Enrichment Center/Disability Services
The University of Toledo, Community and Technical College, Toledo, Ohio.
Urbana University, Urbana, Ohio. Disability Services
Ursuline College, Pepper Pike, Ohio. Students with Disabilities, FOCUS Program
Walsh University, Canton, Ohio. Academic Support Center
Washington State Community College, Marietta, Ohio. Disability Services
Wilberforce University, Wilberforce, Ohio. Disability Services
Wilmington College, Wilmington, Ohio.
Wittenberg University, Springfield, Ohio. Academic Support Services
Wright State University, Dayton, Ohio. Office of Disability Services
Wright State University, Lake Campus, Celina, Ohio.
Xavier University, Cincinnati, Ohio. Disability Services
Youngstown State University, Youngstown, Ohio. Center for Student Progress-Disability Services
Zane State College, Zanesville, Ohio. Student Success Center
Appendix F

**Vocabulary**

**ACT** – a national admissions examination with testing in Mathematics, Science, Reading, Writing and English

**FAFSA** - Completing the Free Application for Federal Student Aid (FAFSA) is the first step in applying for federal student aid. Students file the FAFSA to apply for federal grants, employment (Federal Work Study) and loans. Most states and schools also use the results of the FAFSA to determine their financial aid awards. The FAFSA is an annual application and students must meet eligibility requirements to receive federal student aid and meet satisfactory academic progress requirements. The FAFSA is available January 1st prior to the academic year. Wright State University’s FAFSA deadline to apply is February 15th before the fall semester begins.

**Financial Aid** – funds to attend a post-secondary education program; for additional information visit http://www.wright.edu/financialaid/students/undergraduate.html

**Grade Point Average (GPA)** – the average of earned grades; most post-secondary programs have a minimum required grade point average

**Official Transcript** - a copy of the high school transcript that includes an official seal

**Student Services** - Services designed to assist students with disabilities in meeting all academic requirements at a university

**Summary of Performance (SOP)** - a summary completed during the twelfth grade year of strengths and challenges of students with disabilities; the summary of performance is completed together with the student and an Intervention Specialist.
Appendix G

Materials to construct the College Bound Binder.

Combine this inexpensive binder pocket and dividers for a useful College Bound Binder.
This organizer has labels and pockets included.
This inexpensive type of envelope is available in letter size, legal size, and a variety of colors. Dividers could be added for more efficient organization.
College Bound Binder Model
Label sections such as Admissions, Financial Aid, Housing, and Miscellaneous. Be sure to place forms in the correct sections. Pay close attention to deadlines.
The FAFSA must be completed to qualify for financial aid. A FAFSA form is available online.
College Bound Binder
Appendix H: Additional Resources

For information about the ACT
http://www.actstudent.org/
http://www.act.org/aap/disab/index.html

For additional information including a timeline for applying to a post-secondary program
http://www.collegeboard.org/

Information about the engineering design process

See the Starting Wright Web site for terrific resources.
## Index

<table>
<thead>
<tr>
<th>Lesson Name and Page Number</th>
<th>Main Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Career is Right, 5</td>
<td>Career Exploration - Science, Technology, Engineering, Mathematics and Medicine</td>
</tr>
<tr>
<td>“Unearthing a STEMM Career in Geology,” 29</td>
<td>Career Exploration - Geology and Physical Science</td>
</tr>
<tr>
<td>“Exploring a STEMM Career in Animal Science,” 51</td>
<td>Career Exploration - Animal Science</td>
</tr>
<tr>
<td>“I'm Never Gonna Use This,” 71</td>
<td>Career Exploration - Mathematics</td>
</tr>
<tr>
<td>“Career Spotlight,” 93</td>
<td>Career Exploration - Science, Technology, Engineering, Mathematics and Medicine; Interviewing skills, Interpersonal Communication Skills</td>
</tr>
<tr>
<td>“Talk the Walk, Walk the Talk,” 113</td>
<td>Career Exploration - Engineering; History of Innovation in Dayton, Ohio</td>
</tr>
<tr>
<td>“Great Minds Survey,” 131</td>
<td>Career Exploration - Science, Technology, Engineering, Mathematics and Medicine; STEMM Role Models</td>
</tr>
<tr>
<td>“Oops! There's an Oil Spill!”, 154</td>
<td>Environmental Science, Science Lab, Geology, Oil Spills</td>
</tr>
<tr>
<td>“Once is NOT Enough,” 178</td>
<td>Note-taking, Study Skills, Academic Skills</td>
</tr>
<tr>
<td>“Study Right,” 192</td>
<td>Study Skills, Test Taking, Academic Skills</td>
</tr>
<tr>
<td>“Believe it or Not?”, 222</td>
<td>Validity of research sources, Academic Skills, Critical Thinking</td>
</tr>
<tr>
<td>“24/7,” 254</td>
<td>Personal Skills, Time Management, Project Management</td>
</tr>
<tr>
<td>“Going Pro,” 272</td>
<td>Personal Skills, Evaluating Emotions and Actions, Perseverance, Reactive versus Proactive Actions</td>
</tr>
<tr>
<td>“Phone Tag- You're It!”, 286</td>
<td>College Preparation and Planning, Interviewing Skills, Interpersonal Communication Skills, Self-Advocacy</td>
</tr>
</tbody>
</table>
About the Contributors

**Kathleen Guest Bledsoe** has been an advocate for children with disabilities at the state, regional, and national level. She earned a BA from Mercer University and a MST from Wright State University. She is a National Board for Professional Teaching Standards Exceptional Needs Specialist (first achieved 2001; renewed 2011). Mrs. Bledsoe has served in the Dayton Regional STEM Center for three years as a Senior STEM Fellow, Lead Fellow and facilitator for professional development for teachers. Kathleen’s son, Nicolas, is her inspiration for being a teacher. Nicolas likes learning but needs information presented to him in a way that he can understand. He is autistic and has multiple disabilities including a visual impairment. Despite his challenges he is pursuing a STEM career of his choosing, working with small animals. Mrs. Bledsoe currently teaches Integrated Science and Environmental Science at Wayne High School in Huber Heights, Ohio.

**Kristy Hurst** holds a B.S. in Special Education and a M.Ed. in Curriculum and Instruction from Ohio University. She is currently pursuing a M.Ed. in Educational Leadership from The University of Dayton. She has worked as an intervention specialist with pre-school, elementary and high school aged students. Mrs. Hurst is currently in her seventh year with Miami East High School and is a member of the Miami Valley Transition Council. This is her second collaboration with Wright State University.

**Theodore Kleiser** has taught high school since 1995. He is currently teaching engineering and digital electronic classes at Wayne High School in Huber Heights as part of the Project Lead The Way program. He has written lessons for the Starting Wright program, the Dayton Regional STEM center and Public Television’s National Teacher Training Institute. He is a children’s freelance writer and has been published in *Cricket* and *Listen* magazines. Prior to becoming a teacher, Ted was a pilot for the United States Navy, an Associate Professor of Aeronautical Engineering at the United States Naval Academy, and an engineer with General Dynamics. Ted is a graduate of Shippensburg University in Shippensburg, Pennsylvania and the Naval Post-Graduate School in Monterey, California. He holds degrees in Secondary Education, Mathematics and Aeronautical Engineering.

**Lisa Preston** holds a B.S. in K-8 General Education and a M.S. in Special Education from Wright State University. Mrs. Preston also holds a licensure in Curriculum, Instruction, and Professional Development from the University of Dayton. She has served as a tutor, Intervention Specialist and Special Education Supervisor at both the elementary and high school levels. This fall, Mrs. Preston will begin her fifth year serving as the Special Education Supervisor in Darke County. In this role she is responsible for providing services to 7 school districts in Darke County at the secondary level.
Stephanie Meade, M. Ed. currently teaches 9th and 10th grade science at Northmont High School, in Englewood, OH. She has spent the majority of her career working as an Intervention Specialist in various capacities. She is certified as a K-12 Intervention Specialist as well as to teach Biology and General Science in grades 7-12. Ms. Meade holds a Bachelor of Science in Biology and a Master of Education in Adolescent/Young Adult Education both from Wright State University.