

36.1 Student Selected Topics (part I)

Individually, read through this page. Prepare to discuss in class for clarification.

This topic provides students an opportunity to further investigate a physical science topic they are most interested in.

The next topic (Topic 37) provides a similar opportunity.

There are four ways students may choose to pursue their interest:

- class demonstration *Individual or small group*
- research paper *Individual only*
- class lesson *Individual or small group*
- science model *Individual or small group*

Once a “way” is selected – students should select one of the three remaining ways for their work in Topic 37.

Said differently, all students will choose two of the four ways to perform their work. One of the four ways listed above will be used for this topic (Topic 36). In the next topic (Topic 37), students will choose a different way to accomplish their work.

The specific subject pursued may (optionally) be the same for Topics 36 and Topic 37. As an example, a student may perform a science model on atomic properties Topic 36, then also perform a research paper on atomic properties for Topic 37.

Or, a student may choose a different emphasis subject for each effort. As an example, a student may perform a science model on atomic properties for Topic 36 but write a research paper on conservation of momentum for Topic 37.

Confirm Your Agreement



1. Read the overview and expectations.
2. Confirm your agreement by checking the “YES” box.

Overview:

1

This topic (and the next topic – Topic 37), are set aside for students to pursue one or more areas of interest – to “dive deep” into a physics, chemistry, or Earth science topic.

While team work can be fun and engaging, this assignment is intended to enlighten or reinforce a science concept. If students choose to work as a team toward this goal, they must each contribute to the final product and they must primarily focus toward completion of the work.

Time management expectations for this assignment include completing the work before the deadline AND productively making use of the entire time allocated for the work.

Expectations:

- Select one of four ways to accomplish this assignment.
- Select a different way to do the next assignment.
- Remain productively busy on your work throughout the allotted time. If work is completed ahead of the schedule, you will find additional improvements to your work.
- Complete your work by the deadline stated by the instructor. Make productive use of all of the allocated time.
- Appropriately challenge yourself during this assignment – to improve and further your grasp of a science concept.
- Include an emphasis on quality of work – such as spelling, grammar, communication, and completeness.

YES

Check the “Yes” box once you agree to the expectations.

☐

2

Ways to Complete Work



- Choose any of the four ways to pursue this assignment (Topic 36).
- Then choose from the remaining three ways to complete your next assignment (Topic 37).

Demonstration



Demonstrate a science principle to the class.

Include attention to safety.

Strive for 5 minute (or less) demonstration.

Use existing materials from school – or purchase materials on your own.

Individual or small group

Research Paper

Turn-in a physical science oriented research paper.

Include/cite references used.

Strive for 300 total words (without “fluff”).

Either neatly hand-write paper or more ideally use computer to complete your paper.

Individual only.

Model



Complete and present a physical science model.

Include written explanation.

Strive for a model that is reasonably self-explanatory.

Refer to topics on “Models” and previous physical science topics covered in class.

Individual or small group

Lesson

Present a physical science lesson to the class.

Include learning objectives.

Strive for 5 minute presentation.

Draw from prior topics covered in class – but extend the material to new ideas.

Individual or small group



Demonstrations and models may require the purchase of additional material. Instructor will not purchase or provide materials beyond those materials already available for daily work. If additional materials are required, students and parent/guardians must provide them. The research paper and lesson options for this assignment do not required additional material.

Select an Area to Investigate

Scan this list to identify your area(s) of interest. Select from this list – or propose an alternative to your instructor for approval.

Atomic Properties and the Periodic Table

Refer to: Honeycutt Science Topics 15, 16, and 19

Properties of Chemical Reactions and Conservation of Energy

Refer to: Honeycutt Science Topic 17

Acceleration and Things That Cause Acceleration

Refer to: Honeycutt Science Topics 22, 24, and 25

Momentum

Refer to: Honeycutt Science Topic 23

Defining and Calculating Energy

Refer to: Honeycutt Science Topics 22, and 25

The Use of Energy, Its Conservation, and Equilibrium

Refer to: Honeycutt Science Topics 26, and 34

The Use of Electromagnetism and Its Effect on the Bioshpere

Refer to: Honeycutt Science Topics 27, and 34

Recognize and Apply Laboratory Techniques

Any one – *or combinations* – of these laboratory skills are appropriate: Scientific method, Lab procedures, Lab safety, Use of equipment, Data gathering, Data measurement, Graphing and charting data, Physical relationship calculations, Devise experiments, Interpret results. Refer to: Honeycutt Science Activity 11.

For Team Efforts, refer to Honeycutt Science Technique 16: Collaboration

Collaboration	
Interpersonal communication	<ul style="list-style-type: none">• Communication existed between team members.• Communication about the project existed between team members.• Communication was generally limited to and focused upon the assignment.
Conflict resolution	<ul style="list-style-type: none">• Any conflicts that arose were addressed with only minimal instructor intervention• Conflicts were limited to the project itself.• Conflicts were never bullying.
Task mgt.	<ul style="list-style-type: none">• Division of responsibility was made clear• Each individual contributed to the project.• Each individual had opportunity for input on the deliverables.

Perform a Demonstration

Demonstration

Demonstrate a science principle to the class.

Include attention to safety.

Strive for 3-5 minute demonstration.

Use existing materials from school – or purchase materials on your own.

Individual or small group

Consider demonstrating a physical science phenomenon.

Note, phenomenon are usually interesting, observable science events. Some example ideas to demonstrate include:

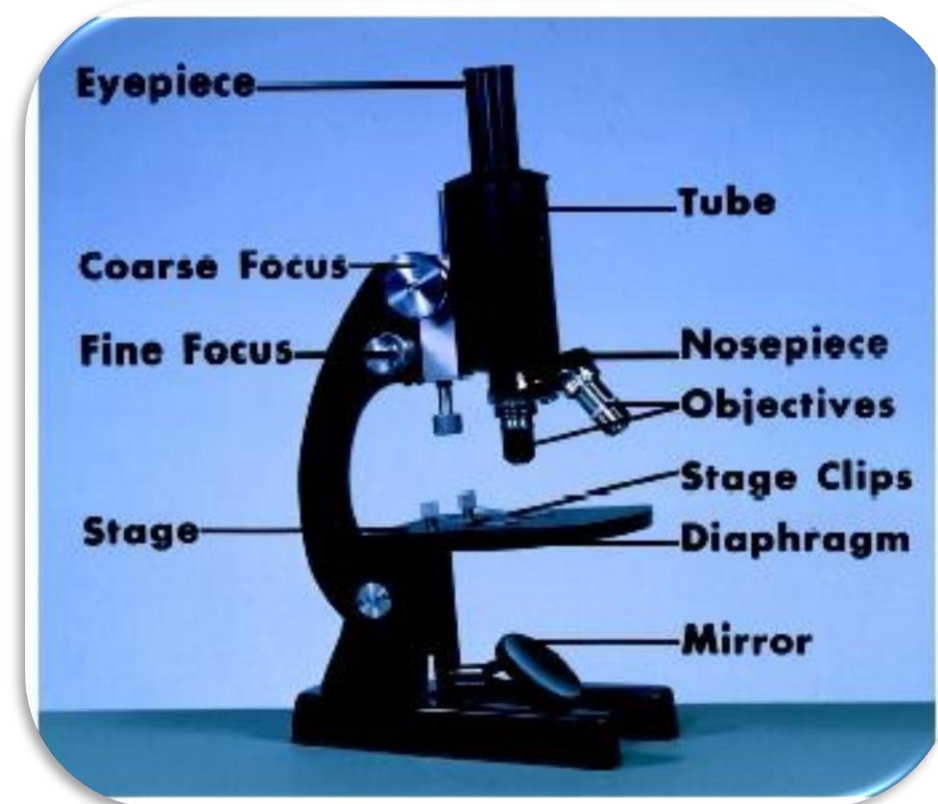
- Simple Chemical Reactions
- Newton's 2nd Law of Motion
- Conservation of Momentum
- Electrostatic Forces
- Energy Conversion
- The 2nd Law of Thermodynamics
- Wave Properties in Media

Find links to really cool examples within Honeycutt Science Phenomenon page.

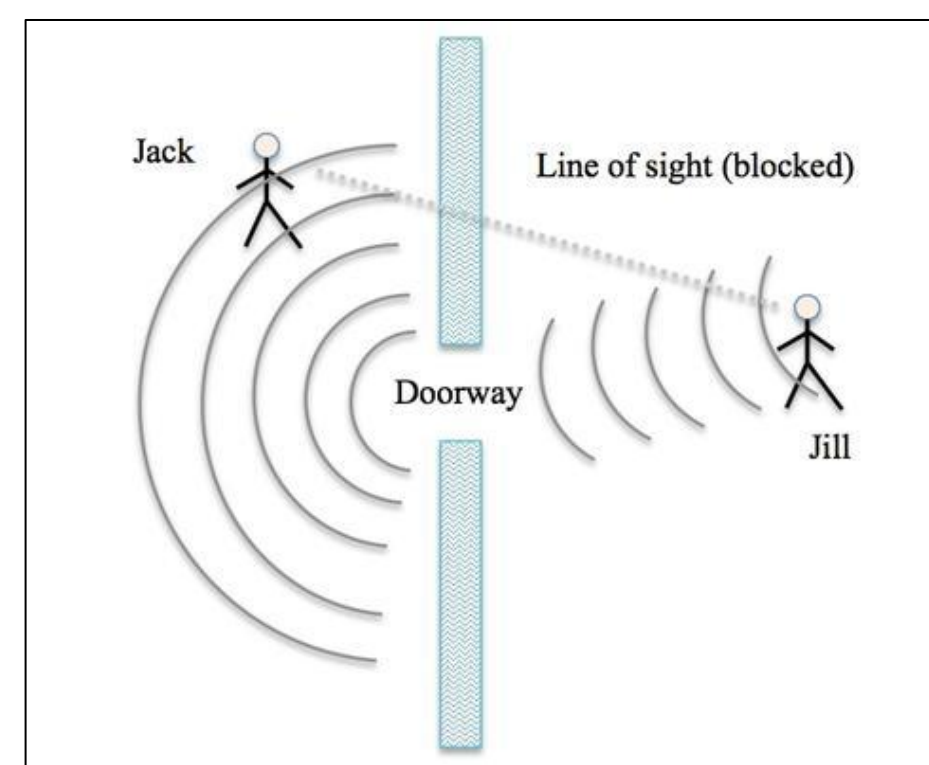
Instructor will not purchase or provide materials beyond those materials already available for daily work. If additional materials are required, students and parent/guardians must provide them. There are alternative ways to complete this assignment that do not require additional material.



Student demonstrating the use of technology to draw picture using a “robot” and a marker.



Demonstrate the proper use of a light microscope as a laboratory skill. Honeycutt Science Biology Topic 28 has some good tips.



Here, students demonstrate similarities and differences of light/sound waves. An oral explanation along with a written summary can make this an interesting demonstration.

Present a Lesson

Lesson

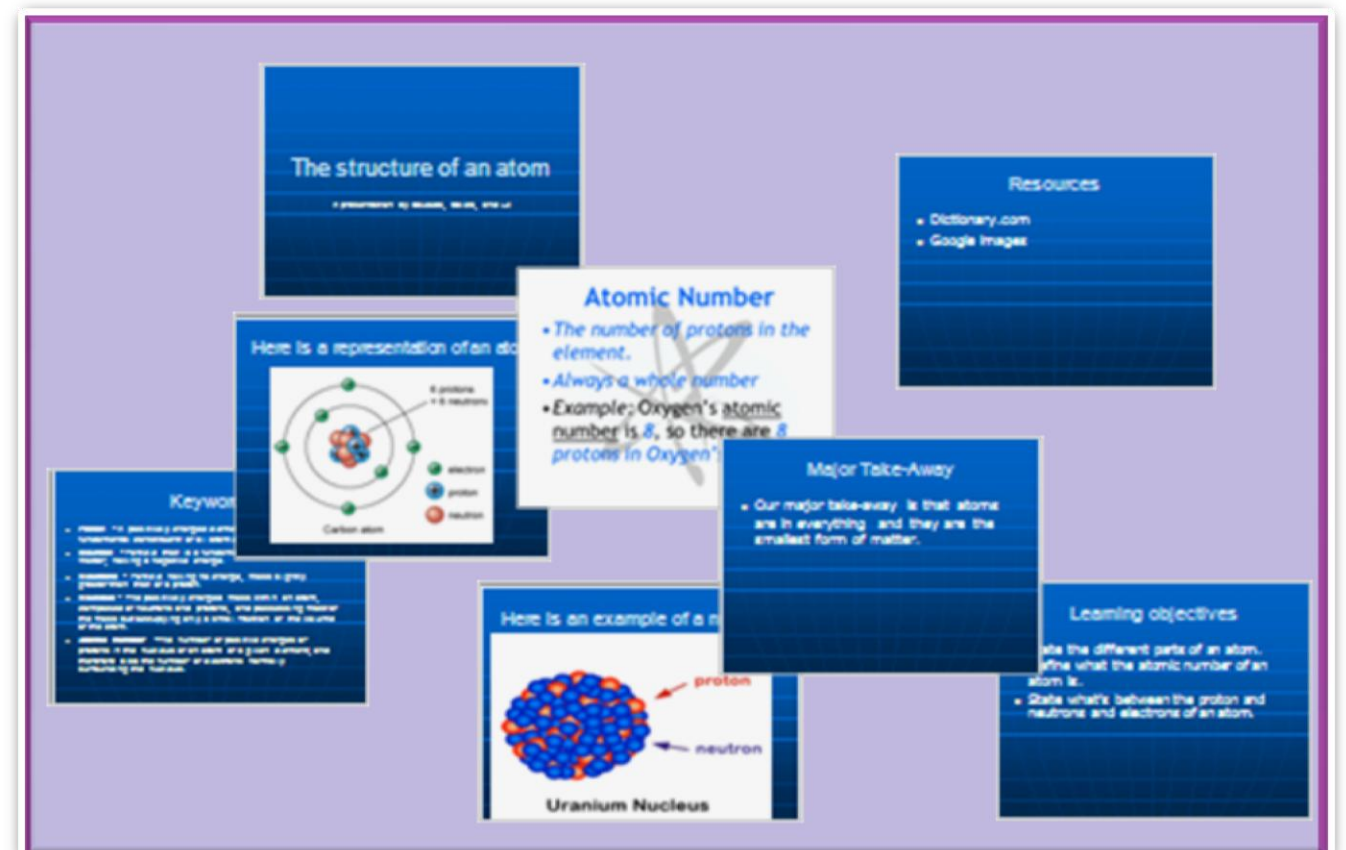
Present a physical science lesson to the class.

Include learning objectives.

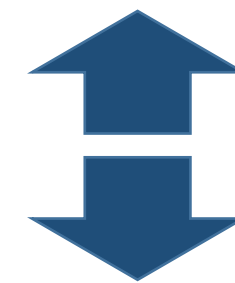
Strive for 5 minute presentation.

Draw from prior topics covered in class – but extend the material to new ideas.

Individual or small group



Example student PowerPoint presentation covering “The Structure of an Atom.”



Here, a student-team wrote and illustrated a children’s story. This was about the planets. They read and presented the information to a third-grade class.

Your PowerPoint presentation must have a title slide, your learning objectives, and citations. Recommended for the content include (at a minimum) definitions, simple illustrations, a few examples and FAQ’s – along with the major concept.

Title Slide	Learning Objectives	Definitions	Illustration
1	2	3	4
Examples	FAQ’s	Major Concepts	Citations
5	6	7	8

Refer to Honeycutt Science Technique 17 – Communication.

Choosing this method of accomplishing the topic has some aspects of research, demonstration, and making of a model. Creating a PowerPoint presentation (or some thing similar) affords students a great opportunity to overcome a fear of public speaking while also reinforcing their own knowledge about a topic.

Build a Model

Model

Complete and present a physical science model.

Include written explanation.

Strive for a model that is reasonably self-explanatory.

Refer to topics on “Models” and previous physical science topics covered in class.

Individual or small group

What is a Science Model?

A model is a representation of an idea, an object, a process or a system.

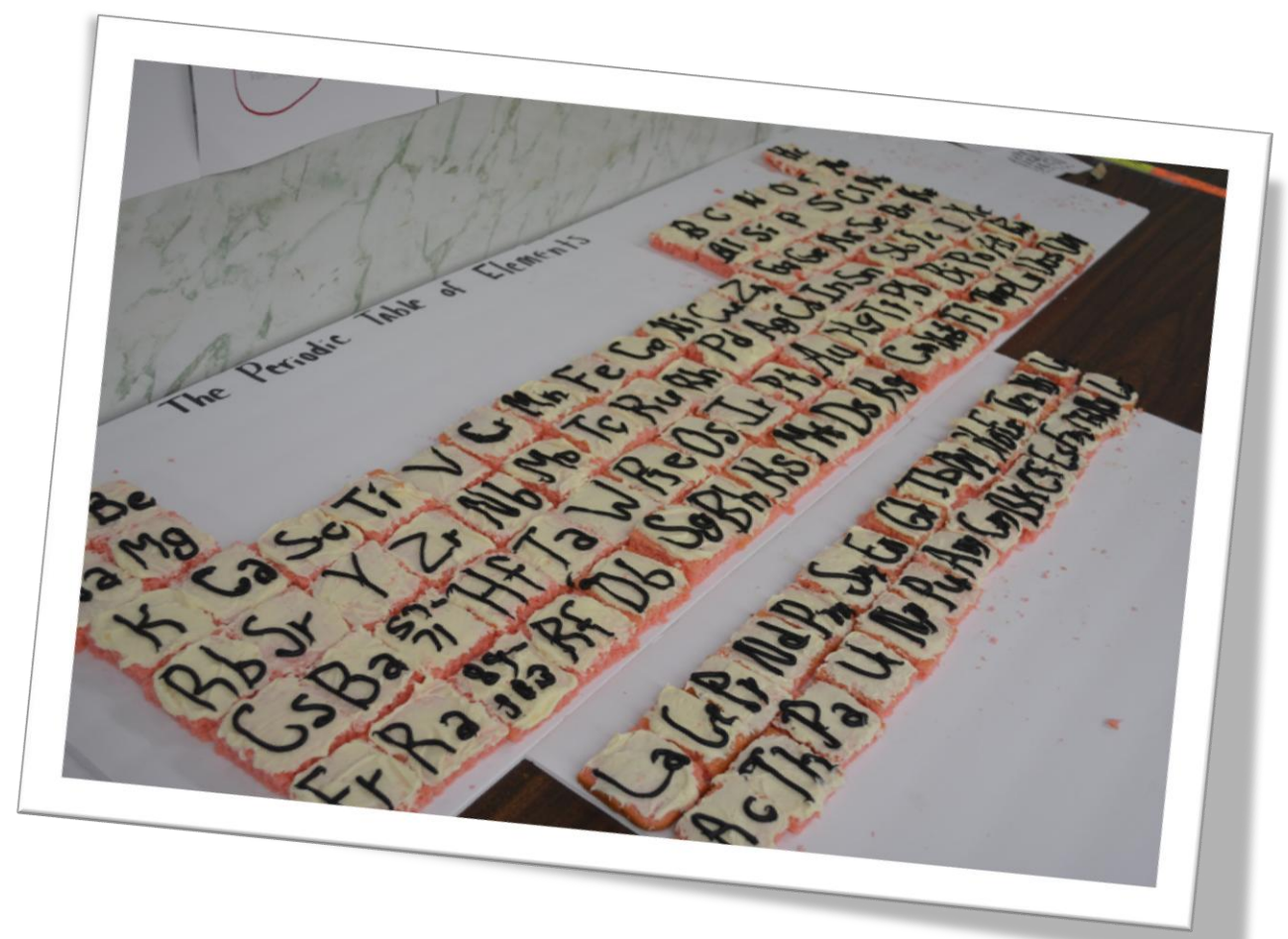
Models describe and explain phenomena that cannot be directly experienced.

There are three main types of science models: physical, mathematical, and conceptual.

Physical models are often the easiest to understand (the world globe is an example of a physical model).

Conceptual models are often presented in the form of a diagram which shows a set of relationships.

Instructor will not purchase or provide materials beyond those materials already available for daily work. If additional materials are required, students and parent/guardians must provide them. There are alternative ways to complete this assignment that do not require additional material.



A student team baked a cake – recreated the Periodic Table – cut into squares and labeled with elements.



An individual student made a topographic map “come to life” by gluing together thick paper.



A team of students worked together constructing a model of an atom using Styrofoam, paint and sticks.

Write a Research Paper

Research Paper

Turn-in a physical science oriented research paper.

Include/cite references used.

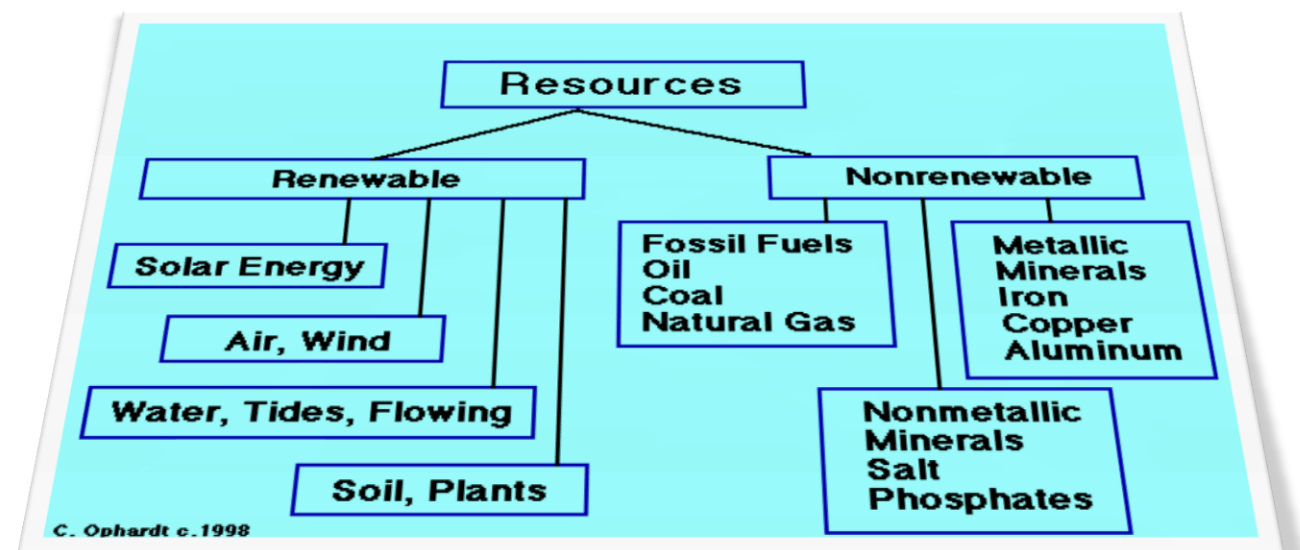
Strive for 300 total words (without “fluff”).

Either neatly hand-write paper or more ideally use computer to complete your paper.

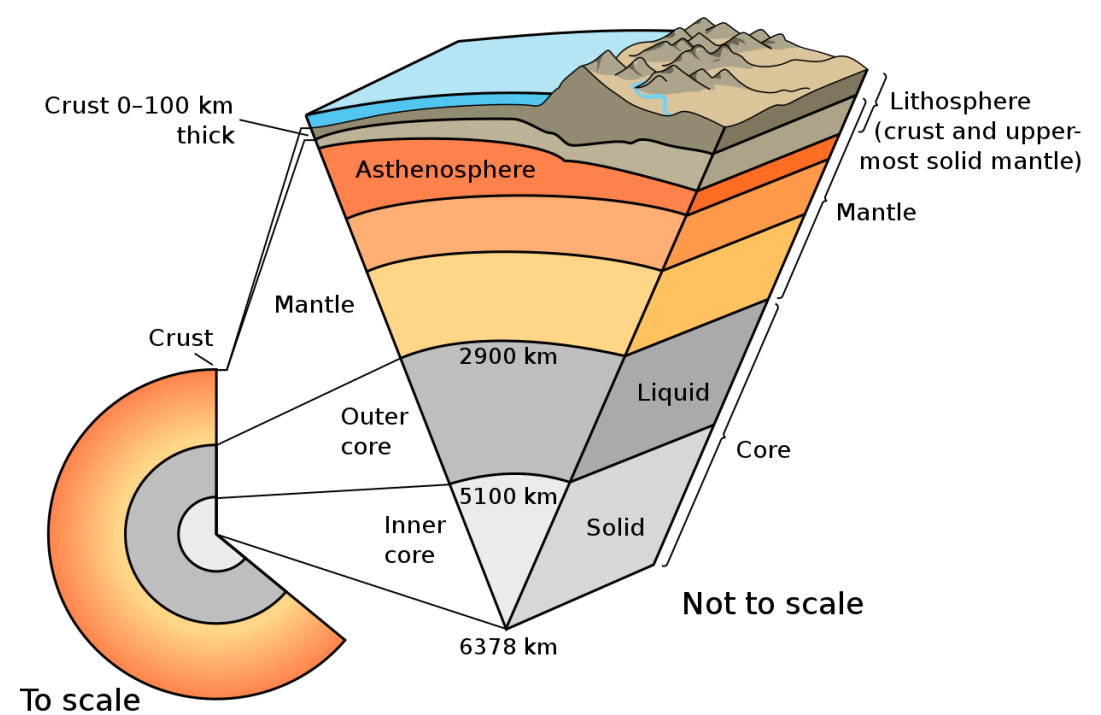
Individual only.

Here are a few tips, reminders, and requirements:

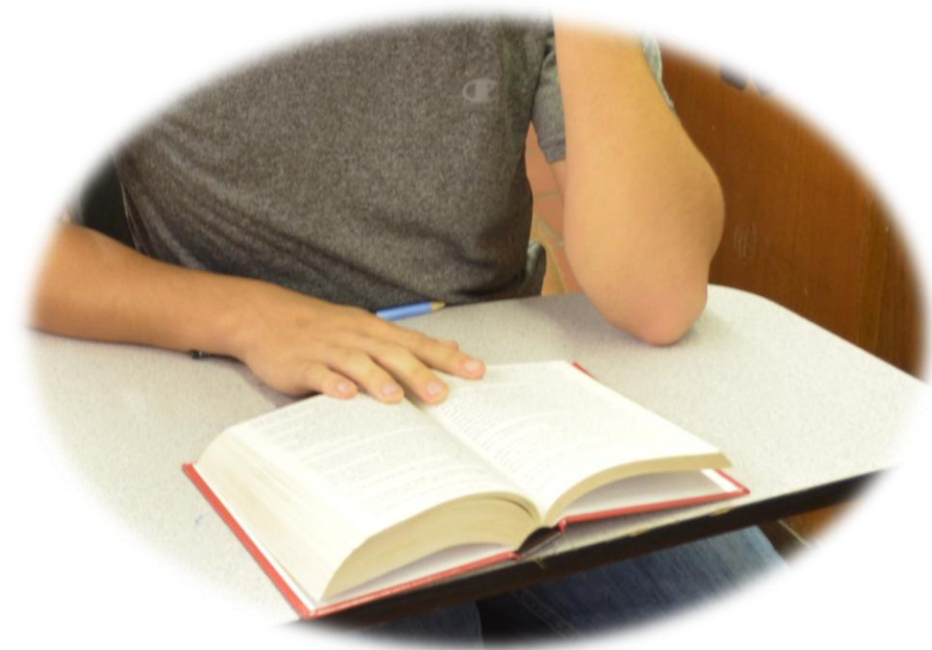
- Do not plagiarize
- Do not simply cut/paste
- Rewrite in your own words
- Include simple illustrations
- Use appropriate grammar
- Punctuate well
- Use multiple sources
- Cite sources used
- Organize the work
- Manage your time
- Find your own voice



One way to organize a written paper is to first create a high-level outline, or structure. The use of a hierarchy diagram is useful to many students. This helps identify major subject areas and facilitates the research effort.



Even though Earth science topics may not have yet been covered in the course, some students might be interested in pursuing a research endeavor about natural resources, climate change, Earth, the solar system, or our universe.



Avoid reliance on web searches and school textbooks only. Make use of the library resources for non-textbook sources including periodicals and magazines.

Plan Your Effort



Make Selections for your work on Topic 36

Check One

Circle either individually or small group

Individually *In small group*

- | | | |
|-----------------------------------------|-----|-----|
| <input type="checkbox"/> Demonstration | Yes | Yes |
| <input type="checkbox"/> Lesson | Yes | Yes |
| <input type="checkbox"/> Model | Yes | Yes |
| <input type="checkbox"/> Research Paper | Yes | N/A |

Check One

- ☐ Atomic properties and the Periodic Table
- ☐ Chemical reactions and conservation of energy
- ☐ Acceleration and things that cause acceleration
- ☐ Momentum
- ☐ Defining and calculating energy
- ☐ Energy, its conservation, and equilibrium
- ☐ Use of electromagnetism and its effect
- ☐ Laboratory techniques
- ☐ Something else (*requires instructor approval*)

Materials, resources, tools needed to complete the work ...

Plan Your Effort



List your Roles and Goals

Are you doing this by yourself only or on a team)?

If it is a small team ... then who? And who will do what?

Can all the work be done during class time? (yes) ... (no)

If no then when and where will the other work be done?

What will the final product look like/be like?

Using complete sentences, describe and define what you envision as the “thing” (the product) which will be turned in.

NOTE: The instructor **will not provide** materials other than those normally associated with daily work. Presenting a lesson and writing a research paper do not require materials beyond those normally used in the class. If you opt to build a model or perform a demonstration, those may require additional materials. You are NOT required to build a model or perform a demonstration. If you CHOOSE one or both of these, you are responsible for any permission required from your parent/guardian (should materials be required for purchase).