General instructions: The following will help clarify some of the instructions for various projects and labs. Please refer to this document often as you are responsible for its contents. In fact, I recommend that you print this out for quick referral. Labs and projects are not optional. They are a requirement of high school science classes. The assigned labs found within a unit must be completed before you are allowed to proceed to the next unit.

If you have a question regarding the lab, you have two options. You can message your instructor or call the LUOA office at 1-866-418-8741 option 4 (teacher), option 3 (science). The LUOA office is open 8:30-5:00 Eastern Standard Time, Monday through Friday.

Helpful hint: When typing in a long answer, essay or report, I recommend typing it in word and either copying and pasting it into the assignment or uploading it, if that is an option. That way, if you happen to lose you connection in the middle of your work, all will not be lost. Trust me on this one! It’s worth the extra effort. Plus, you can take advantage of all the Word features with spell and grammar checks. Wikipedia is not allowed as a source for your assignments.

I do consider the quality of your writing when grading. I expect clean spelling and good grammatical and sentence structure. Unless otherwise stated, answers should be written in complete sentences, working the question into your answer. Proper punctuation and capitalization is also expected. Do NOT write the way you text!!! ☺

Any document that is uploaded MUST be a .doc or .docx file!!!
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Unit 1

Project 3 Research a career

Follow the instructions and be sure to minimally include all the following information:

a. Include three tasks this type of scientist completes most days.
b. Include locations where such a scientist may work.
c. Identify at least three reasons why this type of scientist's work is important.
d. Identify what course of study is necessary to work in this field of science, as well as how many years of study are necessary to complete a degree in this field.

Your report should be at least three strong paragraphs and approximately 450-500 words in length. Use and record at least 2 reference sources.

Project 5 Earth comparisons

Be sure to number each answer and include the question as part of the answer. For example, “The hottest planet is ______.” Obviously, you will need to write in complete sentences. You do NOT need to include the chart that you made in the process.

Project 8 Building a model of the earth (virtual)

Complete the virtual exercise

For #1, you should describe in complete sentences the following layers:

a. □ Inner core
b. □ Outer core
c. □ Lower mantle
d. □ Upper mantle
e. □ Crust

For #2, you can answer in one or two words.

Project 11 Mantle convection (virtual)

Be sure to answer all the questions given in the assignment in complete answers. You will be graded on your ability to see the analogy between the lava lamps and the principles of mantle convection.

Project 13 Plate boundaries (virtual)
Follow the instructions as written. Be sure your answers completely explain the process and demonstrates your understanding. Well written and complete sentences are expected.

**Project 16  Sphere interaction lab (virtual)**

Follow the instructions as written. Answers should be in written in complete sentences.

**Project 20 Special Project**

Message your teacher and introduce yourself, where you live and something about your family.

**Unit 2**

**Project 4. Earthquake features lab (virtual)**

Follow the instructions as written. Follow the instructions as written. Answers should be in written in complete sentences. Be sure that you give a good explanation even for #3.

**Project 10 Volcanic features lab (virtual)**

Follow the instructions as written. Since there is only one opinion question to answer, be sure you do a good job!!!

**Unit 3**

**Project 3 Crystal Systems**

Follow the instructions in the lesson.

**Project 4 Identifying a mineral (virtual)**

Follow the instructions as written. Write one well-written paragraph and incorporate the three questions that are posed. Be sure you do not skimp on your answers since there is only one major thing to write for this lab!

**Project 10 Identifying a rock (virtual)**

Follow the instructions as written. You do not have to write in complete sentences for this one. 😊 One word answers are fine. Oh happy day! 😊
**Unit 4**

**Project 4 Soil particles**
Supplies: 1 ½ cups potting soil, ½ cup sand, 2 wide-mouth jars with lids, Masking tape, Pen, Spoon, Water

Follow the directions carefully.

Answer each of the four sets of questions. Be sure to number each one and write in complete sentences. If your results turn out differently than what the lesson teaches you to expect, please provide an explanation of why your results might be different. You should be able to show your understanding of the principles involved.

**Project 8 Ice erosion or alternate**

Supplies: 10 pounds sand, Square of window screen or kitchen mesh strainer, 2 plastic trays, about 8 x 24 inches, Water, Freezer, Ruler, Bucket, Measuring cup

Follow the directions except you only need to run the experiment for 1 week, not 2! And, no drawings are necessary. Answer the five questions in complete sentences. As always, be sure to include the question as part of your answer. You need to demonstrate your understanding of the principles of erosion and include that in your answers.

**Project 8 Alternate lab:**

If you do not have a big enough freezer to do this experiment, you may substitute the following:

a. Use the internet to research ice erosion.
b. Consult at least three different sources. (Wikipedia is not acceptable)
c. Write an opening paragraph about ice erosion in general.
d. Write a paragraph each about three specific places in the world where ice erosion is evident.
e. The total word count for this project should be about 500 words.
f. Be sure to include your sources.

**Unit 5**

Review and first semester exam. No projects.
Unit 6
Project 2 Water purification

Supplies: 1 cup dirt, 4 cups water, Small glass, Large glass bowl, Clear plastic wrap, small, round rock, sunshine

Complete the experiment as written. If the day is not sunny and bright, you can use a desk light to shine on the bowl and speed the process.

Answer the four questions in complete sentences. As always, be sure to include the question as part of your answer. I need to see that you understand the processes involved!

Project 8 Porosity and permeability

Supplies; Water, Graduated cylinder (or measuring cup with metric measurement), 6 clear cups all the same size, marker, metric ruler, 1 cup each of large, medium and small pebbles, 1 cup each gravel, sand, and dirt, funnel, 3 coffee filters, ring stand or rig some way to support the funnel

Adapt the instructions as follows:

Part A. Measuring porosity:
1. Fill a cup to the brim with water and measure that amount. Record the value.
2. Place a line 4” up from the bottom of each cup.
3. Fill the first cup to the line with large pebbles. Label the cup.
4. Fill and label the second cup with medium pebbles.
5. Fill and label the third cup with small pebbles.
6. Slowly pour the amount of water that you found in step #1 into the first cup but stop when the water reaches the rim of the cup. Record the amount of water left in your measuring cup.
7. Calculate the amount of empty space in each cup by subtracting the amount of water left in the graduated cylinder from 100 ml. For example, if the measuring has 40 ml left after pouring water into the cup, then the sample has 60 ml of empty space (100 ml - 40 ml = 60 ml).
8. Repeat steps 5 and 6 with the remaining two cups.

Part B Measuring Permeability
1. Line the funnel with a coffee filter and place it in the ring stand or rig it up so that it will drip into your cup.
2. Place a plastic cup directly below the funnel.
3. Fill the funnel with gravel.
4. Fill the graduated cylinder with 100 ml of water. Slowly pour the water into the funnel.
5. Time how long it takes for the water to flow through the gravel into the cup. Stop timing after ten minutes.
6. Remove the gravel and the filter. Replace with a new filter. Fill the new filter with sand and repeat steps 4 and 5.
7. Remove the sand and the filter. Replace with a new filter. Fill the new filter with dirt and repeat steps 4 and 5.

Answer all questions in complete sentences. Be sure to clearly define the separate areas and questions of the experiment. Include your data!!!! As always, be sure to include the question as part of your answer.

**Project 13 Fresh water vs. salt water**

Supplies: 4 TBS salt, water, 2 clear glasses, measuring cup, tablespoon, 2 eggs, 2 plastic cups, Spoon, marker, freezer, stove, small pot, stopwatch or clock with second hand, 2 pie plates or shallow pans about the same size, paper

Complete each of the four sections of this experiment as written except for the amount of salt: use 2 tablespoons of salt rather than 1 for each part of the experiment. For the evaporation part of the experiment, you can place the pie plates under a desk lamp instead of in the sunshine to make the experiment go faster. Let the water evaporate for 5 days (not a week) If the water completely evaporates before 5 days is up, you can stop then. Be sure to record your results as you go.

Answer all questions very specifically in complete sentences. Be sure to clearly define the separate areas and questions of the experiment. As always, be sure to include the question as part of your answer. If your results turn out differently than you expect, be sure to provide a reasonable explanation for that. I should be able to know that you clearly understand the principle!

**Unit 7**

**Project 10 Air circulation** (virtual)

Conduct the activity and answer the four questions in complete sentences.

**Project 14 Greenhouse Effect**

Supplies: 2 shoe-box size boxes, plastic wrap or pane of glass, 2 thermometers for measuring air temp, watch, 2 lamps (if it’s a cloudy day), pen and paper
Perform as directed. You will be answering all the questions in complete sentences. If your results turn out differently than expected, be sure to provide a reasonable explanation for that. I should be able to see that you clearly understand the principle!

*Please note:* You **MUST** include all your data in the text box for question 1. Failure to do so will result in a grade no greater than a 50% for the entire lab.

### Unit 8

#### Project 2 Weather or climate

Record your answers for each of the 15 circumstances. For example, you can write your answers like this: 1. Weather. A change in precipitation has not occurred in a day.

**Project 4 Clouds and weather** (virtual)

Follow the instructions as written. You may answer in one word answers as long as you number them.

**Project 5 Clouds and rain** (Section 1 only)

Supplies: 2 liter plastic soda bottle, matches, hot tap water, black pepper

Perform as directed and answer the 5 questions in complete answers. (As always, incorporate the question into your answer.) Be sure each question and answer is numbered.

#### Project 18 Special project

You will be making a barometer.

Watch the following instructional videos

1. [http://www.youtube.com/watch?v=K7hafGGgluM&NR=1](http://www.youtube.com/watch?v=K7hafGGgluM&NR=1) (supplies needed) Note: You do not have to decorate the barometer)
2. [http://www.youtube.com/watch?v=dGoVCvLqoBI](http://www.youtube.com/watch?v=dGoVCvLqoBI) (making the barometer)
3. [http://www.youtube.com/watch?v=K2R1H1OxT4s&feature=related](http://www.youtube.com/watch?v=K2R1H1OxT4s&feature=related) (sealing the barometer)
4. [http://www.youtube.com/watch?v=e0j7IfDtv7o&feature=channel](http://www.youtube.com/watch?v=e0j7IfDtv7o&feature=channel) (making barometer needle)
5. [http://www.youtube.com/watch?v=LKUbkFHfRRI&feature=related](http://www.youtube.com/watch?v=LKUbkFHfRRI&feature=related) (how to mark the barometer gauge)
6. [http://www.youtube.com/watch?v=lrAKlqjicZLI&feature=channel](http://www.youtube.com/watch?v=lrAKlqjicZLI&feature=channel) (explanation of how a gauge works)

Build your barometer and record changes in pressure over three days. You must have at least 3 readings from your barometer and the local weather data throughout each day for a total of 9.
Go to [http://weather.com](http://weather.com) and enter your zip code. Your reading will not be numeric but will be either “falling, rising, or the same) as prior readings. The data from weather.com will be a number as well as rising, falling, or the same. Make a chart to record your data including date, time, your barometer’s data, the official data, and the general weather outside. You can use the following as a template:

<table>
<thead>
<tr>
<th></th>
<th>Official Barometric pressure</th>
<th>Your barometer</th>
<th>Current weather</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day 1 time 1</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Day 2 time 1</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Day 3 time 1</td>
<td>2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

You will write a report that must include the following:

a. A well-written paragraph on how a barometer works and how weather can be predicted on the basis of the pressure.
b. Your data chart
c. A picture of your barometer
d. A paragraph of how well your barometer worked, its accuracy, and any improvements you would make.

Upload your report. The file MUST be a .doc or .docx file!

**Unit 9**

**Project 2  Scale of the solar system (virtual)**
You will need to show you calculations for each planet in #1. Be sure to take into account that they give you the diameters in kilometers but your answers must be in meters.
For question 2, you must convert each answer from #1 to inches and give a reasonable comparison to a known object. For example, for Mercury, $0.035\text{m} \times 39.37 = 1.37\text{ in.}$: That’s about the same of a Cheetos puff.

**Project 5 Newton’s Law**

Supplies: Bucket with handle, water

Complete as directed and answer in complete sentences

**Project 11 Identifying galaxies (virtual)**

Follow the instructions as written and tell me what kind of galaxy is shown. Write in complete sentences and be sure you tell me a reason for your answer.

**Unit 10**

No labs or projects