Physical Science Projects and Alternate Labs with Supply Lists

Introduction

This document is very important. It is THE source for information pertaining to labs and special projects in 9th Grade Physical Science. Please remember that the student is responsible for following the directions contained in this document. Disregard any instruction in the curriculum itself. However, when a project or lab is completed, please upload into the designated spot for grading.

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More important information

***Important:** Please print off this document and reference it throughout the course. These instructions supersede anything that is written in the course labs or projects. You will need to precisely follow the directions.*

When you write your project or lab, ALWAYS use a word processing program and save a copy of your work. If I need to reassign the project, any work typed into the answer box will disappear with no means of recovery. If your report or essay has no special graphics or formatting, you can simply copy and paste it into the answer box. However, anything with pictures, bulleting, etc. should be uploaded.

The minimum number of sources for any essay is two. If more are required, it will be stated in the directions. Be sure to ALWAYS include your reference at the end of your assignment. Additionally, be careful not to plagiarize by copying and pasting information into your report. Short quotes are permissible, however, if referenced properly. Per school policy, a warning for plagiarism may be given once, the project reassigned and a grade no greater than an80% be awarded. Further instances can result in a zero for the assignment and further disciplinary action.

Correct spelling and grammar is expected. You will also be graded on your organization and logical presentation of your report.

Please note that material needed for the labs that are not ordinarily found in the home are highlighted in yellow. We recommend that you look forward and plan on acquiring the materials in advance.

Unit 1

Project: Nuclear reactors (l4e)

Write a 600-word report discussing nuclear reactors. The report should include a description of the way a reactor works, and the theory behind nuclear reactions. Be sure to answer these questions: What are breeder reactors? How are they different from regular nuclear reactors? What are their advantages and disadvantages?

Include the web address of any references and be sure to check for spelling and grammar. Also take care to avoid plagiarism by copying and pasting information. Always write in *your* words.

- Grading: Content 50 pts
- Organization 20
- Grammar/Spelling/Punctuation 10
- Documentation 10
- Length 10
- TOTAL 100 points

Unit 2

Project: Determining volume (l1e)

Here is your goal for this lesson:

- Utilize the mathematical method and displacement method to determine volume

In lesson 1 we looked at volume and some different ways of determining it. In this experiment, we will use some of these techniques to determine the volumes of objects.

Materials needed:

Graduated cylinder or metric measuring cup (The more precise, the better.)
water
5 rocks. (Be sure they will fit easily into the graduated cylinder or measuring cup.).

Hypothesis:
A prediction of what you think the results of the project will be. In other words, what will happen to the water level when you place the rocks in the water. How will that pertain to the volume of the rocks. Write your hypothesis before you begin the experiment. A

common sentence form for a hypothesis is to use an 'if-then' statement. (Example: If students get adequate rest, then grades will improve.) (1-2 sentences)

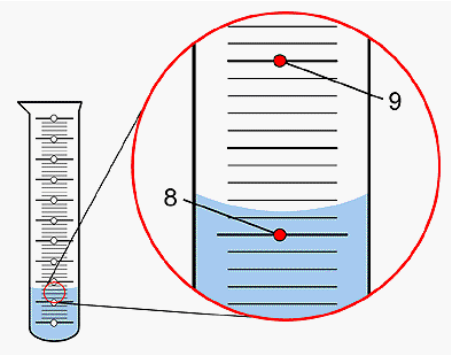
Methods:

In 1st person past tense, write a summary of what you actually did in performing the experiment. Be sure to include any modifications. You should include enough detail so that someone could reproduce the experiment based on what you have written. You may number the steps or write in paragraphs. Your choice.

1. Measure the length, width and height. Record these figures in your REPORT document at the end of this page.

2. Determine the volume of this solid by multiplying these three figures together. Record this result in your REPORT document.

3. Determine the volume one of the small rocks by partially filling the graduated cylinder with water. Record this volume in your REPORT document. To measure the amount of water, be sure to use the line that comes to the bottom of the meniscus, as shown in the following illustration. Notice the curved blue line. This is called the meniscus. Make your measurements to the bottom of this line.



4. Carefully put the selected rock into the graduated cylinder, taking care not to splash out any of the water. Record this volume.

5. Calculate the volume of the rock by subtracting the volume of the water alone from the volume of the water and the rock. Record the result. Repeat steps 3 through 5 for all the rocks you have selected. Use the chart

Results: List all measurements and include proper labels. Always perform measurements using the metric system. Complete, copy and paste the following chart into your lab report.

Rock volume results:

	A. Water volume	B. Water + rock volume	Rock volume (B-A)
Rock 1			
Rock 2			
Rock 3			
Rock 4			
Rock 5			

Conclusion:

Begin by stating whether the hypothesis was true or false. Use data and calculations to support your answer. Consider the following questions as you write your conclusion: Why or what happened to result in the outcome you observed? Did you learn anything new? If not, what previously concepts did this lab reinforce? Is there anything you would or could do differently that would improve the experiment? Do you have any other comments/observations you would like to share about this lab?

Your conclusion should be approximately one paragraph in length.

STOP and CHECK: Your report should include the title, purpose, hypothesis, methods, results, and conclusion sections.

Grading scale:	Follow format/content	Max 50 points
	Spelling/grammar	Max 20 points
	Validity/completeness of data	Max 20 points
	Conclusions/overall impression	Max 10 points
	Total points	100 points

Project: Mass of gas (l2e)

We often do not think of gas in terms of having mass. The atmosphere is something we live in and breathe. In this experiment, we will investigate whether gas does truly have mass.

Materials needed:

two balloons of the same size
meter stick
string
paper clips

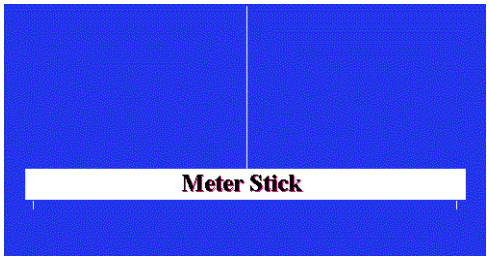
Hypothesis:

A prediction of what you think the results of the project will be. Write your hypothesis before you begin the experiment. A common sentence form for a hypothesis is to use an 'if-then' statement. (Example: If students get adequate rest, then grades will improve.) (1-2 sentences)

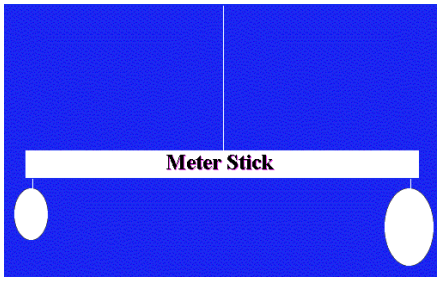
Procedure:

In 1st person past tense, write a summary of what you actually did in performing the experiment. Be sure to include any modifications. You should include enough detail so that someone could reproduce the experiment based on what you have written.

1. Suspend the meter stick from the middle in such a way as to be able to move the string to balance. See the diagram below.



2. Attach each balloon to either end of the meter stick, making the apparatus balance.
3. Blow up each balloon to different volumes, thus measuring out different volumes of gas.
4. Attach the balloons as shown in the diagram below using the paper clips. Be careful to attach the balloons in the same place as where the apparatus balanced.



Data: List all measurements and include proper labels. Record your data. Answer the questions in complete sentences!

1. Did the suspended balloons balance?

2. If they did not, which balloon tipped the scale down?

3. Did your results validate the hypothesis?

Conclusions: Give an explanation for your results, including a discussion of how the data collected either validated, or disproved the hypothesis.

Grading scale:	Follow format/directions	Max 50 points
	Spelling/grammar	Max 20 points
	Validity/completeness of data	Max 20 points
	Conclusions/overall impression	Max 10 points
	Total points	100 points

Unit 3

Project: Volcanic eruptions (l3essay)

- **Write a report on three recent volcanoes**

Find and read articles about three different recent volcanic eruptions. You can easily find such articles online.

Write a 600-word report on what you learned about volcanic eruptions. Focus your report on the 3 volcanoes researched. Be sure to include introductory and concluding paragraphs.

Include the web address of any references and be sure to check for spelling and grammar. Also take care to avoid plagiarism by copying and pasting information. Always write in *your* words. You should use *at least* 2 sources.

Grading:

• Content	50 pts
• Organization	20
• Grammar/Spelling/Punctuation	10
• Documentation	10
• Length	10
• TOTAL	100 points

Project: Specific gravity and alternative (l l8e)

Here are your goals for this lesson:

- **Measure the mass of a rock in air and in water**
- **Calculate the rock's specific gravity**

In this experiment, we will measure the specific gravity of rocks.

These supplies are needed:

Balance with metric masses or spring scale (You will be given data to perform calculations if you do not have the masses or scale.)
Strong thread
Various rocks
Beaker or bowl

Hypothesis:

A prediction of what you think the results of the project will be. Write your hypothesis before you begin the experiment. A common sentence form for a hypothesis is to use an 'if-then' statement. (Example: If students get adequate rest, then grades will improve.) (1-2 sentences)

Methods:

In 1st person past tense, write a summary of what you actually did in performing the experiment. Be sure to include any modifications. You should include enough detail so that someone could reproduce the experiment based on what you have written. Do not copy and paste these instructions and watch the video first!

1. Make sure the balance is tared (leveled out).

2. Hang the rock from the bottom of the pan at one end

3. Add enough masses in the opposite pan to balance the rock. Record the mass of the rock in air in your REPORT document.

4. Place a beaker (glass) of water under the end of the balance so that the rock will hang in the water without touching the glass.

5. Place enough masses on the pan to balance the rock as it hangs in the water. Record the mass of the rock in water in your REPORT document.

Now calculate the specific gravity of the rock. The procedure is as follows:

$$\text{specific gravity} = \frac{\text{mass of the rock in air}}{(\text{mass of rock in air} - \text{mass of rock in water})}$$

Results

List all measurements and include proper units. Copy and paste this chart into your report.

	Mass in air (A)	**Mass in water (B)**	**Specific gravity** $\frac{\mathbf{A}}{\mathbf{A-B}}$
Rock 1			
Rock 2			
Rock 3			
Rock 4			
Rock 5			

Discussion:

What does your data tell you about the types of rocks that you tested? Would the results be the same if you suspended the rocks in oil rather than water? Why or why not?

Conclusion:

Begin by stating whether the hypothesis was true or false. Use data and calculations to support your answer. Consider the following questions as you write your conclusion: Why or what happened to result in the outcome you observed? Did you learn anything new? If not, what previously concepts did this lab reinforce? Is there anything you would or could do differently that would improve the experiment? Do you have any other comments/observations you would like to share about this lab?

Your conclusion should be approximately one paragraph in length.

STOP and CHECK: Your report should include the title, purpose, hypothesis, methods, results, discussion, and conclusion sections.

Grading scale:	Follow format/directions	Max 50 points
	Spelling/grammar	Max 20 points
	Validity/completeness of data	Max 20 points
	Conclusions/overall impression	Max 10 points
	Total points	100 points

Specific gravity alternate lab

If you do not have a scale, substitute the following but be sure to follow all directions and write the lab in the format that you are given. The following chart will be included in your results section.

1. Watch the video
2. Based on the data below, calculate the specific gravity for each rock
3. Write the lab report as if you were actually going to do experiment. Use the format you were given above. (Purpose, hypothesis, methods, results, discussion, conclusion)
4. In your discussion section, be sure to include, among other things, what does your data tell you about the types of rocks that you tested? Which one might be different? Would the results be the same if you suspended the rocks in oil rather than water? Why or why not?

Mass of rock in air	Mass of rock in water	Specific gravity
20g	10g	?
75g	38g	?
46	24	?
62	45	?
110	55	?

Grading scale:	Follow format/directions	Max 50 points
	Spelling/grammar	Max 20 points
	Validity/completeness of data	Max 20 points
	Conclusions/overall impression	Max 10 points
	Total points	100 points

Unit 4 *– No labs or projects*

Unit 5

Project: Moon and tides (l1e1)

Research and write a short report on the effect of the moon on tidal reaction. The length of your report is to be 600 words. Include the web address of any references and be sure to check for spelling and grammar. Also take care to avoid plagiarism by copying and pasting information. Always write in *your* words. Use *at least* 2 different sources.

Grading:

- Content 50 pts
- Organization 20
- Grammar/Spelling/Punctuation 10
- Documentation 10
- Length 10
- TOTAL 100 points

Unit 6

Project: Hubble telescope (Alternate l5e1)

Research and write a report on the Hubble telescope. The length of your report is to be a minimum of 600 words. Include the web address of any references and be sure to check for spelling and grammar. Also take care to avoid plagiarism by copying and pasting information. Always write in *your* words. Use *at least* 2 different sources.

Grading:

- Content 50 pts
- Organization 20
- Grammar/Spelling/Punctuation 10
- Documentation 10
- Length 10
- TOTAL 100 points

Unit 7

Project: Medical science (l3essay)

Here is your goal for this lesson:

- **Write a report on one of the suggested topics or you may choose a subject of particular interest to you.**

This is the major project of this course. You will be writing a 3- page single-spaced paper (approximately 1800 words) on a topic of your choice. Include the web address of any references and be sure to check for spelling and grammar. Also take care to avoid

plagiarism by copying and pasting information. Always write in *your* words. Use *at least* **5** different sources.

Your paper should include the following sections:

1. Title page
2. Introduction (stating your reason for choosing this particular topic and some questions you expect to answer during your research)
3. Body of information--including pictures, drawings, and charts, if applicable
4. Summary and conclusions
5. References (at LEAST 5)

Grading:

- Content 50 pts
- Organization 20
- Grammar/Spelling/Punctuation 10
- Documentation 10
- Length 10
- TOTAL 100 points

Possible topics for selection

Ancient Medicine

Biblical	Hippocrates
Egyptian	Aristotle
Chinese	Galen
Indian	Leprosy

A.D. 1 to the Fourteenth Century

Roger Bacon
Order of the Holy Ghost
plagues and epidemics of the Middle Ages

Renaissance Medicine

the microscope	Fernel
Leonardo da Vinci	Ambroise Pare
William Harvey	public hygiene
Vesalius	

Through the Nineteenth Century

Leeuwenhoek	Lister
Sir Francis Bacon	antisepsis

Priestley and Scheele	Ignaz Phillipp Semmelweis
Lavoisier	nitrous oxide
Philippe Pinel	Hermann Helmholtz
Edward Jenner	Rudolf Virchow
Johann Peter Frank	Emil Behring
Matthias Jakob Schleiden	Robert Koch
Pasteur	Paul Ehrlich
Theodor Schwann	Pasteur

Twentieth-Century Medicine

Roentgen	cortisone
Christiaan Eijkman	antibiotics
vitamins	medical technology
hormone research	transplant surgery
insulin	kidney dialysis
sulfonamides	computer applications
penicillin	genetic engineering

Unit 8

Project: Chemotherapy (l2e1)

Here is your goal for this lesson:

- **Write a report on chemotherapy**

Research the topic of chemotherapy. Write a 400-word report on how it works, its uses, or the advantages and disadvantages of chemotherapy. Include the web address of any references and be sure to check for spelling and grammar. Also take care to avoid plagiarism by copying and pasting information. Always write in *your* words. Use *at least* **3** different sources.

Grading:

- Content 50 pts
- Organization 20
- Grammar/Spelling/Punctuation 10
- Documentation 10
- Length 10
- TOTAL 100 points

<u>Unit 9</u> - No labs or projects

<u>Unit 10</u> – No labs or projects