

Science Experiment

Assignment Overview: This is a hands-on activity that students can do at home, using previous knowledge and skill learned in class about how to conduct an experiment. This could easily be turned into an fair project for next year, keep good records and take good pictures if you want to do that.

You can reach me through:

Google Classroom, text (870) 321-5382, or email brandy.hughes@norfolk.k12.ar.us, we can facetime or zoom if you need video help as well.

Materials: Do not hesitate to let me know what materials you need. IF you do not have them I can provide them. The hardest part will be getting them to you. We can figure that out one on one. Dig soil out of the ground if you have to. I am providing seeds for those picking up paper copies. If you are getting a digital copy and need seeds, contact me.

Alternate assignment: Don't like my plant idea? Come up with your own scientific experiment, but you have to pitch it to me and get it approved. You would also need your own materials. If you do that I will create a new worksheet for you to fill out just for you.

Time Frame: PLANT your seeds BY SATURDAY, April April 4th. Assignment is DUE APRIL 24th. We MIGHT be back in school, but we will continue to see this project through until the 24th to give time to grow. Check in with me weekly.

Student Reference Material (things you know but might need a refresher on)

The Scientific Method is an organized plan for gathering, organizing, and communicating information. The goal is to solve a problem or to better understand an observed event.

Experimental Group: The group that receives change.

Control Group: The group that you compare the experiment against. It receives no change. If you are testing fertilizer, this group would not receive any.

1. Observation: information you obtain through your senses. Repeatable observations are known as facts. Hear, taste, smell, touch, see.

2. Ask a question: WHY? WHERE? HOW? You may combine your observations to formulate a question.
3. Develop a Hypothesis: Proposed answer to a question, use if then statements. "If _____, then _____." Your hypothesis must be TESTABLE.
4. Test Hypothesis with an experiment
 - a. Your experiment must be a controlled experiment, in other words you can only change one variable.
 - b. Variable : ANY factor that CAN be changed in an experiment in order to test a hypothesis.
 - c. Independent Variable also known as the Manipulated Variable is the change in the experiment that we create.
 - d. Dependent Variable, also known as the Responding Variable is the data we collect. This variable changes in response to the Independent Variable. If we were to make a graph, the dependent variable is what we would use.
5. Analyze your data and draw conclusions
 - a. If your data supports your hypothesis you could then DEVELOP a THEORY, or you may want to test your hypothesis with further experiments.
 - b. If your data does NOT support the Hypothesis, you need to revisit your hypothesis. Either develop a new one or revise it.
6. Develop a theory: Once the hypothesis has been supported in repeated experiments, scientists begin to develop a theory which is a well tested explanation.

For additional information on the Scientific Method:

<https://youtu.be/SMGRe824kak>

<https://youtu.be/i8wi0QnYN6s>

STUDENT ACTIVITY: CONDUCT A SCIENTIFIC EXPERIMENT

Directions: Construct a scientific experiment using the Scientific Method. Record your planning, data, evidence, and conclusions.

Materials: 10 seeds, water, soil, and small cups.

Procedure:

1. Using your knowledge of plants follow the Scientific Method and record your information.
 - a. What observations can you make about plants?

- b. What question do you have about plants? (this should align with your experiment)

2. Choose one environmental factor to manipulate for an experimental group of seeds that you will plant. Examples of factors include depth of seed, frequency/amount of watering, light (how long they have light or type of light), fertilizer, type of soil.

- a. What types of seeds do you have? _____
- b. What is your Manipulated Variable, what will you change?

- c. How will you measure your success, what is your Dependent Variable?

- c. Write your Hypothesis based on which variable you choose to manipulate.

If _____, then _____.

Example: If I water each plant in the experimental group fertilizer, then it will grow taller than the control group with regular water.

3. Experimental Group: Plant 5 seeds, one seed per cup. DO NOT CHANGE EACH CUP DIFFERENTLY THAN ONE ANOTHER. They all receive the same change. Label the seeds 1-5

4. Control Group: Plant 5 seeds, one seed per cup, for your control group. Keep all factors the same for your control group. This is the group you will compare your experiment group too. Label the seeds 6-10

Example: For the experimental group, change the factor the same way for all 5 seeds. For example, fertilizer as the environmental factor, all of the experimental group seeds should receive the same amount and type of fertilizer. The control group would all receive the same treatment, but different from your experimental group, possibly no fertilizer for this group.

6. Care for and observe the seeds and developing plants over 21 days.

7. RECORD your observations and dependent variables in the tables, take photos once per week.

Observations of Experimental Group

Day	Plant 1	Plant 2	Plant 3	Plant 4	Plant 5
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					

Observations of Control Group

Day	Plant 6	Plant 7	Plant 8	Plant 9	Plant 10
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					

8. Analyze your data and draw a conclusion.

a. What can you determine from your data?

b. Conclusion: Did the data support your Hypothesis? Explain:

c. What problems or challenges occurred during your experiment?

d. Can you develop a theory based on your evidence?

i. If yes, state your theory:

ii. If no, restate your hypothesis and explain how you would carry out another experiment to test your new hypothesis. (this is just a plan, not a requirement to perform)

9. IF YOU ARE IN MR. COTTER'S Class, answer the following question:

Why are plant an important part of Agriculture?

Why should every person understand how plants are grown?

Explain the impact Agriculture has on our lives.

Grading Rubric

Criteria	Teacher Instructions	Points Possible
1a. Observations		3
1b. Question		3
2a. Manipulated Variable		5
2b. Dependent Variable		5
2c. Hypothesis		5
7. Data Chart		10
7. Photos		5
8a. Analyze Data		3
8b. Conclusion		3
8c. Problems and challenges		3
8d. Develop a theory or revise		5
Checked in Weekly with Hughes		10

Total 60 Points