

Name _____ Date _____

Your turn! What would you like to do an experiment with? I want to do an experiment involving.....

TOPIC: _____

(Life Science, Physical Science, Earth/Space Science)

Next, you have to come up with a question that is **testable and measurable!** Results are measured either with metrics (length, width, volume) timed, or data can be collected. Here are some examples of questions.

How does the amount of sunlight affect how much a plant grows?

How does the type of water or the color of light affect how much a plant grows?

How does temperature affect the way different frozen substances melt?

How does the color of a material affect how much heat it absorbs?

How does the type of paper towel or diaper affect how much water it absorbs?

How does the type or kind of food affect how much an animal will eat?

How does the type of soap affect how much dirt it will clean?

(BE CAREFUL! How will you measure how much dirt was left? You could put a graph on top and count how many squares have dirt in them. Or if seeing which laundry soap cleans the best, get paint color chips from paint store or use a color wheel and see how many shades the dirt color changes. Or cleaning pennies....how will you measure how much dirt is left?!!!)

NOW YOU WRITE YOUR QUESTION!

How does _____
_____ affect how the _____?
_____?

HYPOTHESIS

Hypothesis is what you predict will happen based on what you already know. Write what you think will happen. Explain why you think that will happen based on example(s) from your past experiences, state facts, and use text evidence from your research to support your opinion of what you think will happen demonstrating your understanding.

If _____
affects the _____
then _____

because _____

(Example: If I use tap water on my plants, then the plants will grow more than the plants watered with juice or soda, because tap water is what we usually use to water our plants, and I have observed our plants growing.)

Reminder: You must run the experiment a MINIMUM of three trials....Scientists would do many more trials!
(Example: Three plants watered with tap water, three plants with juice, and three plants with soda).

Name _____ Date _____

Research Summary and Bibliography

Research Topic: You may use books, internet, professional experts, and other resources to find information about your topic. (*If doing which liquid makes plants grow better, look up type of plant, photosynthesis, all the liquids being used, how a plant grows, soil, sunlight, etc.! Talk to a plant nursery worker!*) **WRITE THIS INFORMATION IN STUDENTS' OWN WORDS!** Research and report on a **minimum of 2** topics related to your experiment. Experiment must be mentioned in summary and evidence must be cited from research.

Topic #1

What text evidence did you learn about your topic? _____

Topic #2

What text evidence did you learn about your experiment? _____

Bibliography sources: (2 books, or 2 sites or any combination!)

Examples of sources:

BOOKS:

Book Title

Author's Name

INTERNET SITE:

Title of Article

Site address

EXPERTS in the FIELD:

First and Last Name

Job Title/Occupation

Interview Date

Name _____ Date _____

What is the **CONTROL GROUP**? ONE group that you compare the other groups to. _____
Control Criteria: (In an experiment where plants are watered with different liquids, water would be the control. If there is no set standard for your experiment then you need to establish a criterion that you will compare your experiment to. For example: The battery I chose will be compared to XXXXX because it is the most used (or most sold) battery. Provide statistics to validate your criteria.)

Control Group: _____ **Criteria** of why it was chosen: _____

(Example: Tap water is the control group of plants, because we usually use tap water to water our plants).

Independent variable-one thing changed on purpose in experiment? (Example: **independent-juice and soda**).
Independent Variable: _____

What is the **dependent variable** What you are trying to measure in this experiment? Remember: **Results MUST BE IN METRICS or TIMED.** (Examples: Which type of car goes down the ramp the fastest? How many ants are on different types of food after ½ hour? Plant experiment - how much did the plants with the different liquids grow? Which exercise makes heart beat fastest? Which ice cube melts the fastest?)

Dependent Variable: **The change I am measuring is how** _____

What variables are the **constant variables** (everything that is staying the same)? This should be a **long** list. (In the plant experiment the **constants** are: same type of plant, same plant size, same amount and type of soil, same type and size of pot, same location, same amount of liquid given at the same time of day, etc. Be SPECIFIC-include measurements. IE: pea plant 20 cm high, 2 L ceramic rust colored pot, etc.)

Constant Variables: _____

Materials: List materials here (include **METRIC** measurement tools like meter sticks, beakers, gram scales, Celsius thermometers, stopwatch, and safety equipment. Include exact metric measurements for all materials and/or equipment used in experiment. DO NOT list: camera, pencils, paper, or computer).

- _____
- _____
- _____
- _____
- _____
- _____
- _____
- _____
- _____
- _____

Name _____ Date _____

Procedure: Write the steps for the experiment. Explain in detail what you will do and exactly how you will complete each step, just like a recipe. Be sure to measure the results in metric. Number each step. If you need more space, continue the steps on another piece of paper.

Safety Concerns: _____

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____

Data Table: Write your data in the table below. Remember to label the measurements in **METRIC**. **Be sure to compare the Control Group to the other variables.**

Data Collection Tool

Record/write the quantitative results in this chart. (More trials and/or subjects may be added).

Item	Trial 1	Trial 2	Trial 3	Average
Control Group				

CONTROL AVERAGE _____ Variables average: Item #1 _____

Item #2 _____

Observation Log

Describe observations AS the experiment was run that can be done safely: see, hear, smell, touch or taste. Write what is observed during the trials. Log may be adapted to add more trials and/or subjects.

	Trial 1	Trial 2	Trial 3
(Control Group) Date: _____ Time: _____ Conditions: (Temp, weather, etc.) _____ Item: _____	Observations:	Observations:	Observations:
Date: _____ Time: _____ Conditions: _____ Item: _____	Observations:	Observations:	Observations:
Date: _____ Time: _____ Conditions: _____ Item: _____	Observations:	Observations:	Observations:

CONCLUSION: After you conduct at least three trials, you will know what happened in the experiment or your results. You can explain them to other people through the data in graph or table. What happened? Where there any difficulties? What would you do differently next time? Conclusion has **5 parts**:
 1) was hypothesis supported/not supported, 2) experiment's **results/data/average** collected, 3) some **research** you learned, 4) what you would **try next time**, 5) how does the results of the experiment relate to real life.

1. Was your hypothesis supported or not supported? Why or why not? _____

2. What were the data results in averages? _____

3. What is some information (research) you learned? _____

4. What would you change or try for the next time? _____

5. How do the experiment's results relate to real life? _____

Title: Sum up project! (Example: plant experiment – **Thirsty Sunflowers!**)

Your title: _____

Score Sheet for DIGITAL Scientific Method Project DIGITAL Grades Pre K-5
PROJECT MAY NOT BE ON ANY OF THE TOPICS THAT ARE NOT PERMITTED IN ELEMENTARY

Project Name _____ School _____ Grade _____

0=Does not appear 1=Attempt made to include 2=Adequately Addressed 3=Addressed completely 4=Superior (goes above and beyond)

Title	Reflects theme of the project	0	1	2		
Purpose	“How does the _____ affect how the _____?” Stated in question form using scientific vocabulary.	0	1	2	3	4
Hypothesis	“If _____ then _____ because _____” statement. Uses previous knowledge, research and/or examples to predict experiment outcome.	0	1	2	3	4
PROCEDURE						
	List all steps taken with specific details.	0	1	2	3	4
	Project experiment is original, scientifically relevant, and innovative	0	1	2	3	4
	Describes a minimum of three trials	0	1	2	3	4
	Design of experiment is valid and sound	0	1	2	3	4
	Safety Issues are recognized	0	1	2	3	4
	Metric measurements are used (Celsius, cm/mm/m/km/, mg/g/kg, mL/L/kl, newtons, etc.)	0	1	2	3	4
VARIABLES						
	Identifies Control Group and establishes Control Group criteria	0	1	2	3	4
	Identifies all Constant Variables	0	1	2	3	4
	Identifies Independent Variable (minimum of two different tested subjects)	0	1	2	3	4
	Identifies Dependent Variable	0	1	2	3	4
MATERIALS						
	List all materials used (actual sizes in metric measurement)	0	1	2	3	4
	Lists specific measurement tools used	0	1	2	3	4
DATA DISPLAY						
	Complete and appropriate chart is present (Control Group is labelled)	0	1	2	3	4
	Identifies three separate trials and includes an average of three trials	0	1	2	3	4
OBSERVATION LOG						
	Dates, Times, Conditions, and Description of experiment	0	1	2	3	4
	Describe Observations of experiment as it is conducted based on appropriate/safe senses	0	1	2	3	4
RESEARCH REPORT						
	Student titles and summarizes information read in student’s own words	0	1	2	3	4
	Summary includes information about: ‘Why were these topics chosen?’	0	1	2	3	4
	Summary includes text evidence: ‘How does the text evidence support the experiment?’	0	1	2	3	4
	Summary includes: ‘How will this information help ME understand my experiment?’	0	1	2	3	4
	Identifies a minimum of two sources.	0	1	2	3	4
CONCLUSION						
	Explains results based on hypothesis	0	1	2	3	4
	Includes data in explanation	0	1	2	3	4
	Uses information in written report	0	1	2	3	4
	Explains how results relate to real life application	0	1	2	3	4
	Includes information about further experimentation	0	1	2	3	4
FORMAT						
	Grammar and spelling correct	0	1	2	3	4
	Reflects student’s participation (written in student’s own words and MAY include photos)	0	1	2	3	4

Students must earn 90 points on the project powerpoint to be interviewed.

Judge Number _____

Total points _____

Score Sheet for Scientific Method Interview Grades Pre K-5

0=Doesn't answer 1=Attempts answer 2=Addressed adequately 3=Addressed completely 4=Superior (goes above and beyond)

Project Name _____ School _____ Grade _____

Questions						
1.	What is the purpose of this project?	0	1	2	3	4
2.	What was your hypothesis, and why did you choose it?	0	1	2	3	4
3.	What are the steps to run your experiment?	0	1	2	3	4
4.	What parts of the experiment stayed the same? (Constant Variables)	0	1	2	3	4
5.	What part of the experiment was changed on purpose? (Independent Variable)	0	1	2	3	4
6.	What was the Control Group and why was it chosen?	0	1	2	3	4
7.	What was observed as you were running the three trials?	0	1	2	3	4
8.	What was the result of the change that was made? (Dependent Variable) What was the data of the experiment? (Use board info to explain.)	0	1	2	3	4
9.	How did the result of your experiment support or not support your hypothesis?	0	1	2	3	4
10.	How could this information be used in life?	0	1	2	3	4

Judge Number _____

Total Points _____

Judges will ask each question. Students will describe their project, explain what they did, and how they conducted their experiment. Judges may reword/restate questions for younger students as necessary