

# Science Fair Project Planning Packet

Student Name Example

✓	Due Date	Things To Do
		Choose topic and write project question.
		Get approval from your teacher.
		Research your topic and write key words and paragraph.
		Write a hypothesis.
		Design an experiment; list variables and write procedure.
		List and gather your materials.
		Conduct experiment and record data and observations.
		Create a table, chart, or graph of the data.
		Draw conclusions.
		Make the project display.
	Jan. 29	Present your project at that science fair.

1. Think of a Question - Your question will drive your entire project. Make sure that your question is something that can be measured and answered by following the scientific process. You may use the project question for your project title.

## Project Question

How will different liquids affect plant growth?

2. Research Your Topic - spend some time learning more about your topic. Use reliable Internet sources, books from the library, your science book, or other resources. Not only do you want to be an expert on your topic, but you want to teach others about your topic.

1. *Key Words* - locate at least 3 key science words related to your topic. Your science book is an excellent place to find these. Make sure that the words you choose are directly related to your topic. Provide a definition of each key word **IN YOUR OWN WORDS**.
2. *A paragraph describing the science behind your project* - after you have completed your research give us, your audience, some background information on your topic in a complete and well-written paragraph (5-7 sentences). Give us specific, rather than general information. Use the space provided to write a draft. You will edit a final copy to place on your display board.

List your resources:

University of Vermont, Oxford Journals  
Water.usgs.gov, Merriam-Webster.com  
Dictionary.com

## Key Words

Key word	Definition
calcium	essential nutrient for plants, found in milk Chemical element number 20
nutrients	substance that provides nourishment essential for growth and maintenance of life
acid (pH)	a compound usually with a sour taste, containing hydrogen pH levels below 7.0 are acidic, above 7.0 basic
transpiration	process by which moisture is carried through plants from roots to small pores on the underside of leaves
photosynthesis	process by which plants make food

## Research Description

Calcium helps plants grow, and it can be found in milk.

Plants absorb nutrients through the roots.

The pH level of soil is important for plant growth. Tomato plants prefer 5.5 - 7.5 pH.

Transpiration carries water from plants through pores in leaves.

Photosynthesis is the process by which plants make food by converting light energy into glucose using chloroplast.

3. State Your Hypothesis - In your group decide what you think the outcome of the project will be and make a good guess as to what you think the answer to your question will be. **Also explain WHY you think that will be the outcome.** Remember, it is ok if you don't have the right answer; that is how scientists make discoveries. Make sure that your hypothesis is written in a complete sentence.

### Hypothesis

The plant watered with milk will grow more than the others because it has many nutrients.

4. Design Your Experiment - Clearly write out the procedure you are going to follow. Remember that your experiment needs to follow the scientific process and that you need to have one variable that you are going to change (independent variable). There are three variables in a scientific experiment: independent, dependent, and controlled.
1. The *dependent variables* are the ones that you will keep the same throughout the experiment.
  2. The *independent variable* is the one, and only one, variable you will change.
  3. The *controlled (or constant) variable* helps you, the scientist, understand how the experiment would react under normal circumstances.

### Variables

1. Dependent variables: type of plant, size of pot, type of soil, amount of sunlight, amount of liquid

2. Independent Variable: type of liquid

3. Controlled (or constant) Variable: plant watered with tap water

## Procedure

1. Gather materials and place plants beside one another so they all get the same amount of sunlight.  
(Measure each plant.)
2. Measure the same amount of each type of liquid.
3. Water each plant with a different type than the others, making sure that plant receives the same liquid each time.
4. Measure each plant every other day record growth.
5. Continue for two weeks.

5. **Gather Materials** - list all the materials that you will need to complete your experiment.

**Materials**

4 plants (same kind) in pots  
 4 liquids (water, milk, Clorox, vinegar)  
 ruler  
 measuring cup

6. **Conduct experiment** - when you do your experiment you need to collect data and make observations. You will complete these in your Experiment Log. After you have completed the experiment use your log to write down the data and observations below. In your log you will need to:
  1. **Collect Data** - you will need to collect numerical data; that means you need to take measurements during the experiment. It can be temperature, distance, height, etc. You will analyze the data later to determine the results of your experiment.
  2. **Make Observations** - as you conduct your experiment you will use your senses (sight, smell, touch, etc.) and write down any observations you make during the process.

**Data**

Day 1 - 20 mm each  
 Day 3 - water 22 mm ; m, C, V 20mm  
 Day 5 - water 26 mm ; m, C, V 19mm  
 Day 7 - water 30 mm ; C <sup>7mm</sup> ✓ 10mm  
 ... m 9mm (wilting)

Day 13 - water 42mm ; m, C, V 0mm

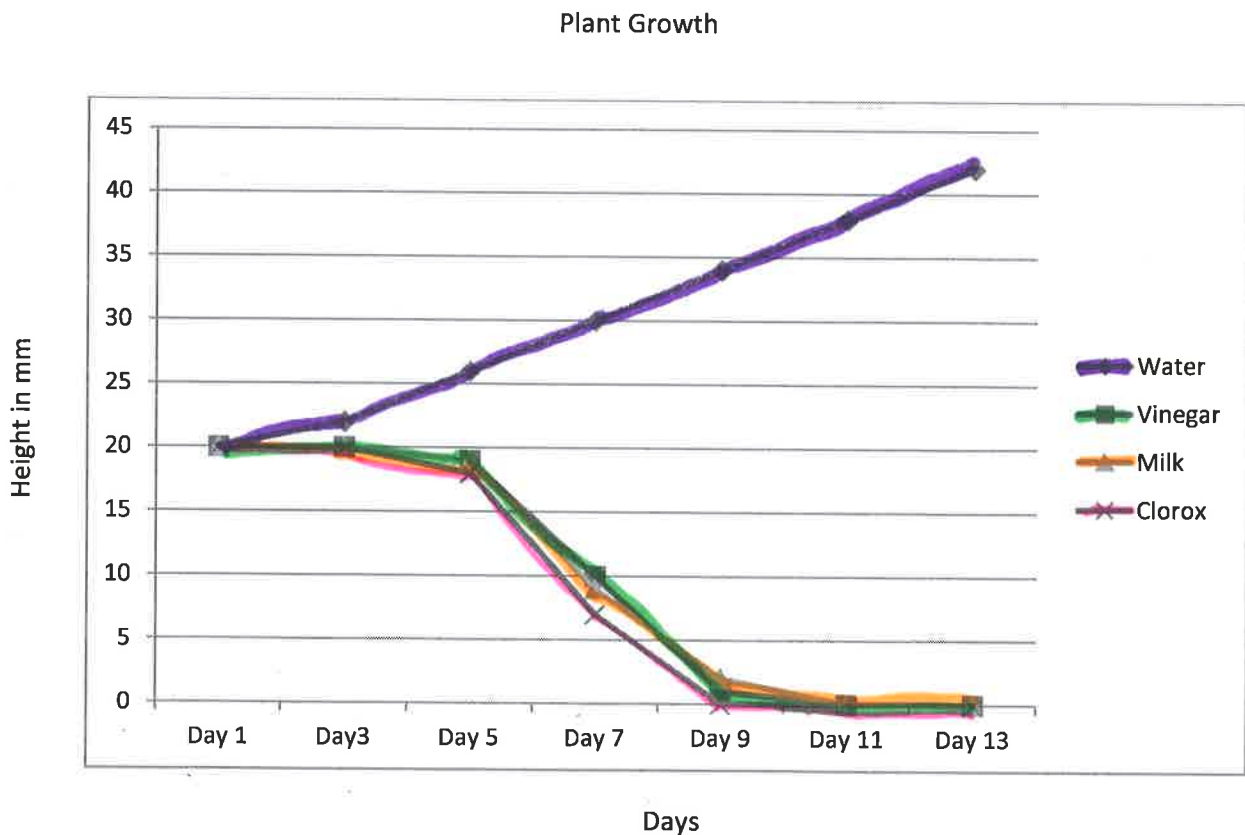
### Observations

The plant watered with water grew 22 mm by the end of the experiment. By day 5, the plants watered with milk, Clorox, and vinegar began to wilt and were completely dead by the end of the two weeks.

7. Determine the Results - Now it is time to review your data and observations to find out what happened. Think about the best way to show your data: bar graph, line graph, chart, etc. and then create a table or a graph using your data. Write out the results of each test in the experiment in paragraph form using complete sentences. Make sure that you include the numerical data (measurements) as well as any other important observations that you made.

### Results (graph or chart)

Use this space, or a separate sheet in your notebook, to sketch 1 or more tables, charts, or graphs to analyze your data.



### Results (paragraph)

The plant watered with water was the only one to grow. The others wilted and died quickly. The sodium in the Clorox overloaded the plant's system. It also raised the pH levels in the soil and prevented proper intake of nutrients. Vinegar was too acidic and lowered pH levels. Milk caused bacterial growth in the soil. Even though the milk provided extra nutrients in the soil, through water's transpiration, the concentration of milk caused it

8. Draw Conclusions - After you have determined the results it is time to decide the answer to your original question. Write your answer in a complete sentence using the question to begin your answer. You also need to tell whether your hypothesis was correct or incorrect. If it was incorrect explain why you think so. End this paragraph by saying how you could change or improve your experiment in the future.

### Conclusions

Answer to your original question: Water helps plants grow, but milk, Clorox, and vinegar will kill them.

Is your hypothesis correct or incorrect? If incorrect, why? My hypothesis was incorrect. Watering plants with milk causes bacterial growth and killed the plant.

If you were to complete this experiment again, what changes would you make? How

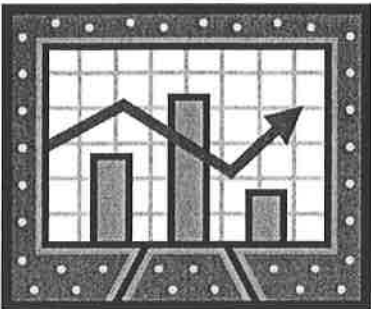
would you improve this experiment?

I might try different types of water to see which helps plants grow more. I would use distilled water, tap water, boiled (and cooled) water, microwaved water, and salt water.

9. Display board - Now that you have completed your experiment you will begin setting up your display board to communicate the results of your experiment to others. Remember, the board is graded on the information not how colorful or pretty it looks. Your display board must have ALL of the following components located in the same places. Other board guidelines:

- Font should be easy to read and at least a size of 16pt or greater.
- Photos should not include faces of students
- Information on the board can be typed or written neatly by hand.

### Display Board

<p><b>Hypothesis</b></p> <div data-bbox="149 1163 453 1304"></div> <p><b>Key Words and Research</b></p> <div data-bbox="149 1392 453 1554"></div> <p><b>Procedure and Materials</b></p> <div data-bbox="149 1669 453 1921"></div>	<p><b>Question/Title</b></p> <div data-bbox="542 1163 1031 1234"></div> <p><b>Photos or Drawings</b></p> <div data-bbox="565 1346 1031 1486"></div> <p><b>Graphs</b></p> <div data-bbox="602 1593 971 1900"></div>	<p><b>Results</b></p> <div data-bbox="1122 1163 1425 1440"></div> <p><b>Conclusion</b></p> <div data-bbox="1122 1572 1425 1850"></div>
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