

Radish Races Project

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Name: _____ Hour _____ Date: _____ Group # _____

Date Assignment is due: _____ Why late? _____ Score: + ✓ -
Day of Week Date If your project was late, describe why

Directions: In this project, you will be working with your assigned group to test a method to increase the rate of growth of radishes. Using the questions below as a guide, you will design an experiment to test your hypothesis, record data and observations, and form a conclusion about whether or not your hypothesis was accurate.

Your objective is to treat your radish seeds or your soil in a way so that your radishes grow faster than the control (the radishes without any treatment). Keep in mind that you should only change one thing – if you change multiple things, you will not be able to determine which change was responsible for the outcome you observe.

1. Ask your instructor when this assignment is due. Then add this information to the blank on the top left.
2. Work with your group to come up with three ideas for increasing the rate of radish growth in the spaces below. Summarize your ideas in the spaces below.

a. _____

b. _____

c. _____

3. As a group, decide which of your three ideas is most likely to work. **Circle that idea above.**
4. To begin, let's turn your idea into a **Research Question**. A research question is usually what frames and guides the entire experiment. Fill in the blanks below:

We wondered if _____ *would*

affect the radishes by making them _____

5. Now let's turn this into a **Hypothesis**. A hypothesis is the main emphasis of any experiment. It is simply an educated guess. Fill in the blanks below:

We hypothesize that if we _____

it will affect the radishes by making them _____

6. Now provide a **Rationale** for your hypothesis. A rationale simply states why you think your hypothesis might be right; it provides some evidence or logic that supports the validity of your hypothesis.

We think this will occur because:

7. Every experiment has two very important components – a dependent and an independent variable.

An **independent variable** is the thing you purposely changed. In this case, whatever you did to your soil or your seeds would be your independent variable. An experiment should never have more than one independent variable. For example, if you treated your seeds with Gatorade to make them grow faster, this would be the thing you purposely changed; the addition of Gatorade would be your independent variable.

A **dependent variable** is the thing or things you measure in order to determine if your hypothesis is correct. It should relate to your hypothesis in some way. In this case, you might measure height, rate of growth, weight, etc. You can have more than one dependent variable, but they need to relate to your hypothesis.

What is your independent variable? _____

What is your dependent variable(s)? _____

8. Every good experiment has a **control**. A control is simply a part of your experiment that does not receive any treatment. It is needed so that we have something to compare to. For example, if your radishes in your control grew as tall as your radishes in your treated groups, we'd know that your treatment had no impact.

In this experiment, what will be your control? _____

9. Before moving on, let's recap everything that we have covered. Re-write your question, hypothesis, and rationale below. You may need to update your hypothesis to include your dependent variables listed above.

Research Question: *We wondered if*

Hypothesis: *We hypothesize that*

Rationale: *We think this because*

10. After your radishes have had a chance to grow, what do you expect to find? How will your treated radishes be different from your control? Describe your predictions for the end of your experiment in the space below:

11. What materials will you need to do this experiment? Think of everything you will need from beginning to end to make this experiment work. Keep in mind you will also need to include the tools you will use to measure your dependent variable (rulers, scale, etc.). You will also need to include everything you will need to keep your plant alive (watering cans, sunlight, etc.).

Materials are divided by categories below. Fill in the blanks.

Materials needed to grow the radishes: _____

Materials needed for your independent variable (the thing you are purposely changing): _____

Materials needed for your dependent variable (the thing(s) you are measuring): _____

Materials needed to keep your plants alive: _____

Any other materials needed (cleanup, maintenance, safety, etc.): _____

12. How will you test your hypothesis? Every experiment should have a detailed **Methods** section. The methods portion of an experiment should be like a cooking recipe – it should provide all of the steps and materials needed to successfully replicate an experiment (just like a recipe provides all of the details needed to successfully allow you to create the same kind of dessert).

Provide all of the steps needed to make your experiment happen. Be sure to ask yourself, *“If I gave this to another person that is not in my group, could they create the exact same experiment with the exact same results?”*

You may not need all of the steps below. It is ok to leave them blank if you do not need them, but make sure you are not missing any important details!!! HINT: Start a rough draft on a separate sheet of paper before writing your steps below.

Step 1: _____

Step 2: _____

Step 3: _____

Step 4: _____

Step 5: _____

Step 6: _____

Step 7: _____

Step 8: _____
