

The Effects of Acid Rain on Radish Plants

Needed Materials: radish seeds, potting soil, pots (3 for each group), masking tape, markers, water, vinegar, greenhouse or constant light source (i.e. growth light)

Safety Rule: As when working with any chemicals, safety goggles should be used when watering the plants with the acidic solutions.

Student Information: The following information will provide you with the steps for setting up your acid rain project. It is important to hold all of the variables constant except for those that are being manipulated. Constant (or controlled variables) would be such things as: the size of the pot, the amount of time the experiment is conducted, the amount of soil, the number of seeds planted, the amount of liquid each plant is given, etc. Manipulated (or independent) variables would be those things that we change to see if the response will be different, such as: pH level of the water, location of the pots, etc. The responding (or dependent) variable for this experiment will be the number of plants that grow and the quality of their growth in height and leaf production. NOTE: Temperature is one variable that will difficult to control or intentionally manipulate in this experiment. However, from your experiments, you may be able to infer as to whether temperature has any impact on the growth of the plants.

The reporting form for this experiment is set up so that you can determine the types of acid you use, the amounts of acid you use, and the pH levels. NOTE: Be sure to include a control group of plants that are only given water. Also remember that a good scientific experiment is repeated a minimum of three times. Therefore, your data will be more accurate if you set up several pots given the same liquids.

Procedural Steps for Conducting the Investigation:

1. Label 3 pots A, B, or C with masking tape and marker.
2. Fill each pot with potting soil.
3. With your finger, make a hole 4 cm deep in the soil.
4. Place 5 seeds in each hole.
5. Carefully cover the seeds with soil.
6. In pots A and B, water the seeds with 50 ml of water.
7. In pot C, water the seeds with 50 ml of vinegar.
8. Place your pots in the growing area designated by your teacher.

9. Check your plants each day. Measure their growth each day in centimeters. Write this information on your chart.
10. Add 20 ml of water every other day to pots A and B. Add 20 ml of vinegar to pot C every other day.
11. After one week, continue to water only pot A with 20 ml of water every other day. Water pots B and C with 20 ml of vinegar every other day.
12. Continue measuring and recording plant growth each day.
13. After plants have grown for three weeks, create a data table and bar graph to display your results.
14. After group and classroom discussions have occurred, login to enter your data.