

Effects of Salt on Plant Growth



How does salt in the environment affect plant growth? Students will build a model for studying the effects of contaminants on plant growth, identify two ways pollutants can enter the ecosystem, and identify the effects of pollutants on terrestrial and aquatic plants.

Problem

How does salt in the environment affect plant growth?

Hypothesis: _____

Primary Learning Objectives

- Build a model for studying the effects of contaminants on plant growth.
- Identify two ways pollutants can enter the ecosystem.
- Identify the effects of a pollutant on terrestrial and aquatic plants
- Conduct an experiment, collect and analyze data

Assessed GPS

Habits of Mind: SCSH2, SCSH3, SCSH4, SCSH5, SCSH6, SCSH7

Content: SB5

Assessed QCC's

Science, Technology and Society: 1, 3, 8

Duration

18 days – 30 min day One, 15 minutes every third day, 1hour day 18

Materials

2 – 2 liter bottles per group

Potting soil

Pond water

Scissors

Heat source

Balance

Pure salt (sea salt) or other contaminant

Distilled water

Fast plants seeds

Peter's N-P-K 20/20/20 (one capful in a 1-Liter bottle of water)

Soda bottle “rain” bottles

Background

Salt can be introduced into the environment in many different ways. Overhead irrigation can cause buildup of salt in fields due to the minerals dissolved in the ground water that is used. The water evaporates leaving the salts behind.

In coastal areas, extensive well pumping of ground water aquifers can cause the infiltration of salts from the oceans into these aquifers and related soils.

Using the biology in a bottle model, both aquifer and soil contamination can be studied.

Procedure

1. Build a bottle ecosystem according to the attached instructions.
2. Place soil and about 30 fast plant seed in the upper chamber. Allow to grow about 4 days before beginning the experiment.
3. Place pond water (full of algae and sand on the bottom) in the lower chamber of the ecosystem.
4. Fertilize every three days with the fertilizer prepared ahead of time.
5. "Rain on the plants with a 10% salt solution made using distilled water. Use 100ml pf rain on days 3,6, 9 and 12
6. Record observations and measure plant growth parameters on days 0,3,6,9, 12 and 18.
7. Average data from the class and make appropriate graphs from your data using multi colors and being sure to put your dependent and independent variables in the correct places. Do not forget to label and title your graphs.

Assessment

1. What happened to the plants in the various salt concentrations as compared to the control?
2. What did the salt do to the algae?
3. How much salt seems to be too much? Does this seem like lot or a little?
4. What can we do to decrease the salts we put into the environment?
5. Hand in your graphs and data analysis paragraph along with the answers to these questions.

Experiment II

Follow the same procedure as experiment one except this time put the salt into the "ground water" at various concentrations. Each group will have a different salt concentration. Use salt water in the aquifer with no algae this time.

Use a wick to get the water from the aquifer into the upper chamber.

Record your results in a data table and share the results with the class at the end of the experiment.

Make graphs, summarize your data and answer the questions you answered in the assessment to Experiment I again for this experiment. Hand in your work when you have completed the experiment.