

## Great Gravity, Batman!

### Basic description:

Through this investigation, students are introduced to the effect of gravity on plant growth.

### Source:

- Botany Projects for Young Scientists by Maurice Blefield, Franklin Watts, 1992.

### Curriculum connections:

Biology, Grade 11, University Preparation

### Plants: Anatomy, Growth, and Functions

#### Overall Expectations

- Describe the major processes and mechanisms by which plants grow, develop, and supply various products, including energy and nutrition, needed by other organisms.

#### Specific Expectations

Understanding Basic Concepts

- Describe the effects of growth regulators (e.g., auxins, gibberellins, cytokinins).
- Design and carry out an experiment to determine the factors that affect the growth of a population of plants, identifying and controlling major variables (e.g., examine the effect on plant growth of the quantity of nutrients, or the quantity and quality of light, or temperature, or salinity).

**Preparation Time:** Seed germination: 3-4 days

### Duration:

- Experiment set-up: 20 minutes
- Geotropism observations: 5-7 day
- Questions and follow-up: 20 minutes

### Materials:

- Germinated lima beans or radish seeds - each group will require 5 bean sprouts or radish sprouts (these can be germinated ahead of time by placing the bean or radish seeds on wet filter paper or paper towel set on a flat tray; allow several days for germination).
- Test tubes – each group will require 5 test tubes
- Paper towels
- Cotton balls
- Test tube stand – each group will need at least two
- Test tube clamps – each group will need 5

### Preparation:

1. Germinate the lima beans or radish seeds.
2. Gather all necessary materials.

## Procedure:

1. Instruct your students to line one side of the inside of each test tube with wet paper towel (you want to be able to see into the test tube from one side).
2. Demonstrate how to carefully place the root end of a sprout into one test tube and gently pack cotton around the top of the test tube to hold the plant in place. Instruct your students to repeat this procedure with each of their plants.
3. Instruct your students to attach each test tube to the test tube stand using the test tube clamps. One test tube should be placed in an upright position, the second should be placed upside down, the third should be placed horizontally, the fourth should be placed diagonally with the stem facing up, and the fifth should be placed diagonally with the stem facing downward.
4. Allow the plants to continue to grow in this manner for about a week (ensure that the paper towels are kept damp but try not to disturb their position in the test tube). Provide time each day for your students to monitor and observe their plants. Students should keep a daily record of their observations by drawing a sketch of their plants.

## Follow-up:

1. Ask your students to draw conclusions, based on their observations, about the effect of gravity on plant growth.
2. Introduce and explain the term *geotropism*.

## Extensions:

The above experiment is only one of many possible investigations into plant growth. As an extension, have your students design and conduct their own experiment investigating phototropism or photoperiodism in plants.

## Resources:

- Science Is... by Susan V. Bosak, Scholastic Canada Ltd. and The Communication Project, 2000.
- Experiments with Plants: Projects for Home, Garden, and Classroom by Joel Beller, Arco Publishing, Inc., 1985.
- Plant Biology Science Projects by David R. Hershey, John Wiley & Sons, Inc., 1995.
- Botany: 49 Science Fair Projects by Robert L. Bonnet and G. Daniel Keen, Tab Books Inc., 1989.
- Botany Projects for Young Scientists by Maurice Blefield, Franklin Watts, 1992.



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