GREEN THUMBS
Teaching Guidelines

Subject: Mathematics

Topics: Algebra

Grades: 3-8

Concepts:

- Variables

Subject: Science

Topics: Experimentation, Biology (Plants)

Grades: 3-8

Knowledge and Skills:

- Can design an experiment which isolates and evaluates the relationship between two variables
- Can present experimental results clearly in written form
- Understands the basic life cycle of plants
- Understands that different kinds of plants have different requirements in terms of light, water, and soil.

Materials: (for each student)

- 1 pea pot
- 1 cups of water
- 1 water dropper
- 1 file label
- 1 ruler (centimeter scale)

Procedure:

Begin the lesson by telling students they are going to do a project with plants. Discuss what plants need to grow (light, water, soil). Point out that the amounts of light and water that are available are not always the same and elicit or present the word "variable" as a mathematical word used to describe a quantity that can change. Tell the class they are going to do an experiment to see what the best amount of light and water are. This experiment will take several days, and it starts with today's activity, in which students will be planting seeds.

Hand out pots, one to a student, and have them do the following:

1) Write their names on the file labels and place those on pots.
2) Add a specified amount of soil to the pots (depending on what's planted; bean seeds, for example, require 3 to 4 centimeters of dirt on top of the seed and so the pots should have 6-7 cm of soil in them).
3) Put the seeds into the soil at the recommended depth.
4) Add enough water to moisten the soil.

Complete the first day's activity by reviewing the term "variables".

A few days later, after the seeds have sprouted, continue with the lesson. (For students whose plants didn't sprout, partner them with students whose plants sprouted.)

Suggest that it would be a good idea to see what the best amount of light and water is, and discuss with students how best to do that. The outcome should be that the class decides to do an experiment.

Each student is assigned to a group whose plants are assigned different light and/or water levels daily (light can be "low", and "bright", water is "1 dropperful", "2 droppersful", "3 droppersful", etc.).

Students should start an experimental record in which they note what will be done with their plants, and place the plants in an appropriate location depending on the amount of light they are to receive.

For the next week, have students water their plants daily with the appropriate amount of water.

As the final part of lesson, one week after the students begin the "variables" part of the project, have them measure the heights of the plants. Make a chart for all of the plants with light level, water amounts, and heights of plants, and discuss what can be observed from the chart. To wrap up the lesson, review once more the term "variable" in this context and discuss the role that variables play in experiments.

Green Thumb

Seed planted	
Soil added to pot	
Soil covering seed	
Seed Depth	

Seed Diary

Date	Light Levels		Water droppers per day	Height
	Low	Bright		

Seed Diary				
Date	Light Levels		Water droppers per day	Height
	Low	Bright		