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## **AGRICULTURE SCIENCE PROJECTS**

**TITLE:** Ways to "Boss" a Plant Around, Experiments for Students, from the USDA, Agricultural Research Service, Coastal Plains Soil, Water, and Plant Research Center

**SUBJECT:** Science

**GRADE LEVEL:** Varies, 4-8

**MATERIAL(S):** Varies, see below

**OBJECTIVE(S):** To help students understand the value of asking the question "what if?" Students will be introduced to factors that can effect the growth of plants such as popcorn, and will encourage Science Projects suitable for the classroom.

**OVERVIEW:** You can try the following experiments at school or at home to see how good you are at "bossing" a plant around. Repeat the experiments several times to increase confidence in the accuracy of your results.

### **Are Seedlings Afraid of the Dark?**

#### **Experiment 1**

**Purpose:** To determine the effects of light on seedlings germinated in the dark vs. the light.

**Materials:** 20 popcorn kernels, 2 Ziploc bags, 2 damp paper towels, desk lamp.

**Procedure:** Separate kernels into two different piles with equal number of kernels (10 kernels in each pile). Wet the paper towels until completely dampened. Place the dampened paper towels in the Ziploc bags, and then place 10 kernels on top of the paper towels in each bag. Make sure the kernels are on the paper towel in the bag and close the bag, but not completely (about 3/4 way closed). Wrap one of the Ziploc bags completely in aluminum foil. Leave the other one uncovered. Place both Ziploc bags under a desk lamp. After 7 days, check the bag that has been in the light as well as the bag that has been wrapped in aluminum foil. Compare the germinated kernels. You should definitely see a difference between the two. You should note mainly the color and stem length differences between the seedlings that germinated in light and those that germinated in darkness.

Think About This:

1. What did the kernels that germinated in the dark look like? (color of leaves, length of stems)
2. What did the kernels that germinated in the light look like? (color of leaves, length of stems)
3. Is light needed for germination and early growth?

## **Is a Greenhouse Better for Plants?**

### **Experiment 2**

Purpose: To determine if brightness of light will alter the growth rate of a plant.

Materials: Greenhouse or sunny window sill, 10 popcorn kernels, 10 small pots, water, ruler, potting soil, pencil.

Procedure: Fill the 10 small pots with equal amounts of dampened potting soil. With a pencil, make holes about 2 centimeters deep in each pot. Place the 10 popcorn kernels, one per pot, and cover the kernels with some of the soil. Place 5 of the pots in the greenhouse or on a window sill on the sunny side of the house. Place the other 5 on a window sill that does not receive bright sunlight. Kernels will germinate within 7 days, and you can begin making stem measurements. Take stem measurements for 14 days. Be sure to water the plants as needed. Note the difference in stem length for each set of plants, and write down your observations.

Think About This:

1. Compare the two sets of plants. How do the ones grown in the bright sunlight compare to the ones grown in less bright light?
2. Which plants had the longest stem length? Which had the shortest?
3. What are some of the differences between a greenhouse and an inside space?

## **Does Crowding Affect Plants?**

### **Experiment 3**

Purpose: To determine the effects of growing plants close together vs. growing plants farther apart.

Materials: 6 medium-sized pots, 10 popcorn kernels, potting soil, water, ruler, large measuring cup, desk lamp, pencil.

Procedure: Fill all pots with an equal amount of potting soil. Be sure that the soil has been dampened with water. Using a pencil, make 5 holes about 2 centimeters (cm) deep in the soil of one pot. Place kernels in each hole making sure that they are spaced relatively close but equal distance from each other within the pot. Place the remaining 5 kernels, 1 in each of the remaining 5 pots, about 2 cm deep. Cover the kernels with soil. Place all the pots underneath a large desk lamp so that each pot receives full light. Be sure to water each plant as needed. The kernels will germinate in about 7 days, and you will be able to begin making stem measurements. Take measurements for 14 days. Note the difference in stem length for each plant and write down your observations.

Think About This:

1. Which set of plants had the longest stem length?
2. How does crowding affect plants?