

# Do Flowers Bloom in Antarctica?

Integration: Science

Grade Levels: K-3

Time: 1-2 initial class periods; additional time for monitoring plant growth; follow-up class after 2 weeks

Materials:

- Paper or plastic cups
- Lima beans
- Soil
- Water
- Paper
- Drawing materials

Objectives:

Students will:

1. Observe what plants need to grow.
2. Determine the reasons why limited plant growth is found in Antarctica.

Lesson:

Full Group

1. Ask students to raise their hands if they have ever seen flowers or plants growing in a flowerpot or garden.
2. Ask students what plants and flowers need in order to live and to grow (soil, water, and sunlight). Write these words on the board. Ask students what would happen if a plant did not receive what it needed (it would not grow properly, it would not grow at all, or it would die).
3. Tell students that they will observe what plants need to grow over the next few weeks by growing their own plants.

Small Groups

4. Divide the class into groups for a group experiment.
  - a. Give each group four paper or plastic cups, soil, and four lima beans.
  - b. Instruct students to label the cups #1 to #4 and prepare the cups in the following way:

- Cup #1: Fill the cup with soil and plant a lima bean.
  - Cup #2: Fill the cup with soil and plant a lima bean.
  - Cup #3: Fill the cup with soil and plant a lima bean.
  - Cup #4: Place a lima bean in the cup.
- c. Tell students to water the soil in cups #1, #2, and #4.
  - d. Tell students to place a paper bag over cup #2.
  - e. All of the cups should be placed in an area where they will get sunlight.
  - f. The students should water the plants with the exception of #3 as necessary.
    - Cup #2 should be watered and the bag placed back on top.
    - Cup #4 will only need water if it starts to dry out.

#### TEACHER REFERENCE

Cup	Sunlight	Water	Soil
1	X	X	X
2		X	X
3	X		X
4	X	X	

5. Tell students that this experiment will help them to see exactly what happens when plants do not receive everything that they need.
6. Ask students which cup has everything it needs to grow (Cup #1). Each of the other cups is missing something that the plant needs. Have students decide what is missing.
  - a. Cup #2: the bag will prevent **sunlight** from reaching the plant.
  - b. Cup #3: this plant does not receive **water**.
  - c. Cup #4: the seed does not have **soil** to grow in.
7. Tell students that it will take about two weeks for the plants to have a chance to grow. At that time they will compare what each of the plants looks like.
8. Have students monitor the growth of the plants.
  - a. Students can record their observations and graph the height of each plant at different intervals OR draw a series of pictures depicting the growth of the plants.

After 2 weeks:

9. Have students observe the differences between the plants and discuss in their groups and with the entire class. Ask students to report what they have found.
10. Ask students if, knowing what they now know, do they think that flowers and plants grow in Antarctica. Why or why not?
11. Tell students that there are very few plants that can grow in Antarctica. Antarctica does not provide what the plants need.
  - a. Soil: 98% of Antarctica is covered by ice. Only 2% is barren rock.

- b. Water: Antarctica is very dry because it almost never rains or snows. The water found as ice came from millions of years ago when the climate in Antarctica was much different (tropical). As the continent became colder, the water froze. Plants cannot use this water because it is frozen.
  - c. Sunlight: There is plenty of sunlight in Antarctica during the summer but absolutely no sunlight during the winter.
  - d. Ask students if the cold in Antarctica would make it difficult for plants to survive and grow (yes).
12. Tell students that two plants are found on the Antarctic Peninsula (point to the Antarctic Peninsula on a map). One is a form of grass called hairgrass; the other is called pearlwort. Pearlwort is a moss-like plant. It is a little warmer in that part of Antarctica and the conditions are not as harsh. The only other plants found in Antarctica are tiny, simple plants such as algae, moss, and lichens (lɪˈkɪnz).
- a. These plants can be different colors and they sometimes look like a crust growing on rocks.
13. Inform students that these plants have adapted to the cold, dry land of Antarctica.
- a. Ask students what the word “adapt” means (to change).
  - b. Ask students for theories of how the plants can survive in Antarctica (They do not require as much water; they can survive even when the temperature is below freezing).
14. Ask students for ways that humans adapt to the cold (put on layers of clothes, wear hats and mittens, turn up the heat inside, etc.).
15. Ask students for other things that humans adapt to (moving to a new place, starting school, sleeping with the lights off, etc.).
16. End by allowing students to give one situation they have had to adapt to.

### Assessment:

Teachers will assess:

1. Student’s ability to name the elements necessary for plant growth.
2. Student’s explanation of the reason why there is limited plant growth in Antarctica.
3. Student’s ability to name the plants that do grow in Antarctica.
4. Student’s ability to follow directions.
5. Student’s ability to work cooperatively.