Sunlight

Integration: Science (Earth Science); Geography; Language Arts

Grade Levels: 4-6

Time: 1-2 class periods

Materials:

- Globe (can substitute a basketball with a cut-out of Antarctica attached)
- flashlight

Objectives:
Students will:
1. Explain why Antarctica experiences six months of constant sunlight and six months without sunlight.
2. Explain the occurrence of seasons throughout the world and what seasons Antarctica experiences.

Lesson:

Full group

1. Ask students to explain the occurrence of sunrise and sunset.
   a. The earth rotates (spins) on its axis (the imaginary line that runs through the center of the earth from the North Pole to the South Pole).
   b. As it rotates, different parts of the world face the sun and receive sunlight while others are in darkness.
   c. It takes 24 hours for the earth to rotate once.

2. Demonstrate this for the students by shining a flashlight on the globe while turning it slowly. The flashlight should be aimed at the equator. Turning off the lights may make it easier to see.

3. Ask students how the movement of the earth affects the occurrence of seasons.
   a. As the earth revolves (moves around) around the sun, it tilts toward and away from it. The part of the earth that is closest to the sun is experiencing summer and vice versa.
   b. It takes approximately 365 days for the earth to circle the sun once.

4. Demonstrate the movement of the earth for the students. Have one student act as the sun and stand in the middle while another student moves the globe around the "sun" while tilting it.

5. Because of the tilting of the earth, the Southern Hemisphere and the Northern Hemisphere experience opposite seasons. When it is winter in the Northern Hemisphere, it is summer in the Southern and vice versa.
    a. Ask students which hemisphere they reside in. Ask them to identify which season they are experiencing and therefore, which the opposite hemisphere is experiencing.
        - Spring and Fall are also opposite according to the hemisphere.

6. Explain to students that Antarctica experiences a brief summer and a long winter—no spring or fall. Initiate a discussion about why students think Antarctica only experiences these seasons.

Small group

7. Divide students into small groups.

8. Tell students that the location of Antarctica and the tilting of the earth affect the amount of sunlight that the continent receives.
    a. Give students a chance to brainstorm what the effect may be.
    b. Allow each group of students time to experiment with the globe and flashlight to determine what the effect is.

9. Have each group report what they think the effect is.

10. Instruct students that Antarctica only receives sunlight for 6 months each year.
    a. Once again, demonstrate the effect with the globe and flashlight.
    b. Have the students explain why this happens
        - the earth tilts away from the sun for part of the year.
        - Antarctica does not receive any sunlight during this time because of its location at the bottom of the earth.

11. Ask students "During which season do you think sunlight is absent?" (winter) Allow them to experiment again if necessary. Ask them to explain how they came to their conclusion. (the sunlight is absent when the earth tilts away from the sun; winter is the season when the earth tilts away from the sun)

12. Tell students that the sun sets in Antarctica around March 22 and does not rise again until around September 22.

13. Ask the students when they think the Bancroft Arnesen Expedition will take place. (Antarctica's summer; November to February). To help the students come to this conclusion, ask these questions:
    a. Will Ann and Liv need sunlight? (yes)
    b. When is there sunlight? (summer)
    c. When is summer? (compared to our location)

14. To conclude, have the students write a story about what it would be like to live without the sun for 6 months or to live with constant sunlight for 6 months.

Assessment:

Teachers will assess:

1. Students' understanding of the movement of the earth and seasons.
2. Students' synthesis of ideas and ability to formulate theory.
3. Students' ability to work cooperatively.
4. Students' language arts and creative writing skills.