Watch out for the Cold!

Integration: Health (Personal Health, Safety and First Aid); Science; Language Arts

Grade Levels: K-3

Time: 3-5 class periods (series of lessons)

Materials:

- Partially frozen piece of meat (chicken)
- Latex or rubber gloves (plastic sandwich bags may be worn in place of the gloves)
- Poster board (optional)
- Paper
- Drawing materials

Objectives:

Students will:
1. Explain the types of dangers that are associated with cold weather.
2. Discuss the risks of cold weather injuries to Antarctic explorers.
3. Describe how they protect themselves against cold weather injuries.

Lesson:

Lesson #1

Full Group

1. Discuss with students the occurrence of injuries that are caused by cold temperatures.

2. Ask students what happens and what does it feel like if they go outside in the cold and are not protected properly.
   a. They feel cold.
   b. They begin to shiver.
   c. Their extremities (noses, cheeks, ears, fingers, and toes in particular) start to turn red.
   d. They may begin to feel numbness in their extremities.

3. Tell students that cold weather can be dangerous. It can cause injuries.

4. Ask students if they have ever heard the word "frostbite" before. Allow responses. Ask students what frostbite is. Encourage them to figure out the definition by thinking about the parts of the compound word (frost and bite). Write the word *frostbite* on the board (optional).

Tell students that frostbite is an injury that can happen when people are not properly prepared to be out in the cold. If any students have had experience with frostbite, allow them to share their experiences.

5. Describe the frostbite to the students
   a. Frostbite is a condition where the skin and the tissue underneath become frozen.
   b. Frostbite can be just frozen skin or all of the tissues, including muscles underneath being frozen.
   c. This can hurt the person permanently.

6. Tell students that frostbite occurs when body parts are exposed to the cold.
   a. Ask students what parts of the body they think get exposed to the cold most often and are at risk of frostbite. Tell them to think of what they may not cover when they go out in the cold
      - Nose
      - Face (especially cheeks)
      - Ears
      - Fingers
   b. Tell students that even parts that are covered may experience frostbite. Fingers and toes, even when covered, are at risk. It is important to be extra careful and to keep their bodies as warm as possible.

OPTIONAL: Demonstrate the effect of frostbite by showing a slightly frozen piece of meat. Allow the students to feel (with gloves) how hard the muscle gets when it is frozen. Elicit student response.

7. Have students explain what frostbite is and how to protect themselves. This can be achieved in written sentences or orally.

Lesson #2

8. Review and discuss the importance of protecting yourself from the cold.

9. Ask students to define what normal body temperature should be (98.6°F or 37°C).

10. Ask students why they think the temperature of the body is important (the body does not function properly if it is too hot or too cold, extreme cold or heat will physically damage tissues and organs, etc.). Ask, “What happens when you have a fever?” (your body doesn’t feel well)

11. Ask students if they think it is important to keep their bodies around the right temperature. Ask students to brainstorm a reason why the body’s temperature may not be normal (fever, outside in the heat, outside in the cold).

12. Discuss with students what happens if the body gets too cold.

a. This injury is called hypothermia. Have students repeat the word or write it on the board.
b. Hypothermia occurs when the body's temperature drops far below normal.
c. This can happen when it is cold, even if it is not below freezing.

13. Ask students to describe why the body may become too cold. (the body was not properly protected).

14. Describe hypothermia and some of its symptoms to the students.
    a. Hypothermia can be very dangerous.
    b. The symptoms include:
        (1) Intense shivering
        (2) Muscle weakness
        (3) Confusion
        (4) Excessive tiredness
        (5) Slurred speech
    c. Inform students that hypothermia can cause permanent damage to the body and can be life threatening.

15. Describe the role of wind and moisture in causing cold weather injuries.
    a. Ask students what it feels like to stand in front of a fan (cool).
    b. Ask students if they get the same feeling when it is windy.
    c. Ask for reasons why they feel cooler. Tell students that they fell cooler because the wind helps to remove heat from the surface of their bodies.
    d. Ask students what it feels like when they get out of a pool, lake, bathtub, etc. (they feel cold).
    e. Tell students that they feel cooler or cold because the moisture that is on their bodies is evaporating (being removed from their bodies). Evaporation occurs when a liquid dries. When the moisture evaporates, it takes heat with it.
        - Have students repeat the word "evaporate" or write in on the board.
    f. Tell students that it is very important to stay dry and warm when they are outside in cold weather.

16. Allow students to experience the effects of evaporation on temperature.
    a. Rub alcohol on the back of students' hands.

    OR

    b. Wet the back of students' hands and have them fan their hands back and forth to allow the air to cause evaporate.

17. Discuss what the students observe and have them talk about, write about, or draw a picture of other times when they have experienced evaporation and how their bodies felt.

Lesson #3

18. Review and discuss cold weather injuries from previous lessons.

19. Ask students if they think that Ann Bancroft, Liv Arnesen, and other Antarctic explorers have to be careful that they do not experience frostbite or hypothermia (yes).

20. Ask students why they think the explorers are at risk.
    a. Ask students about the temperature in Antarctica. It is very cold (-30°F; -34°C)
    b. Ask students if it is windy in Antarctica. It is very windy (the wind gusts up to 100 miles per hour (160 km per hour)).
    c. Ask students if Ann and Liv will be indoors a lot of the time. They are outside for 8-14 hours every day.

21. Ask students for suggestions of how the explorers protect themselves from cold weather injuries like frostbite and hypothermia.
    a. They wear layers of clothing.
    b. They try to stay dry.

22. Ask students how they protect themselves from cold weather injuries.
    a. What do they wear when the weather gets cold?
    b. Do they stay inside or go outside often?
    c. Do they try to stay dry?

23. Tell the students to do one of the following:
    a. Draw a picture of themselves practicing cold weather injury prevention
    b. In groups, make a poster that tells others how to protect themselves from cold weather injuries.

24. Display pictures and/or posters.

EXTENSION: For older students

- Divide the students into groups. Tell the students that they are going to produce an advertisement for a piece of clothing that will help guard against cold weather injuries.
    (i) The advertisements should have a picture of the clothing, the name of it, a brand name if possible and should tell how the clothing prevents cold weather injuries.

Assessment:

Teachers will assess:

1. Student’s ability to describe frostbite and hypothermia, their causes, and dangers.
2. Student’s understanding of the risk of cold weather injuries in Antarctica.
3. Student’s application of cold weather injuries to their own lives.