# Snow Characteristics Lab Activity

**Overview**

Students take temperatures at different depths in the snow and compare them to the air temperature. Variations for students to see where in the snow jello will solidify fastest, and for catching and classifying snowflake shapes are presented.

**Objective(s)**

Students will discover the insulating effect of snow and understand that temperature varies according to snow depth.

**Background**

This science lab is designed for a location with snow on the ground. With this activity, students will become aware of temperature variations above the snow and below the snow as well as physical characteristics of the snow and its effects on wildlife in places like Glacier National Park. Snow acts as insulation and provides an environment that has relatively stable temperatures. Small animals such as mice, voles and shrews spend most of the winter under a protective blanket of snow. Snowshoe hares, grouse and ptarmigan snuggle into the snow which provides protection from wind and temperature extremes. Large animals such as deer, elk, moose, mountain goats and bighorn sheep move to south and southwest facing slopes because they are warmer (and snow melts off more quickly making walking and locating food easier). Temperatures within a snow pack can vary depending upon the consistency of the snow. Snow consistency as well as snow depth can either assist or impede the movement of animals.

**Materials**

Household thermometer
Shovel
Clipboard
Paper or Data Collection table
Pencil

**Procedure**

1. Place a large drawing of a thermometer on a piece of paper, cardboard, or chalkboard so students can visualize it. Be sure everyone knows how to read a thermometer.
2. Divide students into teams to take and record temperatures. (Be sure that all students have a chance to take some of the temperatures).
3. Go outside and have each team use the shovel to dig a "pit" in the snow at different locations in your test area. Have them take temperatures at the following locations: the air temperature; the temperature at the surface of the snow and every few inches below the surface down to ground level if possible. Have them record their temperatures in a table such as this so that teams can compare their findings.
4. Return to class and compare temperatures and layer observations. Discuss how the temperatures are the same or different and why. How might these differences affect animals struggling to survive in the winter? Did anyone notice any difference in the snow layers as they took the temperatures? What do they think could have caused that?

**Assessment**

Have student groups prepare a graph depicting the data they collected. Have the groups present their information to the class and explain temperature variations they observed.

Variation: Place equal amounts of water (or jello) in cups with lids and bury one cup in the snow and put the other cup on the surface of the snow. Which solidifies faster and why? (It is best to start with cold water in the cups and place them outside early in the day).

**Extensions**

**Is Snow Clean?** Collect fresh snow in a clean, empty plastic container with a lid (such as a yogurt or margarine container). When the container is full, put the lid on and bring it inside. Allow the snow to melt. Hold a paper towel or coffee filter over an empty bowl. Stir the melted snow and pour it slowly into the bowl. Is there dirt collecting on the towel or filter? A magnifying glass can give you a closer look. There will be dirt collecting on the filter because every snowflake forms on a speck of dust or salt. As the snowflakes fall, they collect more dirt from the air.

**Flakes Up Close:** On a day that it is snowing, take your students outside. Tape a small piece of chilled dark material or dark construction paper onto the arm of each child. Give everyone a hand lens. Look closely at the snowflakes that fall on the material. Encourage students to share their findings. Check out http://snowflakebentley.com for some great snowflake images.

**Permanent Impressions:** Chill a piece of glass (a microscope slide works well) and spray it with chilled hair spray or chilled clear lacquer. Take the students and the sprayed glass (carried on a piece of cardboard) outside. Catch snowflakes onto the glass as they fall and they will make imprints on the glass. Leave the slides in the cold until the lacquer dries and then look at your shapes under a microscope. Use the classification guide on the next page to see what shapes your snowflakes are in. You could record how many you get of each type and then find the percentage of each.

Snow Riddles: Have students make riddles with snow vocabulary. Examples:

What kind of sheet can't be folded? A sheet of ice

Where did the snow dance? At the snowball;

Where do snowmen keep their money? In snowbanks!

Catch snowflakes onto the glass as they fall and they will make imprints on the glass. Leave the slides in the cold until the lacquer dries and then look at your shapes under a microscope. Use the classification guide on the next page to see what shapes your snowflakes are in. You could record how many you get of each type and then find the percentage of each.