



# How Do Snowflakes Become Ice?

## materials

- 3 large or small marshmallows per student
- Snow if available
- Potato Masher
- Large (gallon) clear jar

## background

Snow in Antarctica does not remain frozen snow; instead it becomes part of a large frozen body of ice called an ice sheet. As ice sheets move, they are called glaciers. Most snow particles in Antarctica do not melt to become ice (as in warmer climates). Since the weather is so cold and dry, snow layers remain intact and are compressed by the weight of each accumulating layer. The intermediate stage between snow and glacial ice is called firn. It is formed under the pressure of overlying snow by the process of compaction, recrystallization, localized melting, and the crushing of individual snowflakes. This takes about one year. Further compaction of firn at a depth of 45 to 60 meters (150 to 200 feet) results in glacial ice.

activity time:  
**15 minutes**



## directions

1. Discuss snow in Antarctica (95% of the continent is ice, snow fall average is 2 inches (5 cm) in the interior and 10 inches (25 cm) in the coastal areas).
2. Ask why the continent is ice covered if the snowfall is so low (Kansas gets that much snow yearly and Kansas does not have ice!).
3. Using 3 large or small marshmallows (one on top of the other), demonstrate how one layer of "snow" pushes on another layer of "snow" and flattens the marshmallows. The snow layers lose their air much like the marshmallows.
4. If snow is available, fill the jar half way with snow and ask students to smash it down. Continue this until it becomes ice.
5. Layers of snow can be shown by adding food coloring to each layer as it is smashed.



## discussion

- What happens to the marshmallows as you press down on them?
- What happens to the shape of the marshmallow?
- What happens to the height of the marshmallow tower?
- If able to use snow, why does the snow turn into ice? (It loses its' air and changes the shape of the crystal)
- What force did you use to change the snow into ice? (pressure)
- How is ice different than snow?



## vocabulary

**Firn** - the intermediate stage between snow and ice.

**Glacier** - an ice mass that continuously accumulates from compacted snow that deforms under its own weight and slowly moves.



## extension

- Design another experiment using a different procedure to smash marshmallows, snow or shaved ice.
- Use magnifying glasses to compare individual snow crystals to ice.
- Make snow, firn, and ice layers by making snow cones with shaved ice and add a different colored cool-aid to each layer.

## alignment to national science standards

Unifying Concepts and Processes, Standards A, B, E, F, G

## alignment to kansas science standards

**Science as Inquiry:** K-2: 1.1.4, 1.1.5; 3-4: 1.1.1, 1.1.2, 1.1.4; 5-7: 1.1.1, 1.1.4, 1.3.1

**Physical Science:** K-2: 2.1.3; 3-4: 2.1.2, 2.1.3, 2.1.4; 5-7: 1.3.1, 2.1.1, 2.1.2, 2.1.3, 2.3.1, 2.4.1, 2.4.3

**Earth Science:** 5-7: 4.1.1, 4.4.1, 4.4.3

**Science and Tech:** 3-4: 5.1.1, 5-7: 5.2.1

**History and Nature of Science:** K-2: 7.1.1; 3-4: 7.1.1