



Ice!

Science, Mathematics, and Language Arts

Purpose

To learn how people obtained and preserved ice in the past and to learn principles of volume.

Time: 60-minutes

Level: this lesson is appropriate and can be modified for grades K-2

Materials

- The Sunset of the Farmer* by Ethel Ohlin Bradford
- Ice Cubes
- Small boxes of various sizes
- Sawdust (janitors often have some)
- Worksheet (attached)
- Ruler
- medium sized blocks
- computer/projector to play:

<http://www.youtube.com/watch?v=rKRGNdGQjCw>

Standards

- Utah Core Science Standard 2: Students will gain an understanding of Earth and Space Science through the study of earth materials, celestial movement, and weather.
- Language Arts Common Core Writing Standard 2 and Reading Informational Text Standard 1 (across grade levels, e.g. W.K.2-W.3.2)
- Mathematics Common Core: K.MD.1. Describe measurable attributes of objects, such as length or weight. This lesson teaches students about measurement and provides a foundation for understanding about volume.

Essential Questions

- How does water change during the seasons?
- Why is ice important?
- Why was measuring important for Mr. Wheeler's business?

Background

Until the 1930s, ice was a precious commodity, particularly in hot summer months. Wheeler Farm has two ponds that the Wheelers used for harvesting ice. This lesson is a hands-on activity helps students understand how ice is formed as part of the phases of water and seasonal changes and develops their concept of volume through learning about the process of storing ice.

Activity Procedures

1. To begin the activity, arrange students into groups of four. Give each group a small box, some ice cubes, and the sawdust. Give the students one minute to brainstorm ideas about what these objects could mean. After the minute is over, have students clean the area. Next, let the students share some of their ideas of how the materials could be used.
2. Explain to students that prior to the 1930s, commercial ice machines were not readily available. Farmers, like the Wheelers, irrigated water from the mountains into ponds that in winter months, became frozen. When there was enough ice, the Wheelers used saws, axes, and crowbars to cut the ice into blocks. The Wheelers would then move the ice into the ice house and would put sawdust between the ice blocks to insulate them and prevent them from freezing together. In the summer months, the Wheelers would sell the ice so that people could keep their food cool. Additionally, people would use the ice to make ice cream (a cherished treat at that time).
3. Read the following excerpt from *The Sunset of the Farmer* (p. 62-63). Have students listen for important details in the story.

Each spring, as the snow melted in the eastern canyons, the water came furiously down into the valley, filling the gullies, flooding the streams and gouging out new deep holes... When cold weather arrived the Farmer began paying close attention to the pond. Ice from it was an important farm crop, and, like other crops, had to be watched so that at the perfect time, not too soon, not too late, it could be harvested. When ready, he would scrape the snow off only as large as an area as he knew that he could take care of within one or two days. With a tool that looked like an old fashioned harrow, he and a horse would 'score' the ice field... Then men with large saws, sawed along the grooves, and with crow bars for levers, the big ice blocks were separated and floated free. They were then 'caught' by a claw attached to the end of a heavy rope and, so simple, but how precise, the horse hauled the blocks by a pulley, up the ramp into the ice house, where they were stored with plenty of saw dust over, under, and above them.

4. If technology equipment is available, this clip shows a process of cutting ice: <http://www.youtube.com/watch?v=rKRGNdGQjCw>
5. Review with students that when water freezes, it becomes ice. When ice is used in the summer months, it melts and becomes water again. These are two phases of water, the third being in a gaseous form. Ask students why ice was important to the Wheelers and why it continues to be important today.

6. Next, students complete the attached worksheet. Instruct students that they have to figure out how much ice to cut from the pond to fit in the ice house. The boxes are the 'ice houses' and the blocks are the blocks of ice.

Students place the blocks in their containers and count the number of blocks that fit securely in the box.

Assessment

The assessment for this lesson comes from students' ability to contribute to the hands-on activity and discussion as well as their knowledge of the phases of water and volume demonstrated through their completion of the worksheet.

