



Water Expansion

materials

Per Group:

- Small piece of clay
- 1 small jar
- Blue food coloring
- 1 straw
- 1 permanent marking pen
- 1 spoon
- 1 metric ruler

why does water expand when frozen?

Water molecules are attracted to one another and stick together or bond when they get close enough. The molecules have spaces between them and the spaces change depending on their temperature. Liquid molecules are more flexible and can crowd together, making them take up less space or volume. As the temperature gets colder, the molecules form a hexagonal structure that is not flexible and takes up more space than the same number of liquid molecules.

activity time:
20 minutes



directions

1. Press the piece of clay inside on the center of the bottom of the jar.
2. Pour tap water into the jar until it is almost full.
3. Add 4 drops of food coloring and stir.
4. Lower the straw slowly into the water.
5. Push the straw into the clay so it is standing.
6. Slowly pour all of the water out of the jar, keeping the water in the straw.
7. Mark the height of the water in the straw with the pen.
8. Freeze the jar overnight.
9. Measure the change in the height of the ice.



extension

Class results from this experiment can be graphed. Students can devise their own projects to prove that water expands when frozen. These can be done at home and the results shared at school.



related activities

“Salty Water”
“Water Pockets”



vocabulary

Expansion - growth, or spreading out

Liquid - a substance that flows whose shape can be changed but not its volume

Volume - the size of a three-dimensional space enclosed within or occupied by an object.

alignment to national science standards

Unifying Concepts and Processes, Standards A, B, D, E

alignment to kansas science standards

Science as Inquiry: K-2: 1.1.1, 1.1.3, 1.1.5; 3-4: 1.1.1, 1.1.2, 1.1.3, 1.1.4; 5-7: 1.1.1, 1.1.3, 1.1.4, 1.2.2, 1.3.1

Physical Science: K-2: 2.1.1; 3-4: 2.1.1, 2.1.4; 5-7: 2.2.1

Earth Science: 5-7: 4.3.1, 4.4.2, 4.4.3

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