



## WINTER | Water

# The Shape of Water: Liquid Versus Solid

### Summary:

We find water all over our neighborhoods but we also find it in different states—solid, liquid or vapor—depending on the season or temperature. Today, we're going to explore liquid versus solid.

### Before Visiting the Garden:

**Gather:** A clear glass, ice cubes, warm water in a thermos (if doing experiment outside), and a notebook and pencil for observations

**Explore:** “Sea Ice, Beaufort Sea, Alaska, July 2002” by Subhankar Banerjee. Can you find water in a liquid state? Solid?

**Read:** *Many Kinds of Matter: A Look at Solids, Liquids, and Gases* by Jennifer Boothroyd

### In the Garden:

In the spring and summer, we can watch water in its liquid state on lakes and ponds. In winter, we can observe those same spots to see if the water has changed into a solid—ice! Our gardens love water in its liquid state but water in its solid state can freeze and kill our plants.

We're going to explore the different properties of water in today's experiment. A liquid has volume, takes up three-dimensional space, but it does not have a shape. Instead, it forms to the shape of whatever it is in, like the glass we will be using in our experiment. A solid, like an ice cube, has both volume and its own shape.

### Questions to Explore:

- What differences do you notice between liquids and solids?
- What are some other examples of liquids and solids?
- Are there different uses for water in its three states?

### Activity:

1. On a flat surface fill the clear glass container all the way to the top with warm water.
2. In your notebook, write down your answer to this question: What will happen to the level of water in my glass when the ice cube I place in the water melts? This is your hypothesis.
3. Next, run your experiment. Gently place your ice cube in the warm water, being careful not to bump the container. Keep track of your steps in your notebook.
4. Write your observations of the ice cube melting.
5. Lastly, compare your observations with your hypothesis. What did you notice about the level of the water when the ice melted? You probably noticed that the level of the water did not change. The water did not overflow in the cup! This is because as water freezes into an ice cube, it expands and takes up more space as a solid than it does as a liquid. When the ice cube melts and becomes water again, it takes up very little space in the glass!

### Beyond the Garden | Build a Snowman!

Who says science isn't fun? Explore water in transition as you use a tricky building material—snow! Notice how the wetness of the snow affects your ability to create spheres and other shapes.

### Continue Exploring | Supporting Materials

A few other experiments to try: <http://www.scienceinschool.org/2012/issue24/energy>