

## Tip of the Iceberg!

Water is a unique substance!

Water's solid form is less dense than its liquid form. Ice expands – becomes less dense – when it freezes. Because of this, ice floats in water – a very important property. If ice sank when it froze, our oceans would be frozen solid!

This activity is designed to help your child further investigate the properties of water and ice.

### What You Need:

- Two clear plastic cups (8 to 12 ounce)
- Large clear container, approximately  $\frac{1}{2}$  to 1 gallon
- Water to fill the cups and container  $\frac{3}{4}$  full
- Permanent marker
- Plastic wrap or foil to cover each container
- Rubber band to hold the plastic wrap in place
- Iceberg cartoons



### What To Do:

- Fill both cups with water to the exact same level.
- Mark the level with the marker. Cover each container with the plastic wrap and secure it with a rubber band.
- Freeze one container over night.
- Invite your child to examine the cup of water and the cup of ice; prompt their exploration with the questions and discussion points in the Parent Prompts.

### Parent Prompts

What happens when we place water in the freezer? (It freezes.)

Does anything else happen? What happens when we fill ice cube trays too full with water and freeze them? (They “overflow” with ice; the ice “grows” or expands.)

- Share the cup of water with your child.

What will happen to the water level when we freeze it? (Your child may guess that nothing will happen, or that the “water” level will go up or down.)

- Share the frozen cup of water. Explain that this was filled to the exact same level as the cup of water.

What do they observe? (The level of ice is higher, or the ice expanded.)

How can there be more ice than water? We did not add more water! (The ice expanded, like the ice in the overflowing ice cube trays.)

What might happen to the level if we allow the ice to melt? Will there be more water in the cup? Less? The same as the other cup? (Because we are not adding or taking away any water – we have the same amount with which we started, when the ice melts, the water level will be the same as in the cup of water we did not freeze.)

This is a special property of water. Its solid form – ice – is less dense than its liquid form. It expands when it freezes. There is the same amount of stuff, but when water freezes to become ice, it stretches.

Does ice float or sink in a glass of water? (Ice floats.)

What will happen when the big ice cube is placed in water? Will it float or sink?

- Place the ice in the large container of water.

What does your child observe? (The ice floats.)

How much is floating above the water? (About 5 to 10 percent or 1/20 to 1/10).

This is a very special property of water; its solid state – ice – is less dense and floats in its liquid form. If this were not the case, our oceans and lakes would freeze from the bottom up, and it would be hard to melt that much ice – Earth would be a frozen world.

So if ~1/10 of our ice is above water, and ~9/10's of our ice is below water, what does your child predict about icebergs floating in the ocean? How much is above water and how much is below? (About the same!)

- Invite your child to illustrate their predictions by coloring in the top and bottom of the iceberg! Help them estimate and draw the 9/10's of ice below the floating iceberg top. Repeat for the 1/10 of ice floating above second iceberg.

*Based on what you learned, draw the bottom or top of these icebergs!*

