

Background for Ice Cube Activity

Ice melts faster in fresh water than in salt water.

It's all about density!

1. What happens when ice melts in fresh water at room temperature?

- Water from melting ice is cold and fresh. It is more dense than fresh water at room temperature (REMEMBER: Liquid water's density decreases as *temperature* increases.)
- The denser cold water from the melting ice sinks to the bottom of the cup. That's why you saw the food coloring sink to the bottom of the cup.
- When the dense cold water sinks to the bottom of the cup, it displaces water at the bottom of the cup. The room-temperature water at the bottom of the cup has to go somewhere when it is pushed out of the way by the sinking cold water. The displaced room-temperature water from the bottom of the cup moves up toward the surface. You saw that the food coloring was eventually mixed throughout the cup just by the movement of dense cold water sinking and room-temperature water being displaced.
- The result of this mixing process is that the ice is always being surrounded by new room-temperature water as the dense cold water sinks and less dense room-temperature water is pushed upward. Therefore, ice melts faster in fresh water.

2. What happens when ice melts in salt water at room temperature?

- Water from melting ice is cold and fresh. Fresh water is always less dense than salt water no matter what the water temperature is. (REMEMBER: Water density decreases as *salinity* decreases.)
- Since the cold water from the melting ice is less dense than the salt water, it floats on the top of the salt water. That's why you saw the food coloring form a layer at the top of the cup.
- The layer of cold water from the melting ice "insulates" the ice. In other words, the cold, fresh water from the melting ice helps keep the ice cold. Therefore, the ice melts more slowly in salt water.

