

## ACTIVITY 3: VISUALIZING MELTING ICE



*Image Credit: Gary Abud, Jr.*

In this activity, students will create an ice sheet, then strategically melt it using salt and visualize the melting pattern using food coloring. You'll be able to see channels, holes, and tunnels in the ice, plus it's really cool to look at.

### **Materials:**

- Water
- Salt (rock salt or coarse Kosher salt)
- Liquid food coloring in individual bottles
- 2oz paper cups
- Disposable aluminum baking trays (size depends on freezer space)
- Paper and colored pencils
- Paper towel

Begin the day ahead by filling the aluminum trays with water to at least one inch thick and allow them to freeze overnight.

Start by explaining that students are going to visualize the melting patterns of frozen water as it undergoes a phase change to become liquid water. Have them draw a prediction of how they think that ice melts and what the pattern looks like for how it will melt. Allow them time to share their drawings with a partner and ask for a few students to verbally share descriptions of their predictions about the melting patterns.

Have students pair or group up, depending on how many ice sheets are available, and obtain the remaining necessary materials for the experiment: a small paper cup with some rock salt in it and some food coloring bottles.

**\*Teaching Tip:** *This will most likely work best over a two-day period where you first make the ice sheets and then work with them to melt them on day two.*

First, have the students place individual grains of rock salt at different positions on the ice sheet. They can put as many or as few as they'd like, and can do a uniform pattern or randomly distribute them. They could even make little mounds of ice by putting several grains all in one spot. Regardless of how the salt is distributed, leave at least 5cm of space between each grain of rock salt to allow space for melting to take place.

Next, have students draw a diagram of their ice sheet and all the rock salt in the proper locations where it was placed. These drawings do not need to be to scale.

Then, have students drop one drop of food coloring—they can use all one color or a combination of colors—on each grain of rock salt. Be sure to squeeze the drops of food coloring from a low height close to the rock salt and to squeeze slowly, so as to reduce the chance of there being splatter.

Last, have students observe what they see (and maybe even hear) as the ice begins to melt. They should see that the melting ice, which forms liquid water, will mix with the food coloring and start to run in different directions taking the food coloring with it and showing a pattern of the melting ice.

Have students draw a diagram of the melting ice tray at a few different times (e.g., 1min, 5min, 10min, 20min, etc. as your time together allows) to create a sort of time-lapse diagram of the ice melting and the pattern. Have students compare diagrams with other groups to discuss how their diagrams were the same/different at various elapsed times of melting.

Engage the whole group in a discussion about what happened, how their diagrams compared to their predictions, and what they think was going on at the smallest possible level in this situation. You can extend thinking by asking them to draw a particle diagram to represent the melting, or to explain verbally why the food coloring didn't mix with the water until it was melted.