

## DIY Ice Cream!

Based on the concept of water's freezing point, this activity entails lowering the freezing point to chill another substance—in this case, ice cream! In this fun—and delicious—activity, kids learn science and math concepts in a really hands-on way.

### Ingredients:

- ¼ cup of sugar
- ¼ teaspoon extract of your choice
- ½ cup of whole milk
- 2 tbsp mix-ins (optional), such as chopped nuts, chocolate chips, sprinkles, etc.
- Rock salt
- Ice cubes



### What You Do:

- Place the sugar, milk, extract, and any mix-ins of your choice into a 1-quart plastic bag; securely seal the bag, and mix well by squeezing the bag with your hands.
- Next, add 2 cups of ice to a 1-gallon plastic bag.
- Add between 1/2 and 3/4 cups of rock salt to the gallon bag.
- Place the sealed quart bag into the gallon bag. Close the larger bag securely.
- Holding the large bag by the top seal and gently rock the bag from side to side. It will be cold!
- Continue rocking the bag until the contents of the quart bag have solidified. Eat and enjoy!

### STEM Concepts Explained

Just like we use salt on icy roads in the winter, salt mixed with ice in this case also causes the ice to melt. When salt comes into contact with ice, the freezing point of the ice is lowered. The lowering of the freezing point depends on the amount of salt added; the more salt added, the lower the temperature will be before the salt-water solution freezes. For example, water will normally freeze at 32°F. A 10% salt solution freezes at 20° F, and a 20% solution freezes at 2° F. When salt is added to the ice (or snow), some of the ice melts because the freezing point is lowered. As heat must be absorbed by the ice for it to melt, the heat that causes the melting comes from the surroundings (the warmer cream mixture). By lowering the temperature at

which ice is frozen, you were able to create an environment in which the cream mixture could freeze at a temperature below 32° F into ice cream.

### **STEAM Extensions**

- Have kids practice their math skills by doubling, tripling, and halving the recipe.
- Have kids make your grocery list for this activity by figuring out how much milk and sugar you'll need to buy for 20 kids (or however many you expect at your program) to each make a bag of ice cream.
- Invite kids to come up with a name for their ice cream creation; take it further by having them design a package, and even a marketing campaign.
- Have kids use a thermometer to measure the temperature of the ice cream ingredients before and after shaking with the rock salt and ice.

### **A Note on Dietary Restrictions, Allergies, and Preferences**

This recipe can be adapted in a number of ways as needed:

- Dairy free: try substituting soy, rice or almond milk for dairy milk
- Sugar free: try swapping a sugar substitute for the sugar
- Gluten free: the basic recipe already is! Just avoid mix-ins with gluten

### **Alternative Mixing Methods**

One alternative to the plastic baggie method is to use empty coffee cans. Place the ice cream ingredients in a standard size coffee can and seal with the plastic lid, then place that can inside a larger coffee can. Pack the large can with ice and salt, and seal with the lid. Have the children roll the can back and forth on the floor until the ice cream is set.

Another option is to place the ice cream ingredients in empty water bottles, secure the lids, and mix well by shaking them. Then, cut half way around an empty gallon milk jug near the handle; place the water bottle (or two) inside and add the rock salt and ice cubes. Seal the cut well with duct tape, then shake away.