ACTIVITY 6: MAKING ICE CREAM IN A BAG USING SCIENCE

The purpose of this activity is for students to apply the science of **freezing point depression** to generate an ice water system that's cold enough* to freeze dairy and make ice cream.

Materials Needed:

- zipper-lock quart freezer bags
- zipper-lock gallon freezer bags
- 3-5 cups of ice
- 3 teaspoons vanilla extract
- 2 tablespoons of sugar
- 1/4 cup coarse kosher salt
- 1/2 cup whole milk
- 1/2 cup heavy cream
- sundae toppings
- plastic cups & spoons
- measuring cups and spoons

First, inform students that they will be working with a partner to apply what they learned about freezing point depression in **Activity 5** to make ice cream in a bag. Provide them the materials.

Then, have students add the heavy cream, whole milk, vanilla extract and sugar to the quart bag and tightly seal it. Direct them to eliminate as much air from the bag when sealing as possible.

Next, have students add ice and salt to the gallon bag, and gently mix the two together, before putting the sealed quart bag inside the gallon bag and tightly sealing the gallon bag shut with everything inside. Direct them to not eliminate air from the gallon bag when sealing it shut. Have students gently shake, flip, and knead the gallon bag for about 5 minutes. They should notice that the bag will get colder to the touch as they experienced in **Activity 5**. They can use a towel, gloves, or take turns shaking the bag when it is too cold to the touch.

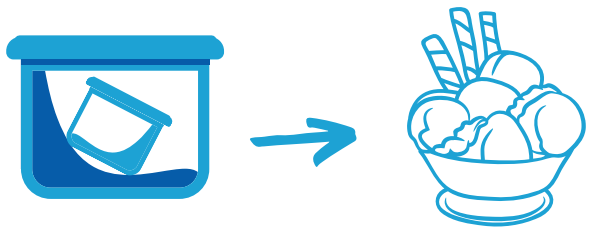

Image Credit: Gary Abud, Jr.

Last, have students determine when their ice cream is frozen** enough to their liking. For a traditional firmer "scoop" ice cream, they might want to shake it a little longer; however, for a more "soft serve" style ice cream they might prefer to stop shaking the bag earlier.

Once they are done shaking their bags, direct them to carefully remove the quart bag and wipe it off before opening it and pouring the ice cream out into containers to eat. This is to reduce the chances of getting salt water into their ice cream.

Students can split their ice cream into two servings, add toppings, and enjoy with their partner.

Once done cleaning up, ask students to draw a particle diagram and provide a written explanation to show what happened in the ice cream experiment.

**Note: the freezing point of water at sea level is 32°F and the freezing point of cream at sea level is 27°F. Typical ice would not be cold enough to freeze the dairy in this experiment and produce ice cream, which is why the salt must be added to depress the freezing point and make the system colder.*

***If the ice cream is not freezing, students may have neglected to add salt to their ice or may need more salt for that amount of ice.*