

cooking with chemistry

DIY PLASTIC BAG ICE CREAM

Have you ever made homemade ice cream? It can be a lot of fun, and you end up with a tasty frozen treat for summer! A lot of interesting chemistry is actually needed to make ice cream. For example, think about how you start out with refrigerated (or even room-temperature) ingredients and then need to cool them down to turn them into ice cream. In this chemistry experiment, you will get to make your own ice cream in a bag and test out a method to chill the ingredients and make them into a delicious reward!

Background

To make ice cream, the ingredients—typically half and half or milk, sugar and vanilla extract—need to be cooled down. One way to do this is by using salt. In really cold places, trucks often spread salt on the streets in the wintertime to prevent roads from getting slippery after snow or ice. Why is this? The salt lowers the temperature at which water freezes (turns from liquid to solid), so with salt, ice will melt even when the temperature is below the normal freezing point of water.

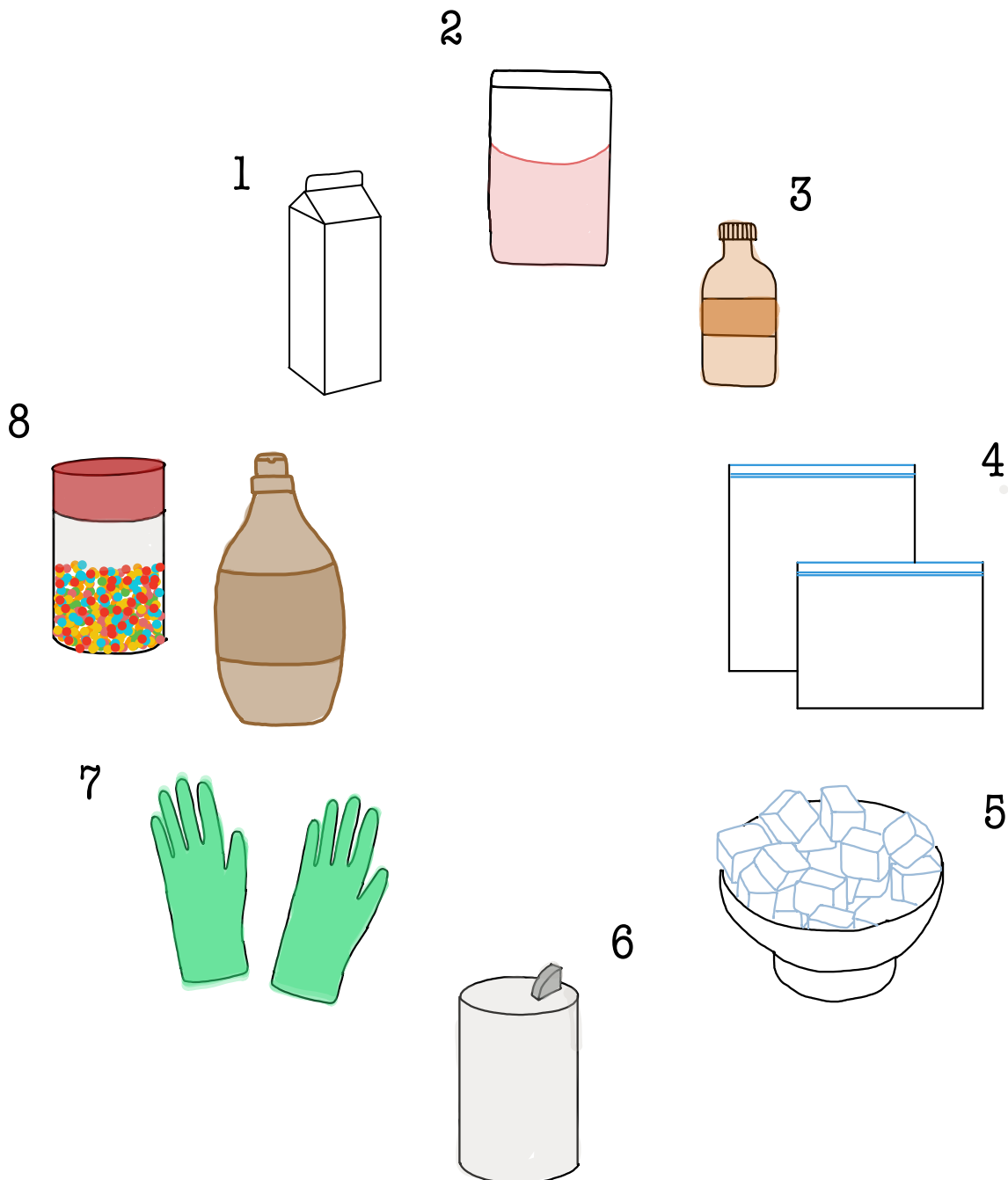
When a freezing point is lowered, such as by adding salt to water, the process is called freezing-point depression. An example of this is a certain amount of pure water freezing at 0°C . When a certain amount of salt is added, the water-salt mixture may freeze at -7°C , meaning it will stay a liquid until then. As we'll see in this activity, freezing-point depression is not unique to solutions made of water and salt; it also happens with other solutions. (A solution is made when a substance, such as salt, is dissolved and becomes a solute. The substance into which it is dissolved is a solvent—typically a liquid, like water.)

This Experiment

Similar to the roads, salt will be added to ice to surround the bag with the ice cream ingredients. As said before, when the salt is added, some of the ice will melt as the freezing point is lowered. However, since some heat is needed to melt the ice, it will be taken from the ice cream mixture. As heat is removed from the ice cream, it will start to solidify or freeze. Now that we know the basics, let's start the experiment!

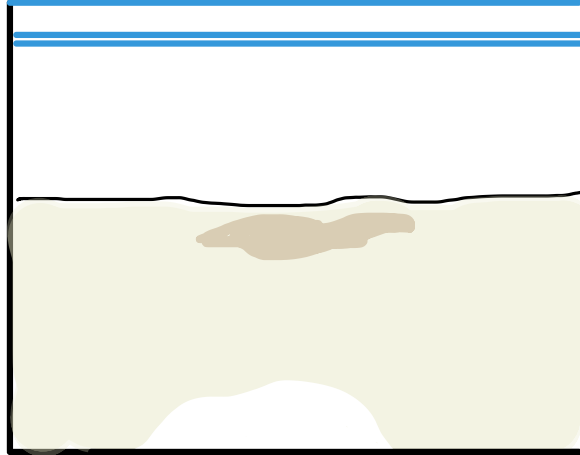
Materials

1. 1/2 cup of half and half (milk or heavy whipping cream can be used)
2. 1 tablespoon of sugar
3. 1/4 teaspoon of vanilla
4. 1 or 2 quart sized sandwich baggies and 1 gallon sized sandwich baggie
5. 6 cups of ice
6. 1/2 cup of salt (rock salt works best but table salt can also be used)
7. gloves (optional but recommended)
8. sprinkles/chocolate syrup/other sundae toppings (optional)

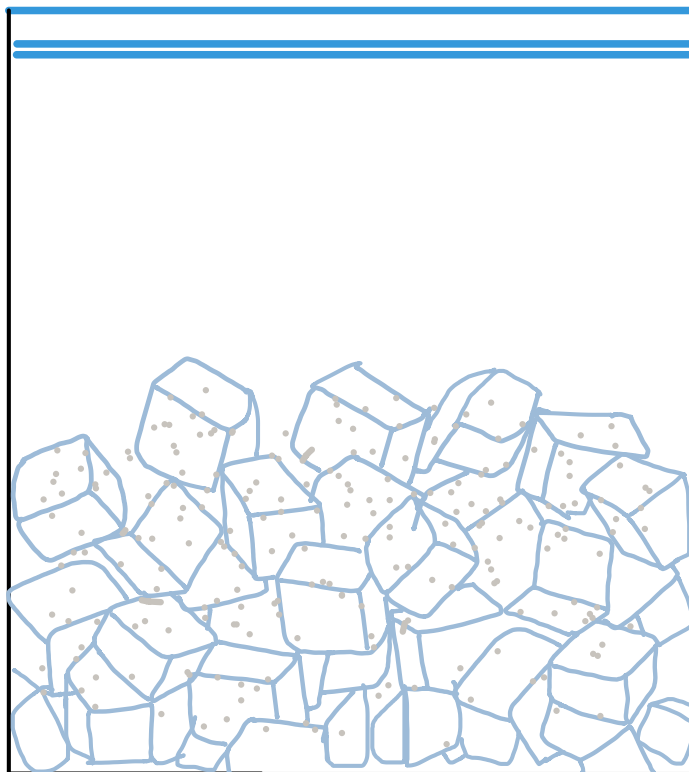


Procedure

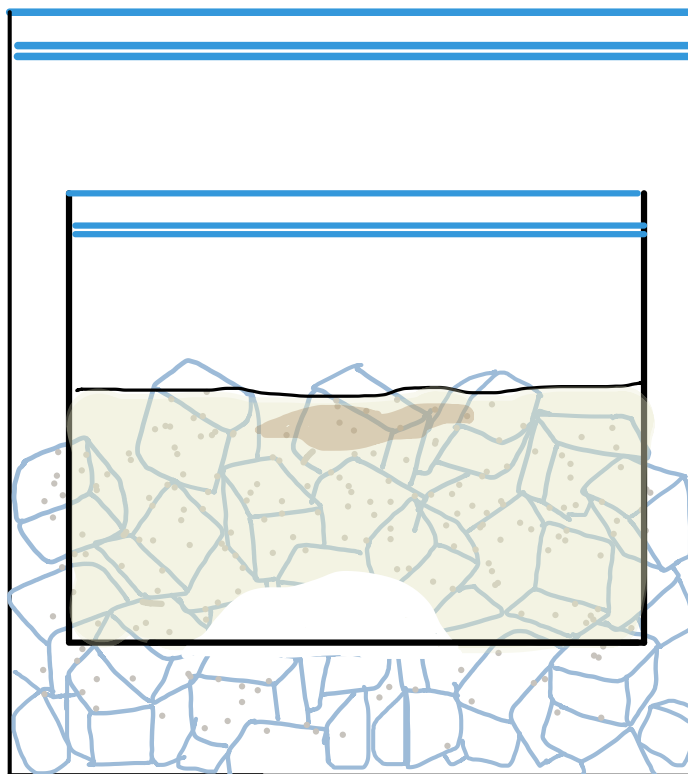
1. Measure out the half and half, sugar, and vanilla into a quarter sized sandwich baggie. Seal the bag firmly and get any excess air out. Put this bag into another quart sized baggie to ensure no leakage if wanted.



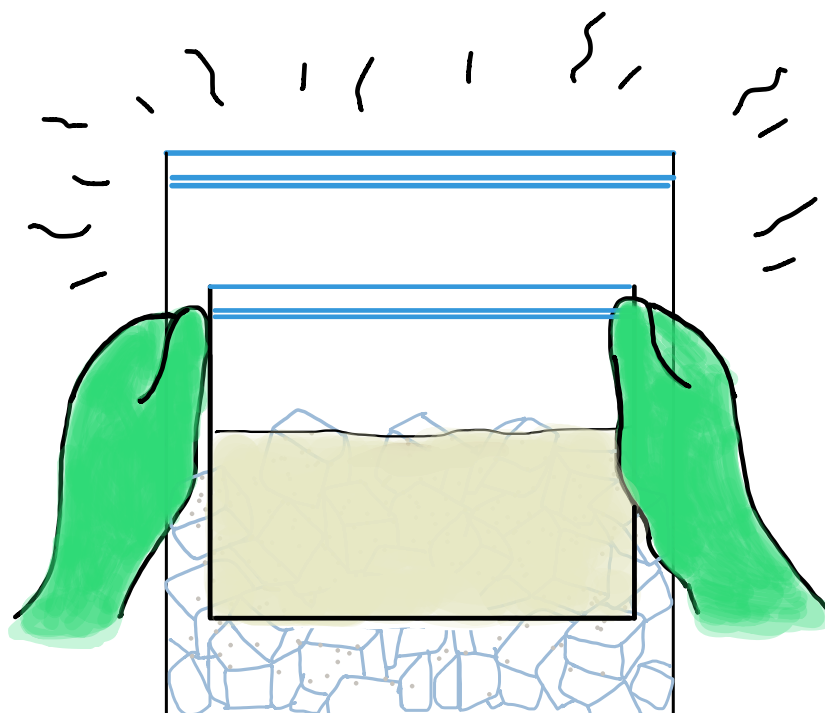
2. In a gallon sized sandwich baggie, add 5 cups of ice. Then, add 1/2 cup of salt. Try and pour it evenly over the ice.



3. Put the small bag containing the cream, sugar, and vanilla into the large bag with the ice and salt. Seal the large bag very tightly to ensure no leakage.



4. Put the gloves on and shake the bags for 10 to 20 minutes. The longer you shake the more solid the ice cream will be! The gloves are recommended since the salt makes the ice extra cold.



5. After you have checked that the consistency of the ice cream is right, take out the smaller bag from the ice bag. Cut a corner off of the bag and squeeze the ice cream into a bowl. Top with sprinkles, chocolate syrup, or any other toppings. Now grab a spoon and enjoy your creation!



