

Dry Ice Root Beer

Prepare your class with a demonstration or class activity to show sublimation and/or solubility of a gas in a liquid. This activity is done as a demonstration!

Materials:

- 5 gallon container (those orange Rubbermaid ones with a spigot are perfect)
- 5 pounds sugar
- 5 gallons water
- 1 bottle root beer extract
- 5 pounds or so of dry ice

Procedure

Put water in container. If you can use cold water, that's great. Add sugar and extract. Mix well. This makes enough for about 200 3 oz. cups of root beer. At this point it would be a good idea to pour out enough root beer for one or two classes into a smaller container and carbonate the root beer for one or two classes at a time. You need about 1 pound of dry ice per gallon of root beer mix. When you are ready, add the dry ice to the root beer mixture. The students will enjoy watching it bubble, etc. and you can use the wait time to discuss sublimation and solubility of gas in a liquid. Serve the root beer in 3 oz.cups and have the students answer the following questions while they drink.

Suggested questions:

1. How do you know that the dry ice sublimates and doesn't go through the liquid phase first?
2. What is the gas that dry ice emits?
3. What would be another way to carbonate a drink?
4. You are drinking an acid in your cup. How did it become an acid?
5. Has this changed your attitude about acids? Explain your answer.

Alternate Plan: STUDENTS MAKE THEIR OWN INDIVIDUAL CUP OF Root beer
SO THEY GET PRACTICE IN CONVERSIONS AND MEASURING AS WELL AS
LEARNING ABOUT SUBLIMATION

Materials

- 7 gallon container (those orange 10 Gallon Rubbermaid ones with a spigot are perfect)
- 5 pounds sugar (if you don't have a container this large, just reduce the quantities proportionally)
- 5 gallons water
- 1 bottle root beer extract
- 5 pounds or so of dry ice
- graduated cylinders
- paper towel

3 oz cups (one per person)
balances
spoons or straws to stir with

Procedure

1. Mix water and root beer extract together in a five gallon container.
2. Give each student a 3 oz cup
3. Have students figure out how much root beer/water mixture they need to put in their cup. You can give them the following conversions:
454 grams = 1 pound
1 gallon = about 20,000 ml (or one liter =1,000ml, one quart is about 1 liter, one gallon = 4 quarts, 1 liter = 32 ounces if you're brave)
4. From the above conversions, students should be able to figure out that they need 93 ml of the water/root beer mixture, 10.7 grams of sugar, and 10.7 or so grams of dry ice.
5. Have students measure water/root beer mixture into their cup, measure the sugar, add to water mixture and stir, and then add dry ice to their cup.
6. After discussing sublimation and solubility of gas in a liquid, have students answer the following questions on their own paper.

Conclusion questions

1. How do you know that the dry ice sublimates and doesn't go through the liquid phase first?
2. What is the gas that dry ice emits?
3. What would be another way to carbonate a drink?
4. You are currently drinking an acid in your cup. How did it get that way?
5. Has this changed your attitude about acids? Explain your answer.

Safety concerns:

Teachers and students, be sure to keep all Chemical Safety Rules that are specified by your teacher and in all general laboratory experiences.