Hot Ice Sculptures

Student Worksheet

Name_____

Overview: Become an artist and make a masterpiece out of ice! Sound too easy? How about using hot ice instead!

What to Learn: You will know that sodium acetate, commonly found in disposable hand warmers, is actually a supercooled liquid. That means in order to get to its freezing temperature, it first has to heat up!

Materials

- Sodium acetate (found in disposable hand warmers such as "EZ Heat") (MSDS)
- Disposable aluminum pie plate

Lab Time

1. Flex the disc in one packet of EZ Heat. Observe, allowing all the crystals to form.
2. Put on gloves and open the packet with a pair of scissors.
3. Take out one crystal and place it in a disposable aluminum pie plate. Set aside the EZ Heat packet.
4. Snip the corner of a fresh, unused packet of EZ Heat, so only a thin stream of liquid can be poured out.
5. Stream sodium acetate onto the pie plate. Make a sculpture, your very own sodium acetate icicle! (Be careful as this will get very hot!)
6. To reuse sodium acetate: Put in an old saucepan (one that is no longer used for cooking!), heat on stove using low heat for about 5 minutes, stirring occasionally. Let come to room temperature before repeating the experiment.

Exercises Answer the questions below:

1. Explain why supercooling was important to this experiment.

2. Why does EZ Heat feel warm if it's at the *freezing point* of sodium acetate?

3. Why did you need to put a crystal of sodium acetate in the pie pan before you poured the liquid sodium acetate into it?

4. It took energy for sodium acetate to go to a liquid, but it gave off energy as it heated up to its freezing point. This energy transfer is the same thing that happens in our Earth. Explain how energy transfer could happen with water as it goes from a solid to a liquid and vice versa.

Exercises

1. Explain why supercooling was important to this experiment. (The sodium acetate was supercooled, so it had to warm up again to get to its freezing point.)
2. Why does EZ Heat feel warm if it's at the *freezing point* of sodium acetate? (The freezing point of sodium acetate is very warm … 140°F! Energy is given off as it heats up to its freezing point.)
3. Why did you need to put a crystal of sodium acetate in the pie pan before you poured the liquid sodium acetate into it? (The crystal activated the crystallization process so that the sodium acetate would instantly turn to a solid as it was poured into the pan.)
4. It took energy for sodium acetate to go to a liquid, but it gave off energy as it heated up to its freezing point. This energy transfer is the same thing that happens in our Earth. Explain how energy transfer could happen with water as it goes from a solid to a liquid and vice versa. (Answers may vary. Ice can melt in one place, taking in heat, then flow to another where it freezes again and gives off heat.)

Closure: Before moving on, ask your students if they have any recommendations or unanswered questions that they can work out on their own. Brainstorming extension ideas is a great way to add more science studies to your class time.