

Hot Liquids and Cool Solids

Student Worksheet

Name _____

Overview: Let's make some hot stuff, make some cold stuff, then combine them together to make it snow inside our test tube!

What to Learn: You should understand that an exothermic reaction produces heat, and an endothermic reaction absorbs heat.

Materials

- calcium chloride, CaCl_2 (AKA: "ice melt" or "Dri-EZ") ([MSDS](#))
- sodium carbonate, Na_2CO_3 (AKA: "washing soda") ([MSDS](#))
- two disposable cups
- two test tubes with caps
- medicine dropper
- distilled water
- goggles
- gloves

Lab Time

1. Put on eye protection and gloves. Cover your work surface with a disposable covering.
2. Mix up a saturated solution of calcium chloride in one test tube and a saturated solution of sodium carbonate in the other. Here's how to do this:
 - a. Add a few tablespoons of water in a disposable cup.
 - b. Sprinkle 1 teaspoon of calcium chloride into the water and stir, dissolving as much of the solid into the water as possible.
 - c. Add more calcium chloride until you see bits of it at the bottom that refuse to dissolve.
 - d. Now pour only the liquid into your test tube; the liquid is your saturated solution.
 - e. Do the same for the sodium carbonate.
3. Do the test tubes feel hot or cold? Record findings in your data table.
4. Pour one test tube into another. Record these results in your data table.

Hot Liquids and Cool Solids Data Table

Chemical	Observations
calcium chloride solution (CaCl_2)	
sodium carbonate solution (Na_2CO_3)	
calcium chloride + sodium carbonate ($\text{CaCl}_2 + \text{Na}_2\text{CO}_3$)	

Exercises Answer the questions below:

1. Which chemical caused an exothermic reaction? How do you know?
2. What is an endothermic reaction?
3. In chemistry, a precipitate is a solid that appears to “fall out” of a solution. What were the precipitates in this experiment?

Exercises

1. Which chemical caused an exothermic reaction? How do you know? (Calcium chloride, because when dissolved in water, it produced heat.)
2. What is an endothermic reaction? (A chemical reaction that absorbs heat, making it feel cold.)
3. In chemistry, a precipitate is a solid that appears to “fall out” of a solution. What were the precipitates in this experiment? (Sodium chloride and calcium carbonate.)

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.