

## Where's the Evidence?

### Problem

What are some signs that a chemical reaction has taken place?

### Skills Focus

observing, predicting, drawing conclusions

### Materials

4 small plastic cups	birthday candles
2 plastic spoons	sugar
tongs	clay
matches	sodium carbonate (powdered solid)
graduated cylinder, 10 mL	
aluminum foil, about 10-cm square	
dilute hydrochloric acid in a dropper bottle	
copper sulfate solution	
sodium carbonate solution	

### Procedure



*Review the safety guidelines in Appendix A of your textbook.*

Preview the steps for each reaction. Be sure to record your data in the data table.

### Part 1

1. Put a pea-sized pile of sodium carbonate into a clean plastic cup. Record the appearance of the sodium carbonate in the data table.
2. Observe a dropper containing hydrochloric acid. Record the appearance of the acid in the data table. **CAUTION:** *Hydrochloric acid can burn you or anything else it touches. Wash spills with water.*
3. Make a prediction about how you think the acid and the sodium carbonate will react when mixed. Record your prediction in the data table.
4. Add about 10 drops of hydrochloric acid to the sodium carbonate. Swirl to mix the contents of the cup. Record your observations in the data table.

**Chemical Reactions ▪ Skills Lab****Part 2**

5. Fold up the sides of the aluminum foil square to make a small tray.
6. Use a plastic spoon to place a pea-sized pile of sugar into the tray.
7. Carefully describe the appearance of the sugar in your data table.
8. Secure a small candle on your desktop in a lump of clay. Carefully light the candle with a match only after being instructed to do so by your teacher. **CAUTION:** *Tie back long hair and loose clothing.*
9. Predict what you think will happen if you heat the sugar. Record your prediction in the data table.
10. Use tongs to hold the aluminum tray. Heat the sugar slowly by moving the tray gently back and forth over the flame. Make observations while the sugar is heating.
11. When you think there is no longer a chemical reaction occurring, blow out the candle.
12. Allow the tray to cool for a few seconds and set it down on your desk. Record your observations of the material left in the tray.

**Part 3**

13. Put about 2 mL of copper sulfate solution in one cup. **CAUTION:** *Copper sulfate is poisonous and can stain your skin and clothes. Do not touch it or get it in your mouth.* Put an equal amount of sodium carbonate solution in another cup. Record the appearance of both liquids in the data table.
14. Write a prediction of what you think will happen when the two solutions are mixed. Record your prediction in the data table.
15. Combine the two solutions and record your observations. **CAUTION:** *Dispose of the solutions as directed by your teacher.*
16. Wash your hands when you have finished working.

**Chemical Reactions** ▪ *Skills Lab***Where's the Evidence?** *(continued)***Data Table**

Reaction	Observations Before Reaction	Predictions	Observations During Reaction	Observations After Reaction
1. Sodium carbonate (powder) + hydrochloric acid				
2. Sugar + heat				
3. Copper sulfate + sodium carbonate solutions				

**Analyze and Conclude**

Write your answers in the spaces provided.

1. **Predicting** How do the results of each reaction compare with your predictions?

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2. **Observing** How did you know when the reaction in Part 1 was over?

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3. **Interpreting Data** What was the evidence of a chemical reaction in Part 1? In Part 2?

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**Chemical Reactions ▪ Skills Lab**

4. **Observing** Was the product of the reaction in Part 3 a solid, a liquid, or a gas? How do you know?

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5. **Drawing Conclusions** How do you know if new substances were formed in each reaction?

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6. **Communicating** Make a table or chart in the space below briefly describing each chemical change in this lab, followed by the evidence for the chemical change.

**More to Explore**

Keep your data table handy as you read the rest of this chapter. As you learn more about chemical reactions, try to identify the products that formed in Parts 1, 2, and 3 of the Skills Lab. Research the physical properties of each product by using your library or the Internet. Evaluate the accuracy of your data by comparing the properties of the substances produced in the lab to the properties that you found in your research.