

Name: _____ Class: _____ Date: _____

Physical vs Chemical Change

Learner Outcomes:

- Identify conditions under which properties of a material are changed, and critically evaluate if a new substance has been produced.
- Observe and describe evidence of chemical change in reactions between familiar materials

Key Terms:

Physical Change

Chemical Change

Properties

Background Information: Physical change is one in which a material changes from one form to another, but still has the same composition. Chemical change occurs when two or more materials react, or one material reacts to produce completely different substances with different properties. To determine whether a change is chemical, or not, we look at 4 main pieces of evidence:

- Change in colour
- Change in odour
- Formation of a solid or gas
- Release or absorption of heat energy

PreLab: PHYSICAL OR CHEMICAL CHANGE?? Please provide the evidence that helped you make your choice

a) Snow melting:

b) Alka-Seltzer tablet in water:

c) Water boiling:

d) Yellow cloud formation:

e) Leaves changing color:

This investigation / activity has been adapted from:

Mah K, Martha J, McClelland L, et al. *Science in Action 9*. Toronto, ON: Addison Wesley.

Investigating Physical and Chemical Change

Research Question: What are some of the characteristics of physical changes and chemical changes?

Hypothesis:

Evidence of a physical change would be...

Evidence of a chemical change would be...

Materials:

250 mL beaker

5 mL measuring spoon

stirring rod

3 test tubes

test tube holder

tongs

sodium carbonate

hydrochloric acid

aluminum foil

sugar

candle

matches

sodium carbonate solution

copper(II) sulfate solution

copper (II) sulfate solid

Procedure:

- Read each of the following procedural steps and make predictions about what you think you will observe before conducting the experiment.

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Sodium carbonate and hydrochloric acid

1. Put a pea sized sample of sodium carbonate into a small beaker and record your observations.
2. Observe and record the characteristics of a small sample of hydrochloric acid.
3. Add 8 drops of hydrochloric acid to the sodium carbonate and record your observations.

Sugar and heat

1. Observe and record the characteristics of a small sample of sugar.
2. Place a pea sized sample of sugar into an aluminum foil cup.
3. Using tongs to lift the foil cup, carefully heat the sugar over a candle flame. Record your observations.
4. Set the foil cup aside to cool before disposal.

Copper(II) sulfate and sodium carbonate

1. Place 5 mL of copper (II) sulfate solution into a test tube and record your observations.
2. Place 5 mL of sodium carbonate solution into a second test tube and record your observations.
3. Carefully combine the two solutions by pouring the sodium carbonate into the copper (II) sulfate solution and record your observations.

Copper (II) sulfate and water.

1. Place a pea sized sample of solid copper(II) sulfate in a clean test tube and record your observations.
2. Add 15 mL of water to the test tube and mix gently with a stirring rod. Record your observations.

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Observations:

Change	Observations before change	Predictions	Observations during change	Observations after change	Type of Change physical or chemical
Sodium carbonate and dilute hydrochloric acid					
Sugar and Heat					
Copper (II) sulfate and Sodium Carbonate					
Copper (II) sulfate and water					

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Analysis:

1. In the examples you investigated, how did you know whether a new substance was produced or not?
2. What observations helped you identify a physical change?
3. What observations helped you identify a chemical change?
4. Which of the changes you observed could be easily reversed? How?
5. If a change could be reversed, was it physical or chemical? Explain.
6. Are changes in matter necessarily chemical changes?

Conclusion: summarize the characteristics of physical and chemical changes

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Extension:

1. What evidence of chemical change would you see in the following situations?
 - a. Combustion of a fuel
 - b. Corrosion or rusting of a metal
 - c. Neutralization of
2. Select 5 household materials you currently have in your own home and describe how each of these materials might undergo a chemical change. Describe the evidence you would see to know that the change was chemical and not physical
3. Identify and describe 5 examples of chemical changes that you feel are useful to you personally or to society in general. What characteristics or properties of these changes makes them useful?

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