

What Do You Remember?

- Describe several clues that tell you that you are observing a chemical change. Give an example to illustrate each clue you described. (5.3) **K/U**
- Describe several physical changes that can be made to a silver spoon. Explain why each is a physical change. (5.2) **K/U**
- List three quantitative characteristic properties of water. Explain why they are considered characteristic. (5.6) **K/U**
- Explain how the unique properties of water allow it to support life in frozen lakes and ponds during our Canadian winters. (5.6) **K/U A**
- What does WHMIS stand for? (5.4) **K/U**
- Sketch and describe the WHMIS symbol for each of the following hazards: (5.4) **K/U C**
 - explosive
 - poisonous and infectious, causing immediate and serious toxic effects
 - corrosive
 - flammable

What Do You Understand?

- Classify each of the following properties of a cake as qualitative or quantitative. Give reasons for your answers. (5.2) **K/U**
 - It is circular in shape.
 - Its mass is 1.5 kg.
 - It tastes like chocolate.
 - It is 30 cm in diameter.
 - Its icing is melting.
- Adding salt to ice melts the ice at a lower temperature than the normal melting point of ice. Explain what changes occur in the process that causes ice to change to water, with and without the presence of salt. (5.6) **K/U**
- Density is considered a characteristic property of a substance. Explain why its value is stated at a specified temperature. (5.6) **K/U**
- Classify each of the following changes as physical or chemical. Give reasons for your answers. (5.2, 5.3) **K/U**
 - When molasses is warmed, it becomes less viscous.
 - When a chair is painted, it has a new colour.
 - When sugar is stirred into hot water, it dissolves.
 - When egg whites are cooked, they become opaque.
 - When wood is sawed, some of it changes to sawdust.
 - When wood is burned, ashes remain.
 - When vinegar is added to baking soda, bubbles are seen.

Solve a Problem

- When a sample of blue crystals is heated, a vapour is given off and a white powder remains. Analyze whether a physical or a chemical change occurred. Give reasons for your answer. (5.2, 5.3) **K/U**
- When an opaque beige solid is heated, a clear colourless liquid is formed. When this liquid is cooled, it returns to being an opaque beige solid. Analyze whether a physical or a chemical change occurred. Give reasons for your answer. (5.2, 5.3) **K/U**
- Iron pyrite is a lustrous yellow mineral that consists of iron and sulfur (Figure 1). Its common name is fool's gold. Design a procedure to measure one of its characteristic physical properties so that you can distinguish it from real gold. (5.6) **T/I**



Figure 1 Iron pyrite (fool's gold) looks similar to gold.

14. You have learned that adding salt lowers the freezing point of ice. You hypothesize that adding salt will also have an effect on the boiling point of water. To test your hypothesis, you plan to take the temperature of a beaker of salt water every minute as it is heated, until it boils. (5.5, 5.6) **T/I**
- Identify your independent variable and your dependent variable.
 - Explain all the variables that you will control and how you will control them.
 - How will you label the axes of the graph you will plot to analyze your results?
 - If your results do not support your hypothesis, does that mean your investigation was not successful? Explain.
15. Phone books are updated and changed every year or two. Old phone books pose a massive disposal problem. (5.2, 5.3)
- Research your local recycling program to find out the options available for disposal of your old phone books. **T/I**
 - Brainstorm with a partner to come up with other environmentally acceptable methods of reducing, reusing, or recycling phone books. **K/U T/I A**
16. Calculate the mass of a liquid with a density of 2.3 g/mL and a volume of 30 mL. (5.6) **T/I**
17. An irregular object with a mass of 12 kg displaces 1.75 L of water when placed in an overflow container. Calculate the density of the object. (5.6) **T/I**
18. A piece of wood that measures 3.2 cm by 5.7 cm by 7.3 cm has a mass of 100 g. What is the density of the wood? Would it float on water? (5.6) **T/I**
19. A plastic ball has a mass of 150 g. If the density of the ball is 0.80 g/cm³, what is its volume? (5.6) **T/I**

Create and Evaluate

20. Gourmet cooking is the art of blending physical and chemical changes into tasty and nutritious concoctions. As a scientist and chef, your task is to create a scientific recipe that explains the type of change involved in the cooking instructions. Select one of your own recipes that requires baking, or use the following recipe. (5.2, 5.3) **T/I A**

Quiche Me Quick

- slice 4 cups of mushrooms and dice 2 onions and 2 green peppers
 - cook the vegetables in a frying pan with a little oil until just tender
 - beat 10 eggs until light and bubbly
 - grate 2 cups of cheddar cheese
 - cook 8 strips of bacon until crispy, then crumble into small pieces
 - mix all ingredients with 1 cup of milk and $\frac{1}{2}$ teaspoon of salt
 - bake in a large pie dish at 175 °C until firm to the touch (about 50 min)
- Design your scientific recipe so that it is informative, attractive, easy to understand, and clearly explains the type of change (physical, chemical, or both) for each step. **T/I**
 - Evaluate and compare the importance of following instructions closely in physical changes and in chemical changes in the recipe. **T/I**
 - Create a recipe of your own that involves only physical changes and no chemical changes. Give your recipe a descriptive name. **T/I C**

Reflect on Your Learning

21. How does the phrase “there are two sides to every coin” apply to the use of common chemicals and their impact on society and the environment? Support your answer with specific examples. **A**

Web Connections

22. (a) Why is the use of road salt in winter impractical in many northern communities? (5.6, 5.7) **A**
- (b) What other substance could be used to improve road safety? (5.7) **A**
23. Research and report on the use of lead and lead poisoning. (5.1) **T/I A**
- What were common uses of lead in the past?
 - What properties of lead made it suitable for each use?
 - What are the symptoms of lead poisoning?



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