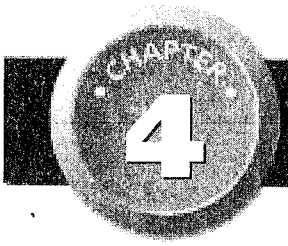

Chapter Review

Key Ideas Summary

- Use the Key Ideas Summary to review what has been learned. After reading each key idea, have students discuss, in pairs, what they remember about the topic.
- Paraphrasing is a very useful way of checking for understanding. Model for students how to paraphrase, and then ask students to work with a partner to paraphrase the key ideas.
- Revisit the KWL Chart you began with students at the beginning of the unit by asking them to share the answers to their "Wonder" questions. Call on volunteers to retell each text section. Have students use the information in their KWL charts to write brief summary statements.
- Discuss with students how using the KWL strategy helped them understand and appreciate the chapter. Encourage them to share any other reading strategies that helped them understand what they read. Direct attention to the last column in the chart and ask, *What questions do you still have about why different things sink or float? What would you like to explore further?* Record students' responses on the board in the form of a list. Then ask, *Where do you think you might be able to find this information?*
- Have students complete *BLM 4.0 Chapter 4 Quiz* to review the vocabulary and concepts presented in the chapter.

Time

60–90 min

Vocabulary

- hydrometer

Skills and Processes

The Chapter Review provides an opportunity for students to demonstrate their understanding of and their ability to apply the key ideas, vocabulary, and skills and processes.

Program Resources

BLM 4.0 Chapter 4 Quiz
Rubric 14: Research
Nelson Science Probe 7 Web site
www.science.nelson.com

Review Key Ideas and Vocabulary—Suggested Answers

1. Answers will vary. Students may refer to colour, taste, texture, odour, lustre, and clarity in their descriptions. For example, the student book is smooth, does not have an odour or taste, is very colourful, is mostly blue and white, and is shiny.
2. Answers may vary. Some properties that require measurements are melting, boiling, and freezing points.
3. **a)** To measure the volume of a ring, you would need a graduated cylinder and some water. You should use a graduated cylinder half filled with water, and the displacement method, to measure the volume. You would measure the volume of water in the cylinder before and after the ring was placed in the water and then use the formula

   Volume of solid = (volume of water + solid) − volume of water

   to determine the volume of the ring.

b) To measure the mass of a sample of liquid, you would need a container and a scale. You would first measure the mass of the dry, empty container. Then you would place the sample of liquid in the container and you would find the mass of the container and the liquid. The mass of the liquid is calculated using the formula

Mass of liquid = (mass of container + liquid) − mass of container

c) To measure the volume of a cement block, you would need a measuring tool, such as a ruler or metre stick. You should measure the length, width, and height of the block, and then calculate the volume using the formula

Volume = length × width × height

d) To measure the mass of a stone, you would need a balance or a scale. You could then measure the mass of the stone directly.

e) To measure the volume of a sample of liquid, you would need a graduated cylinder. Using the cylinder, you should gently pour the liquid into the graduated cylinder. You should then be at eye level with the meniscus, and read the volume at the bottom of the meniscus.

4. Density is the mass per unit volume of a substance. Density is a property of matter that can be calculated. Each substance has its own unique density. For instance, copper has a density of 8.92 g/mL, and pure water has a density of 1.00 g/mL. An object's density remains relatively constant, so density is a property of matter that can be used to identify a substance.

Use What You've Learned—Suggested Answers

5. Because vinegar and water look the same, you could not use sight to tell them apart. Observable properties that you could use to tell them apart include taste and odour. Measurable properties that you could use to tell them apart include melting point, boiling point, and density.

6. If a substance is solid at room temperature, its melting point must be greater than 20°C.

7. Ethanol would be better to use in an outdoor thermometer in the Arctic; it has a greater range of temperature, which is well suited to the Arctic. The climate is very dry and cold. Mean daily winter temperatures range from –40°C to –50°C in the long winters, and the daily temperatures are between 5°C and 10°C in the short summers. Mercury would become a solid much more easily than ethanol would in the Arctic. If temperatures went below –38.9°C, the mercury would freeze and the thermometer would not be functional.

8. a) 1 L of apple juice is larger.

b) 0.5 kg of laundry soap is larger.

c) 50 L of water in a bathtub is larger.

d) 2 kg of potatoes is larger.

9. Mass of liquid = (mass of container + liquid) – mass of container
mass of liquid = 475 g – 250 g
= 225 g

The mass of the liquid is 225 g.

10. length = 11.0 m
width = 9.0 m
height = 3.0 m

Volume = length × width × height
volume = 11.0 m × 9.0 m × 3.0 m
= 297 m^3

The approximate volume of air in the classroom is 297 m^3.

11. Volume of solid = (volume of water + solid) – volume of water
volume of solid = 57 mL – 40 mL
= 17 mL

The volume of the stone is 17 mL.

12. **a)** If you tried to use displacement of water to determine the volume of a sugar cube, the sugar cube would dissolve in the water. You could measure the sugar cube and apply the following formula:

Volume = length × width × height

b) Answers may vary. Students may indicate that the volume of any object that would dissolve in the liquid could not be measured using the displacement method. It would also be difficult, if not impossible, to measure the volume of very large objects (e.g., large oil tanker) using the displacement method.

13. A large overflow tub could be used to measure the volume of your body. Fill the tub with water until water just starts flowing out of the overflow tube. Then gently lower yourself into the tub, and catch the water that flows out when you completely submerge yourself. The volume of water that flows out of the tub will equal the volume of your body.

14. The balance would stay level if the ice cube were allowed to melt. The mass of the water will be the same as the mass of the ice cube. (Some students may estimate, looking at the drawing, that some of the water from the melted ice cube would overflow the pan. If this happened, the mass of the remaining water would be smaller than the mass of the ice cube, and the balance would tilt.)

15. Individual student answers will vary. To extract grease from eulachons, the fish are allowed to decompose in canoes, chests, or pits for one to two weeks. Then, the fish are placed into hot water and heated for 30 minutes. During this process, oil is released from the fish. The resulting oil is skimmed off the surface of the water. Eulachon oil is less dense than water and floats on the surface, making it easy to skim off. The oil is strained, cooled, and heated again until it turns clear. The finished oil is then stored.

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16. Students' answers will vary. A hydrometer is a device used to measure the densities of liquids. Because each liquid has its own density, a measuring tool will float at different heights in different liquids. A hydrometer can be calibrated to the height at which it floats in a variety of liquids. The hydrometer works on the principle that an object displaces an amount of liquid equal to its own weight. If the density of the liquid is great, the hydrometer floats higher, because it must displace less liquid to equal its own weight. If the hydrometer floats deeper, it is in a liquid of lower density. In industry, hydrometers are used to test liquids such as antifreeze, battery acid, and maple syrup. A hydrometer is used to monitor salt concentration in marine aquariums.

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Think Critically—Suggested Answers

17. Students should disagree with the statement that solids are always denser than liquids. Not all liquids are less dense than solids. For example, mercury (a liquid) is denser than most metals, except for gold. Another example is solid ice floating on water. If the statement that solids are always denser than liquids were true, then the ice would sink if it were placed in water. The normal pattern for most compounds is that as the temperature of a liquid increases, the density decreases as the molecules spread out from each other. As the temperature decreases, the density increases as the molecules become more closely packed. This pattern does not hold true for ice, because the exact opposite occurs.

Reflect on Your Learning—Suggested Answers

18. Answers may vary. Students may include such ideas as the following (suggesting that their thinking has changed):
    - You can use your senses to observe and describe matter.
    - All matter has mass and occupies space (has volume).
    - All matter has a freezing point and a boiling point.
    - The freezing point and boiling point of substances are unique.
    - Some liquids are less dense than solids.
    - Density is not the same as mass or weight.
    - Some materials may float in one liquid but sink in another liquid.