Chapter 6 Review

Key Ideas Summary

- The Key Ideas Summary follows the sequence of the chapter and indicates the relevant pages where new vocabulary is introduced. Students can refer back to these pages for additional information.
- Ask students to write each key idea in their notebook. Beside each key idea, ask them to create labelled diagrams or sketches using the vocabulary words that illustrate the idea.
- Paraphrasing is an important way of checking for understanding. Model with the class and then ask students to work with a partner to paraphrase the key ideas.
- Students started a graphic organizer in Section 6.1 of this chapter and completed it as new concepts were introduced (see Learning Tips). Students can use this organizer to synthesize some of the information they have learned in this chapter.
- Have students complete *BLM 6.0 Chapter 6 Quiz* to review the vocabulary and concepts presented in this chapter.

Time

60–90 min

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 0.0-6 Three-Column Table
BLM 6.0 Chapter 6 Quiz
Rubric 14: Research
Nelson Science Probe 7 Web site
www.science.nelson.com

Review Key Ideas and Vocabulary—Suggested Answers

1. A pure substance is a substance that contains only one kind of particle. Examples include diamonds, aluminum foil, table sugar, salt, and pure water. A mixture is a substance made of two or more pure substances. Examples of mixtures include bread, soft drinks, concrete, ink, and air.
2. Elements are pure substances that cannot be broken down into any other pure substances. Examples include iron, aluminum, oxygen, carbon, etc. Compounds are pure substances that are made up of two or more different elements. Examples include water (H_2O), salt (NaCl), carbon dioxide (CO_2), sugar, alcohol, and baking soda.
3. a) Granola is a mechanical mixture because you can see different parts of the mixture with the unaided eye (nuts, oats, fruits, etc.).
   b) Orange juice is a suspension, as the orange juice concentrate and water will separate into layers if it is not stirred.
   c) Tap water is a solution because it is a mixture of different substances, such as oxygen, hydrogen, and other chemicals, that appears to be only one substance.
   d) A toonie itself is a mechanical mixture. The mixture of two different parts (inner core is gold in colour and the outside is silver in colour) can be seen with the unaided eye. The materials of which the different parts are made are solid solutions or alloys of different metals. According to the Royal Canadian Mint, the outer ring is

99% nickel and the inner core is 92% copper, 6% aluminum, and 2% nickel.

e) Farm-fresh milk is a suspension. If the milk is left standing, the fatty part of the milk rises to the top of a container and the watery part sinks to the bottom.

f) Homogenized milk is an emulsion because it is treated so that it does not separate.

g) Concrete is a mechanical mixture because you can see different parts of concrete with the unaided eye (pebbles, etc.).

h) Clear apple juice is a solution because it is a mixture of different substances, such as water, concentrated juice, ascorbic acid, etc., that appears to be only one substance.

i) Hand lotions are usually emulsions. Some are suspensions because they separate into their components if left standing.

j) Cereal and milk is a mechanical mixture because you can see the different parts of the mixture with the unaided eye (cereal and milk).

4. a) To separate sand and salt, you would add water to the mixture and dissolve the salt. The sand could then be filtered out of the mixture. To recover the salt, the water could be evaporated and the salt would crystallize. The solubility of the salt makes this separation method work.

b) To separate dust from the fluffy blanket you can shake out the blanket. This separation method works because the density of the dust is less than that of the blanket, so the dust floats in the air as you shake the blanket.

c) To separate sawdust and sand, you would add water to the mixture and make the sawdust float. The sawdust could then be filtered out using a slotted spoon or similar filter. The sand could be separated from the water using a finer filter. This separation method works because the density of the sawdust is less than that of water, so the sawdust floats, making it easy to skim off the water.

d) To separate pebbles and sand, you would pick apart the mixture using your hands (or forceps). This separation method works because of the observable properties of the pebbles—their size and shape make them easy to pick out of the mixture.

e) Flour particles are suspended in water, so they can be separated by filtering.

5. a) If a solution is saturated at 20°C, it will be *unsaturated* at 25°C.

b) This statement is correct as written.

c) When a saturated solution is cooled, some crystals begin to appear in the solution. The solution *remains saturated.*

d) A solvent is a liquid that dissolves *another substance.*

e) A solute *can be a solid, a liquid, or a gas.*

f) Oil is insoluble *in some solvents.*

6. **a)** Acidic solutions include those with pH 3 and 5.
   b) The most acidic solution is the one with pH 3.
   c) The neutral solution has pH 7.
   d) Basic solutions include those with pH 9 and 11.
   e) Sour tasting solutions include those with pH 3 and 5 (acidic solutions).
   f) The solutions most helpful in breaking down oils and fats have pH 9 and 11 (basic solutions).

Use What You've Learned—Suggested Answers

7. Mixtures differ from compounds in that compounds are pure substances; they contain only one type of particle throughout. Compounds are made of combinations of elements, but each compound has the same combination of elements throughout. For instance, water is a compound. It is made of the elements hydrogen and oxygen. Every particle of water contains both of these elements and every water particle is the same as every other particle of water. Mixtures are not pure substances; they are made up of two or more pure substances, but there may be more or less of different kinds of particles throughout a mixture.

8. Student answers will vary, but tables should look similar to the one below. Students can use *BLM 0.0-6 Three-Column Table* to answer this question.

Screen or filter	What is let through	What is held back
window screen	air	flies and mosquitoes
colander	water	food and vegetables (e.g., salads, pasta)
furnace filter	air	dust and dirt particles
dryer lint screen	air	dust and lint

9. To recover the oil-based perfume from the water, you could evaporate the bath water. Since oil is less dense than water, it will float at the surface. The oil could be skimmed off, but the skimming would likely take some water along with the oil. The small amount of water could then be evaporated, leaving behind only the oil. (Some of the perfume would also evaporate, so the expensive perfumed oil would not be as valuable after recovery.)

10. You could shine the beam from the flashlight through a suspension and a solution to distinguish between the two types of mixtures. Shining a beam of light through a suspension will reveal solid or liquid particles suspended in a liquid or a gas. Shining a beam of light through a solution will not reveal any particles, as the parts of a solution are completely mixed. The suspension will look brighter because the light reflects off the suspended particles back to our eyes. Light shining through a solution will be refracted but there will be very little reflection.

11. Student answers will vary, but the completed table should look similar to the one below. Students can use *BLM 0.0-6 Three-Column Table* to help them answer this question.

Liquids in home	Is it a solution?	Solvent and solute
fruit beverage (Five Alive)	yes	solvent—water solute—fruit juice from concentrate, sugar/glucose-fructose, citric acid, natural flavours
bottled water	yes	solvent—water solute—sodium, potassium, other minerals
Kool-Aid	yes	solvent—water solute—Kool-Aid drink crystals
vinegar	yes	solvent—water solute—acetic acid
tea	yes	solvent—water solute—chemicals from tea leaves
bathroom spray cleaner	yes	solvent—water solutes—sodium hydroxide, perfumes
salad dressing	no (oil and vinegar suspension)	
milk	no (emulsion)	

12. The small bottle of detergent has a higher concentration of cleaning agents (thus requiring less detergent for a load of laundry) than the larger bottle with a lower concentration (requiring more detergent for the same load of laundry). This would explain the different-sized bottles of detergent washing the same number of loads.

13. Three ways that will shorten the time a sugar cube takes to dissolve in a drink are increasing the temperature, stirring faster, and crushing or grinding the solute. Increasing the temperature of the solvent causes the solvent particles to move faster. This increases the size of the space between particles and speeds up the distribution of solute particles in the spaces between solvent particles. Stirring causes greater movement of the solute particles (similar to increasing temperature). Crushing or grinding the solute exposes more solute particles to the solvent particles (increasing its surface area).

14. The oil can be broken up or washed (converted into an emulsion) by the use of detergents. This is similar to washing clothes or dishes. Fats and oils, which don't dissolve in water, are treated with a surfactant (soap or detergent), which carries the oil into water "solution." Chemicals such as detergents break apart floating oil into small particles or drops so that the oil is no longer in a layer on the water's surface. These small droplets of oil then disperse or mix with the water. The problem with this method is that dispersants often harm marine life and the dispersed oil remains in the body of water, where it is toxic to marine life.

Think Critically—Suggested Answers

15. Ocean water is an unsaturated saltwater solution. Salt can be dissolved in ocean water; therefore, ocean water is an unsaturated solution. Salinity is defined as the total amount of salt dissolved in seawater (salt concentration). Average salinity in the open ocean is approximately 35%; however, the concentration of dissolved material changes with the addition or removal of water (i.e., variations can result from differences in local rates of evaporation and precipitation over the ocean, and from the volume of fresh water discharged from rivers and streams into a particular basin).

16. Opinions may vary, but the general consensus should be that chemicals that can dissolve in water are more dangerous than chemicals that cannot. For example, if a pesticide (toxic chemical) can dissolve in water, it gets into the water table or underground streams. Plants or animals may ingest it without knowing, thus becoming contaminated. A toxic substance that does not dissolve in water will remain separate, and there may be an opportunity to recover it.

Reflect on Your Learning—Suggested Answers

17. Student graphic organizers will likely resemble the one on page 147 of the student book. If they do not, review with students any concepts that they have had difficulty with. The graphic organizer may be in a different form, such as a concept map or web.

Meeting Individual Needs

Extra Challenge

- Have students research the missing elements in Mendeleev's periodic table (i.e., their properties, why they were not known at the time, and how his periodic table was instrumental in their being found).
- Mendeleev used increasing atomic mass and properties to make his first periodic table. It was a good organizational scheme that made it easier to study the elements. In addition, Mendeleev's table predicted the properties of unknown elements. One weakness was that the table, when arranged by increasing atomic mass, resulted in a few elements not "fitting" their position in terms of properties. Ask students to name those elements and explain why they do not fit their position in terms of properties.