

Time

30–45 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

Chapter 6 Quiz
Nelson Science Probe 9
website
www.science.nelson.com

Chapter 6 Review Chart

- Ask students to make up questions (and answers) that can be asked about the illustrations on the review chart.
- Have students explain the concept(s) associated with an illustration to a classmate.
- Have students review their *Chapter 6 Study Guide Outline* notes to recall what they have learned in this chapter.
- Have students complete the *Chapter 6 Quiz* in the Student Workbook to review the vocabulary and concepts in this chapter.

Review Key Ideas and Vocabulary—Suggested Answers

1. (a) (Note: wood was one of the five elements of the Chinese and Hindu models of matter.)
2. (c) Ni is the symbol for nickel.
3. (b)
4. (a)
5. (c)
6. Answers will vary and could include France, francium; Europe, europium; California, californium; Berkeley (California), berkelium; Poland, polonium.
7. (a) Rn, radon
(b) Si, silicon
(c) Cd, cadmium
(d) P, phosphorus
(e) K, potassium
(f) Fe, iron
(g) I, iodine
(h) Ca, calcium
(i) Ra, radium
(j) Ag, silver
8. (a) F: It was natural chemistry.
(b) F: Their goal was to find purity in life and in substances.
(c) F: Compounds are made of elements.

- (d) F: The organization was by atomic mass and the properties of the elements. The atomic numbers were given based on his organization.
- (e) F: Periods are the rows in which the properties change from metallic to non-metallic as you move to the right in the table.
- (f) F: Metals are shiny and good conductors of electricity.
9. A period is made up of the elements between two repeating properties. They make up a row in the modern Periodic Table. The properties of the elements become less metallic as their atomic number increases. A group is the family of elements that share some common properties. They make up a column in the modern Periodic Table. The properties of the families become more metallic as their atomic number increases.
10. (a) probably a solid
 (b) shiny lustre
 (c) malleable
 (d) will conduct electricity
11. The element is likely a metalloid. Although it has metallic properties, it is brittle, which means it is more likely a metalloid. To confirm, it might be important to check how conductive the substance is.
12. The metalloids, and their ability to conduct under some circumstances and not under other circumstances, are the group most necessary for producing semiconductors.
13. Answers may vary, but Mendeleev predicted the future discovery of germanium, gallium, and scandium.
14. As soon as there was a language and a symbolic system to communicate about new elements and compounds, there was a great increase in the number of elements and compounds discovered and described.

Use What You've Learned—Suggested Answers

15. Aspartame contains carbon, hydrogen, nitrogen, and oxygen in the proportions 14 parts C to 18 parts H to 2 parts N to 5 parts O. Sugar, on the other hand, is composed of 12 parts C to 22 parts H to 11 parts O.

16.

Formula	Elements	Proportions
KF	potassium and fluorine	1 to 1
Al ₂ S ₃	aluminum and sulfur	2 to 3
CaCl ₂	calcium and chlorine	1 to 2
Na ₂ S	sodium and sulfur	2 to 1
CaO	calcium and oxygen	1 to 1

17. Answers may vary, but reasons for their late discovery could include their very rare nature or the fact that they do not react naturally with any other elements.
18. Mercury is still considered a metal, even though it is liquid at room temperature, because it has all the other properties of metals, such as lustre, conductivity, and malleability.
19. Mercury is named after the same Roman god as the first planet from the Sun. Uranium shares the same name as the seventh planet from the Sun. Neptunium is named after the planet Neptune, namesake of the Roman god of the sea. Plutonium was named shortly after the then-planet Pluto was discovered. Tellurium's name derives from the Latin word *tellus*, meaning Earth. Selenium's name derives from the Greek word *selene*, meaning Moon. Palladium is named after the asteroid Pallas, discovered about the same time. Cerium is named after the asteroid Ceres, discovered in 1801.
20. Metal objects act much hotter than non-metal objects at the same temperature because they conduct their heat so much better. (Note: The same is true of cold metal objects at the same temperature.)
21. Answers will vary but should include arranging the stamps in order of age, starting with the oldest. Then there should be a decision about grouping by country, perhaps alphabetically or by continent. Rows of the stamp table might be the years, and columns, the countries. Alternatively, rows might be countries, and columns, years.

Think Critically—Suggested Answers

22. Answers will vary. The scientists mentioned in this chapter include Jöns Jakob Berzelius, Robert Boyle, John Dalton, Anton Lavoisier, Dmitri Mendeleev, Isaac Newton, Walter Raleigh, and William Ramsay.
23. Answers will vary and may include mining the oceans, the Moon, Mars, and better recycling of our waste products to recapture many of the elements.
24. Answers will vary. Some will suggest safety reasons, but a better suggestion is that colour and taste are not correlated with the groups.
25. The elements on Earth are the elements of the universe, and it is unlikely there are any new elements to be found. Comparing the two elements directly also indicates that they are not the same. Krypton is a noble gas. It does not react naturally with any other substances. Kryptonite is said to be a green solid from a planet in a faraway star. Its only known property is its devastating effect on the "Man of Steel."

26. Answers will vary. Many variations to the traditional Mendeleev Periodic Table have been proposed, including several spiral Periodic Tables, as well as an extended periodic table that includes yet unknown elements. Students' reports on alternative forms should indicate the following: the source of the alternative format; the reason for and the advantages of the new format; that the different formats all present the same information
27. Answers will vary but may include substituting cornstarch for flour in making a sauce, lemon juice for vinegar in a salad, vinegar and water for a commercial cleaning solution, or birch for oak in a woodworking project. Factors that might be considered before making the substitution might include cost, safety, aesthetic appeal, and effectiveness.
28. Answers will vary, but a sample summary table is shown below.

Chapter 6: The Elements	
Ancient ideas	<ul style="list-style-type: none"> - attempt to understand the spiritual world through the natural world - attempt to find and use new substances - secret symbols use to identify substances - four basic elements—earth, fire, air, water
Modern chemistry	<ul style="list-style-type: none"> - began when alchemists began testing ideas through experimentation - knowledge shared among scientists - standard names and symbols assigned to known and newly discovered substances - substances (elements) classified according to their properties as metals, non-metals, and metalloids (Berzelius) - elements ordered according to mass in a Periodic Table of the elements (Mendeleev)

Extra Support

- It may help to connect these students with the elements in a personal way. Assign an activity such as “adopt an element,” in which students use the library and the Internet to find historical information, properties, and applications of an element.

Extra Challenge

- Students can build a model of one of the alternate designs for the Periodic Table researched in question 26. Each different model gives a slightly different perspective on the structure of matter and the organization of the elements.

Meeting Individual Needs