CHAPTER 7 Review

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Time

45–60 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 0.0-10 Chapter Key Ideas
WS 7.0-1 Atomic Theory Word Search
Chapter 7 Quiz
Nelson Science Probe 9 website
www.science.nelson.com

Chapter 7 Review Chart

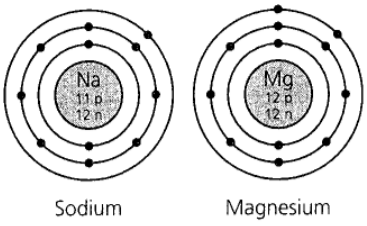
- Have students use the review material and the *Chapter 7 Study Guide Outline* in the Student Workbook to create their own review notes.
- Ask students to discuss what information each diagram triggers in their memories.
- Have students use *BLM 0.0-10 Chapter Key Ideas* to review the key ideas in the chapter.
- Encourage students to visit the online quiz centre on the Nelson Science website and complete the *Chapter 7 Self-Quiz*. As well, they can use *WS 7.0-1 Atomic Theory Word Search* as a study aid.
- Have students complete *Chapter 7 Quiz* in the Student Workbook to review the vocabulary and concepts in this chapter.

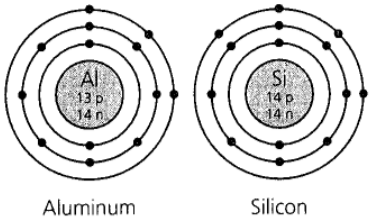
Review Key Ideas and Vocabulary—Suggested Answers

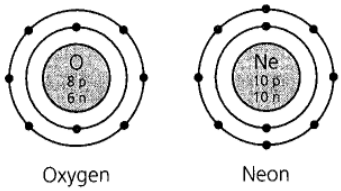
1. (b)
2. (c)
3. (d)
4. (a)
5. (b)
6. **(a)** In the second and third rows, there are between 1 to 8 electrons in the outer shell.
   (b) For the second row, the ions of lithium, beryllium, boron, and carbon will have 2 electrons in the outer shell; the ions of nitrogen, oxygen, and fluorine will have 8 electrons in the outer shell.
7. The atomic number of an element is equal to the number of protons.
8. Mass number
9. Rutherford
10. Select three from the following: element name, element symbol, atomic number, atomic mass, and ion charge.
11. Like raisins in a raisin bun (or Thomson's model), the chocolate chips are distributed randomly throughout the cookie dough. Additionally, chocolate chip cookies are more common in some places than raisin buns (or plum puddings).
12. **(a)** 2– **(b)** 1– **(c)** 1+ **(d)** 3– **(e)** 0
13. (c)

Use What You've Learned—Suggested Answers

14.







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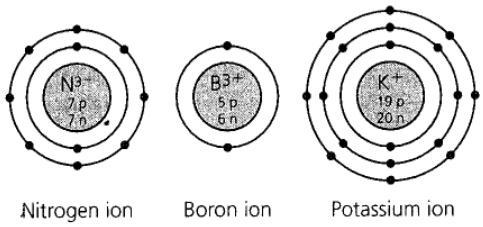

16. seven

17.

Figure	Atomic number	Element	Number of electrons	Number of neutrons	Atomic mass	Atom or ion?
1	12	magnesium	10	12	24.31	ion
2	4	beryllium	4	5	9.01	atom
3	14	silicon	14	14	28.09	atom
4	11	sodium	10	12	22.99	ion

18. A metal atom in Group 2 will give up 2 electrons when forming an ion. The resulting charge on the ion will be 2+.

19. A non-metal atom in Group 17 will acquire an electron when forming an ion. The resulting charge on the ion will be 1–.

20. Aluminum atoms form metallic solids, silver in colour, insoluble in water, and malleable. Aluminum ions will form white compounds, in crystals or powder, and will often be soluble in water. Copper atoms are red–brown in colour, insoluble in water, and malleable. Copper atoms form either white or blue–green compounds, in crystals or powder, and will often be soluble in water.
21. There will be 2 iodide ions formed for each zinc ion.
22. Magnesium has an ion charge of 2+, and nitrogen has an ion charge of 3–. To balance the electrons transferred (and form a neutral compound), there will need to be 3 Mg ions for each 2 N ions (i.e., 6 electrons transferred).
23. According to the Bohr theory, when atoms absorb energy, electrons temporarily move up to higher shells, where they will be unstable. When the electrons eventually fall back down to a lower shell, they give off a specific wavelength (colour) of light. The colour of light given off depends on which element it is, and on which shells the electron has fallen between.
24. In chemistry, the valence of an element means the number of atoms of either hydrogen or chlorine that will bond to the element. Sodium has a valence of 1, because sodium chloride has 1 chlorine atom for each sodium atom. Oxygen has a valence of 2, because water contains two hydrogen atoms for each oxygen atom. The term *valence electrons* refers to the number of electrons in the outer shell of the atom. In linguistics, valency (or valence) refers to the capacity of a verb to take a specific number and type of arguments. Valence is also the name of a town in France.

Think Critically—Suggested Answers

25. When an electron has more energy, it will be farther away from the nucleus. Electrons in the third shell have more energy than electrons in the second or first shells, and less energy than electrons in the fourth, fifth, or higher shells. When an electron moves from the fourth to the second shell, it gives off an amount of energy equal to the difference between the fourth and the second energy levels.
26. The Bohr theory only predicts (exactly) the behaviour of hydrogen or of an element that contains a single electron (which would therefore be an ion with an unusual charge).
27. No. Some elements have flames of similar colour. Noble gases do not form compounds well, and it would be difficult to heat them in a flame to give off spectral light.
28. Bromine would be more reactive, as it has only one vacancy in its outer shell. It will be "easier" to form a bromine ion than a selenium ion.
29. Some possible answers include the following:

    Dalton: rubber ball. The ball has a consistent composition throughout.

Thomson: metallic paint. The main component of the paint represents the positive mass of the atom, and the flakes of aluminum that are the sparkle represent the electrons.

Rutherford: whiffle ball. The ball itself represents the orbiting electrons, and the nucleus would be at the centre, too small to see. It is mostly empty space.

Bohr: channel-lock adjustable pliers. The pliers can only set their jaws at certain spacings, just as there are only certain allowed orbits in the Bohr atom.

30. Possible questions include the following:
- Does the substance have consistent properties for all samples?
- Can the substance be decomposed into other substances?
- Is it shiny, malleable, and conductive for electricity?
- Is it a gas at room temperature?
- Is it dull, brittle, and non-conductive for electricity?
- What ion charge does it have?

Reflect on Your Learning—Suggested Answers

31. Most students should indicate that the Bohr model does not represent the actual positions of the electrons. Reasons include that the atom is likely spherical, so electrons should be found all over it; atoms are often moving up and down between higher and lower shells as the atoms gain and lose energy; and the gaps between shells are not as small as drawn. Some students may be aware of the quantum mechanical model of the atom, and will indicate that the shells are merely regions, or clouds, of probability of finding the electrons.

32. Students should identify the situation, the original idea, the new information, and the revised idea, and discuss which types of ideas are easier or more difficult to change.

Meeting Individual Needs

ESL

- If students created a glossary of vocabulary terms as they worked through the chapter, they can use it now to help their review.

Extra Support

- Have students review the scaffolding masters they previously completed for each section.
- Ask students to write down a potential quiz question that could be asked about each illustration in the Review Chart.

Extra Challenge

- Challenge students to create a video segment reporting on the latest additions to the atomic theory, set in the time of Niels Bohr. It should chronicle previous theories and the new discoveries that Bohr based his theory on.