Review and Assessment

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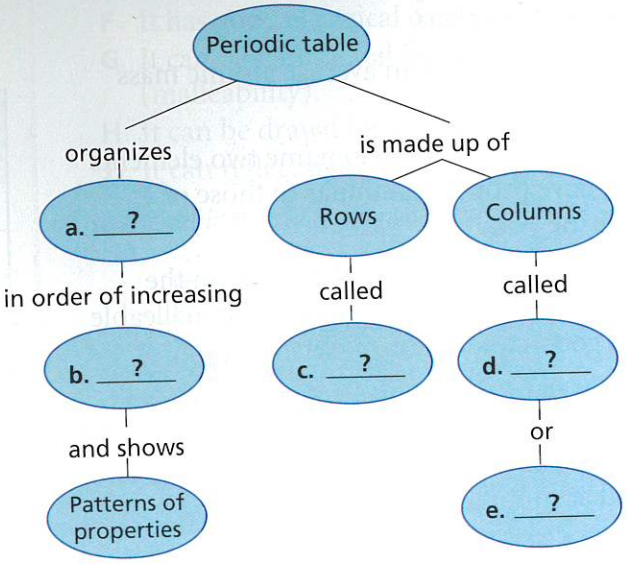
Organizing Information

Concept Mapping Copy the concept map about the periodic table onto a sheet of paper. Then complete it and add a title. (For more on Concept Mapping, see the Skills Handbook.)



Reviewing Key Terms

Choose the letter of the best answer.

1. The atomic number of an atom is determined by the number of
   a. protons. **b.** electrons.
   c. neutrons. **d.** isotopes.

2. In the modern periodic table, elements are arranged
   a. according to atomic mass.
   b. according to atomic number.
   c. in alphabetical order.
   d. according to the number of neutrons in their nuclei.

3. Of the following, the group that contains elements that are the most reactive is the
   a. alkali metals.
   b. alkaline earth metals.
   c. carbon family.
   d. noble gases.

4. Unlike metals, many nonmetals are
   a. good conductors of heat and electricity.
   b. malleable and ductile.
   c. gases at room temperature.
   d. shiny.

5. At the hot temperatures of stars, electrons are stripped away from nuclei. This process forms a state of matter called
   a. a heavy element. **b.** liquid.
   c. plasma. **d.** supernova.

6. Inside the sun, nuclear fusion creates helium nuclei from
   a. oxygen nuclei.
   b. beryllium nuclei.
   c. carbon nuclei.
   d. hydrogen nuclei.

Writing in Science

News Report Imagine you are writing an article for a space magazine about the life cycle of a star. Which elements are produced in a star at different stages? How are these elements distributed into space?

Discovery Channel SCHOOL

Elements and the Periodic Table
Video Preview
Video Field Trip
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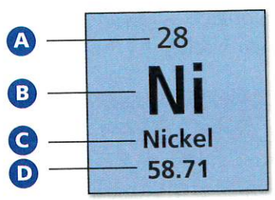
Review and Assessment

Checking Concepts

7. How do two isotopes of an element differ from one another?
8. What element has an average atomic mass nearest to 31?
9. Use the periodic table to name two elements that have properties similar to those of chlorine (Cl).
10. Which two elements in Group 14 on the periodic table are most likely to be malleable and good conductors of electricity?
11. Of the elements oxygen (O), zinc (Zn), and iodine (I), which one would you predict to be a poor conductor of electricity and a brittle solid at room temperature?
12. Why are elements heavier than oxygen *not* produced in stars like the sun?

Thinking Critically

13. **Comparing and Contrasting** List the three kinds of particles that make up atoms, and compare their masses and their locations in an atom.
14. **Applying Concepts** Below is a square taken from the periodic table. Identify the type of information given by each labeled item.



15. **Applying Concepts** Explain how particle accelerators are used to synthesize elements with atomic numbers above 95.
16. **Inferring** What property of the materials used in computer chips makes them useful as switches that turn electricity on and off?
17. **Relating Cause and Effect** Why is extremely high pressure required to cause atomic nuclei to crash into one another in stars?

Applying Skills

Use the table to answer Questions 18–22.

The table below list properties of five elements.

Element	Appearance	Atomic Mass	Conducts Electricity
A	Invisible gas	14.007	No
B	Invisible gas	39.948	No
C	Hard, silvery solid	40.08	Yes
D	Silvery liquid	200.59	Yes
E	Shiny, bluish-white solid	207.2	Slightly

18. **Classifying** Classify each element in the table as a metal or a nonmetal. Explain your answers.
19. **Inferring** Both elements B and C have an atomic mass close to 40. How is this similarity possible?
20. **Drawing Conclusions** Use the periodic table to identify the five elements.
21. **Predicting** Would you expect elements A and B to have similar chemical properties? Why or why not?
22. **Predicting** Would you expect to find element C uncombined in nature? Explain.

Lab zone Chapter Project

Performance Assessment Display the chart showing the metals you studied. Be ready to discuss which properties are common to all metals. Describe other properties of metals you could not test. List all the properties that could be used to find out whether an unknown element is a metal.

Standardized Test Prep

Test-Taking Tip

Reading All the Answer Choices

In answering a multiple-choice question, always read *every* answer choice before selecting the answer you think is correct. In some cases, all of the responses may be true statements, but only one answers the question correctly. In the sample question below, for example, you are asked why a carbon atom is heavier than the total mass of its protons and electrons. Each answer choice is a statement. If you look at each answer choice by itself, it expresses something that is correct. However, only one of the answer choices explains why a carbon atom is heavier than the total mass of its protons and electrons.

Sample Question

Why is the mass of a carbon atom greater than the total mass of its protons and electrons?

- **A** The mass of a proton is greater than the mass of an electron.
- **B** A proton is positively charged and an electron is negatively charged.
- **C** Most of the atom's volume is the sphere-shaped cloud of electrons.
- **D** One or more neutrons in the nucleus add mass to the atom.

Answer

The correct answer is **D**. With the exception of some hydrogen atoms, every atom contains one or more neutrons. The mass of a neutron is about the same as that of a proton. Choices **A**, **B**, and **C** are true statements about the subatomic particles that make up every atom. However, none of the statements answers the question.

Choose the letter of the best answer.

1. Elements that are gases at room temperature are likely to be classified as which of the following?
   - **A** metals
   - **B** nonmetals
   - **C** metalloids
   - **D** unreactive
2. Which property of aluminum makes it a suitable metal for soft drink cans?
   - **F** It has good electrical conductivity.
   - **G** It can be hammered into a thin sheet (malleability).
   - **H** It can be drawn into long wires (ductility).
   - **J** It can reflect light (shininess).

Use the table below to answer Questions 3–5.

8 O Oxygen 15.999	9 F Fluorine 18.998	10 Ne Neon 20.179
16 S Sulfur 32.06	17 Cl Chlorine 35.453	18 Ar Argon 39.948

3. Which element has an atomic number of 18?
   - **A** hydrogen
   - **B** oxygen
   - **C** fluorine
   - **D** argon
4. An atom of fluorine has 10 neutrons. What is the total number of other subatomic particles in this atom?
   - **F** 9 protons and 9 electrons
   - **G** 9 protons and 19 electrons
   - **H** 10 protons and 10 electrons
   - **J** 19 protons and 19 electrons
5. Which combination of elements represents part of a group, or family, of the periodic table?
   - **A** oxygen, fluorine, and neon
   - **B** sulfur, chlorine, and argon
   - **C** fluorine and chlorine
   - **D** oxygen and chlorine

Constructed Response

6. Describe the modern model of the atom. Your discussion should include the three main types of particles that make up an atom and the charge and location of each. Include an explanation of the overall charge on an atom.