

Chapter 10 Study Guide



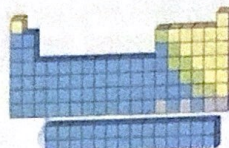
Elements are organized on the periodic table according to increasing atomic number and similar properties.

Key Concepts Summary

Vocabulary

Lesson 1: Using the Periodic Table

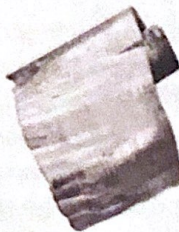
- Elements are organized on the **periodic table** by increasing atomic number and similar properties.
- Elements in the same **group**, or column, of the periodic table have similar properties.
- Elements' properties change across a **period**, which is a row of the periodic table.
- Each element key on the periodic table provides the name, symbol, atomic number, and atomic mass for an element.



periodic table p. 345
group p. 350
period p. 350

Lesson 2: Metals

- **Metals** are located on the left side and middle of the periodic table.
- Metals are elements that have **ductility, malleability, luster**, and conductivity.
- The **alkali metals** are in group 1 of the periodic table, and the **alkaline earth metals** are in group 2.
- **Transition elements** are metals in groups 3–12 of the periodic table, as well as the lanthanide and actinide series.



metal p. 355
luster p. 355
ductility p. 356
malleability p. 356
alkali metal p. 357
alkaline earth metal p. 357
transition element p. 358

Lesson 3: Nonmetals and Metalloids

- **Nonmetals** are on the right side of the periodic table, and **metalloids** are located between metals and nonmetals.
- Nonmetals are elements that have no metallic properties. Solid nonmetals are dull in appearance, brittle, and do not conduct electricity. Metalloids are elements that have properties of both metals and nonmetals.
- Some metalloids are **semiconductors**.
- Elements in group 17 are called **halogens**, and elements in group 18 are **noble gases**.



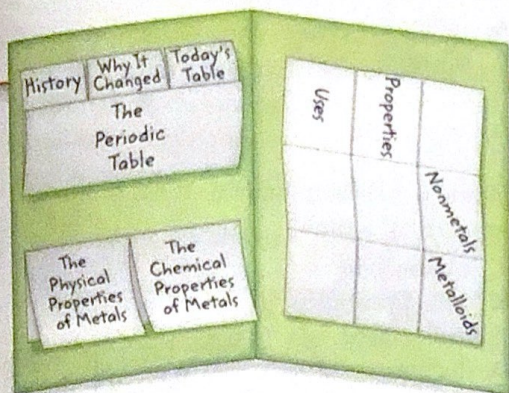
nonmetal p. 363
halogen p. 365
noble gas p. 366
metalloid p. 367
semiconductor p. 367



FOLDABLES

Chapter Project

Assemble your lesson Foldables as shown to make a Chapter Project. Use the project to review what you have learned in this chapter.



Use Vocabulary

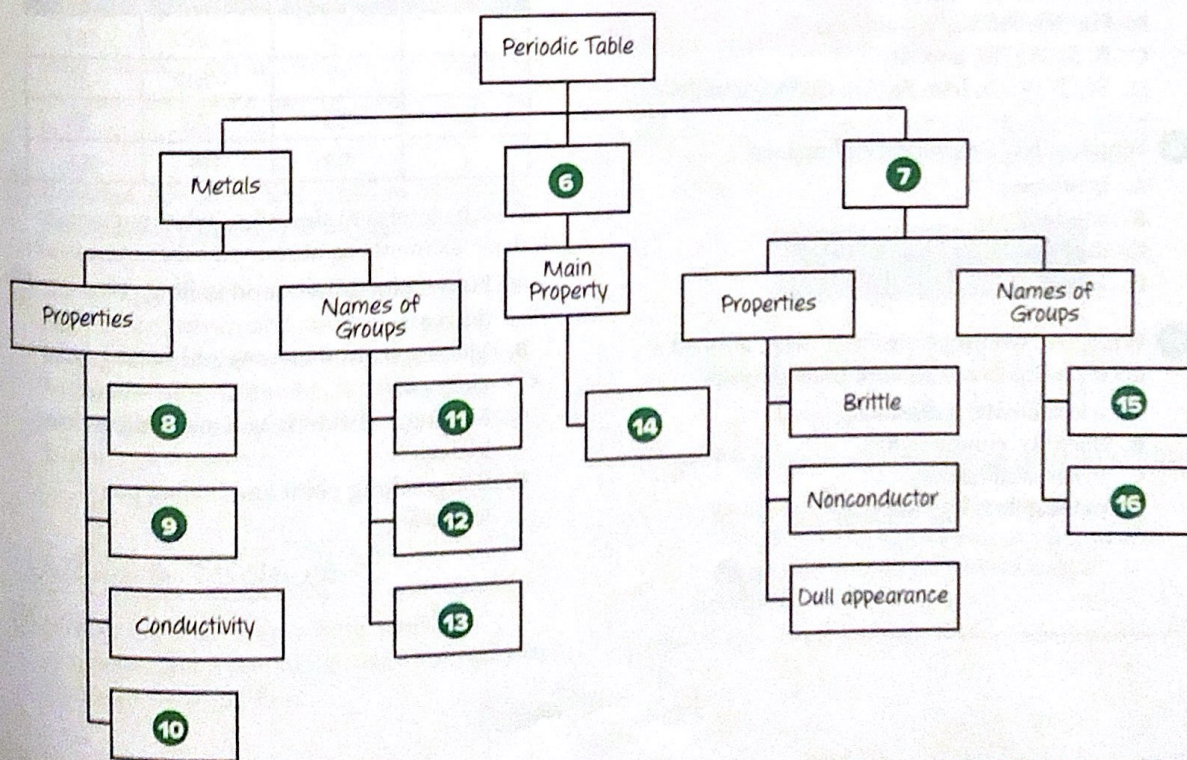
- The element magnesium (Mg) is in _____ 3 of the periodic table.
- An element that is shiny, is easily pulled into wires or hammered into thin sheets, and is a good conductor of electricity and heat is a(n) _____.
- Copper is used to make wire because it has the property of _____.
- An element that is sometimes a good conductor of electricity and sometimes a good insulator is a(n) _____.
- An element that is a poor conductor of heat and electricity but is a good insulator is a(n) _____.

Link Vocabulary and Key Concepts



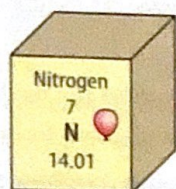
Interactive Concept Map

Copy this concept map, and then use vocabulary terms from the previous page to complete the concept map.



Understand Key Concepts

- 1 What determines the order of elements on today's periodic table?
- increasing atomic mass
 - decreasing atomic mass
 - increasing atomic number
 - decreasing atomic number
- 2 The element key for nitrogen is shown below.



From this key, determine the atomic mass of nitrogen.

- 7
 - 7.01
 - 14.01
 - 21.01
- 3 Look at the periodic table in Lesson 1. Which list of elements forms a group on the periodic table?
- Li, Be, B, C, N, O, F, and Ne
 - He, Ne, Ar, Kr, Xe, and Rn
 - B, Si, As, Te, and At
 - Sc, Ti, V, Cr, Mn, Fe, Co, Cu, Ni, and Zn
- 4 Which is NOT a property of metals?
- brittleness
 - conductivity
 - ductility
 - luster
- 5 What are two properties that make a metal a good choice to use as wire in electronics?
- conductivity, malleability
 - ductility, conductivity
 - luster, malleability
 - malleability, high density

- 6 Where are most metals on the periodic table?
- on the left side only
 - on the right side only
 - in the middle only
 - on the left side and in the middle
- 7 Look at the periodic table in Lesson 1 and determine which element is a metalloid.
- carbon
 - silicon
 - oxygen
 - aluminum
- 8 Iodine is a solid nonmetal. What is one property of iodine?
- conductivity
 - dull appearance
 - malleability
 - ductility
- 9 The following table lists some information about certain elements in group 17.

Element Symbol	Atomic Number	Melting Point (°C)	Boiling Point (°C)
F	9	-233	-187
Cl	17	-102	-35
Br	35	-7.3	59
I	53	114	183

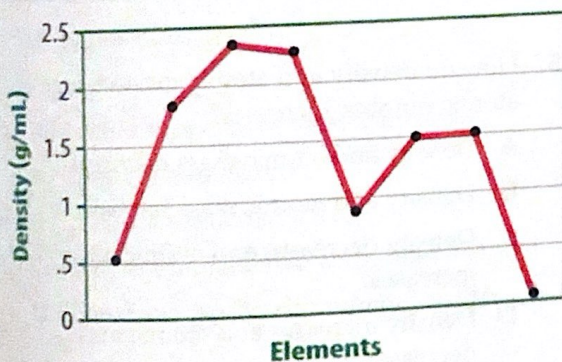
Which statement describes what happens to these elements as atomic number increases?

- Both melting point and boiling point decrease.
- Melting point increases and boiling point decreases.
- Melting point decreases and boiling point increases.
- Both melting point and boiling point increase.



Critical Thinking

- 10 **Recommend** an element to use to fill bottles that contain ancient paper. The element should be a gas at room temperature, should be denser than helium, and should not easily react with other elements.
- 11 **Apply** Why is mercury the only metal to have been used in thermometers?
- 12 **Evaluate** the following types of metals as a choice to make a Sun reflector: alkali metals, alkaline earth metals, or transition metals. The metal cannot react with water or oxygen and must be shiny and strong.
- 13 The figure below shows a pattern of densities.



Infer whether you are looking at a graph of elements within a group or across a period. Explain your answer.

- 14 **Contrast** aluminum and nitrogen. Show why aluminum is a metal and nitrogen is not.
- 15 **Classify** A student sorted six elements. He placed iron, silver, and sodium in group A. He placed neon, oxygen, and nitrogen in group B. Name one other element that fits in group A and another element that belongs in group B. Explain your answer.

Writing in Science

- 16 **Write** a plan that shows how a metal, a nonmetal, and a metalloid could be used when constructing a building.

REVIEW

THE
BIG
IDEA

- 17 Explain how atomic number and properties are used to determine where element 115 is placed on the periodic table.
- 18 The photo below shows how the properties of materials determine their uses. How can the periodic table be used to help you find elements with properties similar to that of helium?



Math Skills



Math Practice

Use Geometry

- 19 The table below shows the atomic radii of three elements in group 1 on the periodic table.

Element	Atomic radius
Li	152 pm
Na	186 pm
K	227 pm

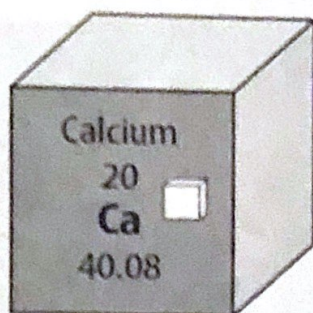
- a. What is the circumference of each atom?
- b. Rubidium (Rb) is the next element in Group 1. What would you predict about the radius and circumference of a rubidium atom?

Record your answers on the answer sheet provided by your teacher or on a sheet of paper.

Multiple Choice

1. Where are most nonmetals located on the periodic table?
- A in the bottom row
 - B on the left side and in the middle
 - C on the right side
 - D in the top row

Use the figure below to answer question 2.



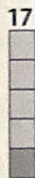
2. What is the atomic mass of calcium?
- A 20
 - B 40.08
 - C $40.08 + 20$
 - D $40.08 \div 20$
3. Which element is most likely to react with potassium?
- A bromine
 - B calcium
 - C nickel
 - D sodium
4. Which group of elements can act as semiconductors?
- A halogens
 - B metalloids
 - C metals
 - D noble gases

Use the table below about group 13 elements to answer question 5.

Element Symbol	Atomic Number	Density (g/cm ³)	Atomic Mass
B	5	2.34	10.81
Al	13	2.70	26.98
Ga	31	5.90	69.72
In	49	7.30	114.82

5. How do density and atomic mass change as atomic number increases?
- A Density and atomic mass decrease.
 - B Density and atomic mass increase.
 - C Density decreases and atomic mass increases.
 - D Density increases and atomic mass decreases.
6. Which elements have high densities, strength, and resistance to corrosion?
- A alkali metals
 - B alkaline earth metals
 - C metalloids
 - D transition elements
7. Which is a property of a metal?
- A It is brittle.
 - B It is a good insulator.
 - C It has a dull appearance.
 - D It is malleable.

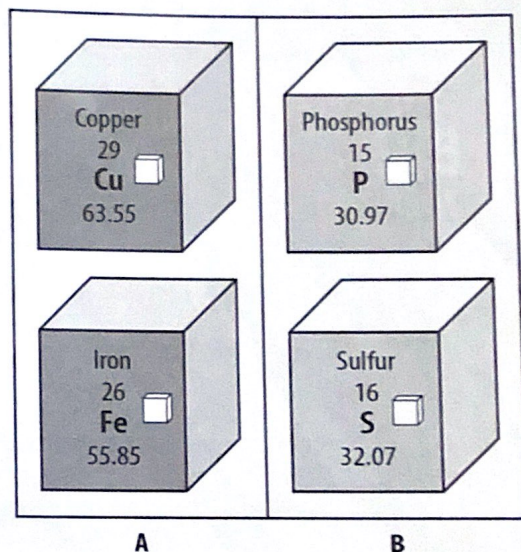
Use the figure below to answer questions 8 and 9.



- 8 The figure shows a group in the periodic table. What is the name of this group of elements?
- A halogens
 - B metalloids
 - C metals
 - D noble gases
- 9 Which is a property of these elements?
- A They are conductors.
 - B They are semiconductors.
 - C They are nonreactive with other elements.
 - D They react easily with other elements.
- 10 What is one similarity among elements in a group?
- A atomic mass
 - B atomic weight
 - C chemical properties
 - D practical uses

Constructed Response

Use the figure below to answer questions 11 and 12.



- 11 Groups A and B each contain two elements. Identify each group as metals, nonmetals, or metalloids. Would silicon belong to one of these groups? Why or why not?
- 12 Which group in the figure above yields the strongest building elements? Why?
- 13 How does the periodic table of elements help scientists today?
- 14 What connection does the human body have with the elements on the periodic table?

NEED EXTRA HELP?	1	2	3	4	5	6	7	8	9	10	11	12	13	14
If You Missed Question...	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Go to Lesson...	1	1	3	3	1	2	2	3	3	1	2,3	2	1	3