Name _____ Date _____

UNIT
Literature

Green and Clean: Plants as Pollution Control

Read the Literature feature in your textbook.

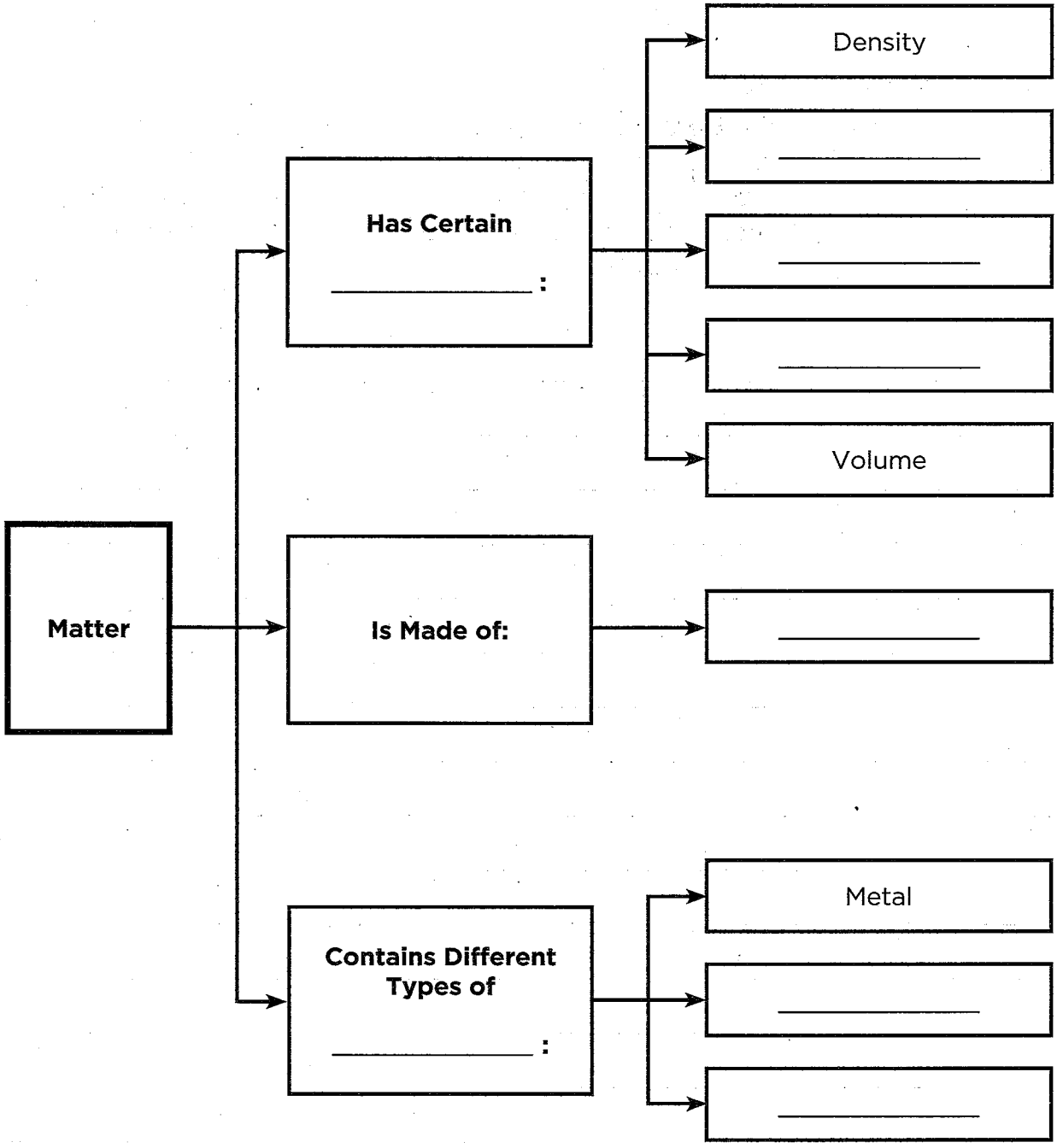
Write About It

Response to Literature This article describes how plants are used to help clean polluted soil. Research additional information about cleaning up waste. Write a report about the cleaning process. Include facts and details from this article and from your research.

CHAPTER
Concept Map

Name _____ Date _____

Comparing Kinds of Matter



Name _____ Date _____

LESSON Outline

Properties of Matter

Use your textbook to help you fill in the blanks.

How can you describe matter?

1. The amount of matter in an object is its _____ .
2. The mass of an object is measured in _____ or kilograms.
3. A measure of how strongly gravity pulls on an object is the object's _____ .
4. The greater the _____ of an object, the greater its weight.
5. Weight is measured in _____ .
6. The amount of space an object takes up is its _____ .
7. To measure liquid volume in _____ , scientists use tools such as beakers or graduated cylinders.
8. The volume of solids is measured in _____ .
9. Anything that has mass and volume is _____ .

What is density?

10. The amount of mass for each milliliter of a substance is that substance's _____ .
11. To calculate density, divide an object's _____ by its _____ .

Name _____ Date _____

12. Buoyancy depends on _____, which depends on mass and volume.

13. Changing the mass or volume of an object changes its density and _____.

14. If an object covers a large enough area of the water's surface, it can float on the water because of the _____ of water particles.

What forms can matter have?

15. Matter can exist as a solid, a(n) _____, or a gas.

16. A solid has a definite _____ and volume.

17. A liquid has a definite _____, but it takes the shape of the container holding it.

18. A gas does not have a definite volume or a definite _____.

Critical Thinking

19. How can matter be described?

_____

_____

_____

_____

_____

_____

_____

_____

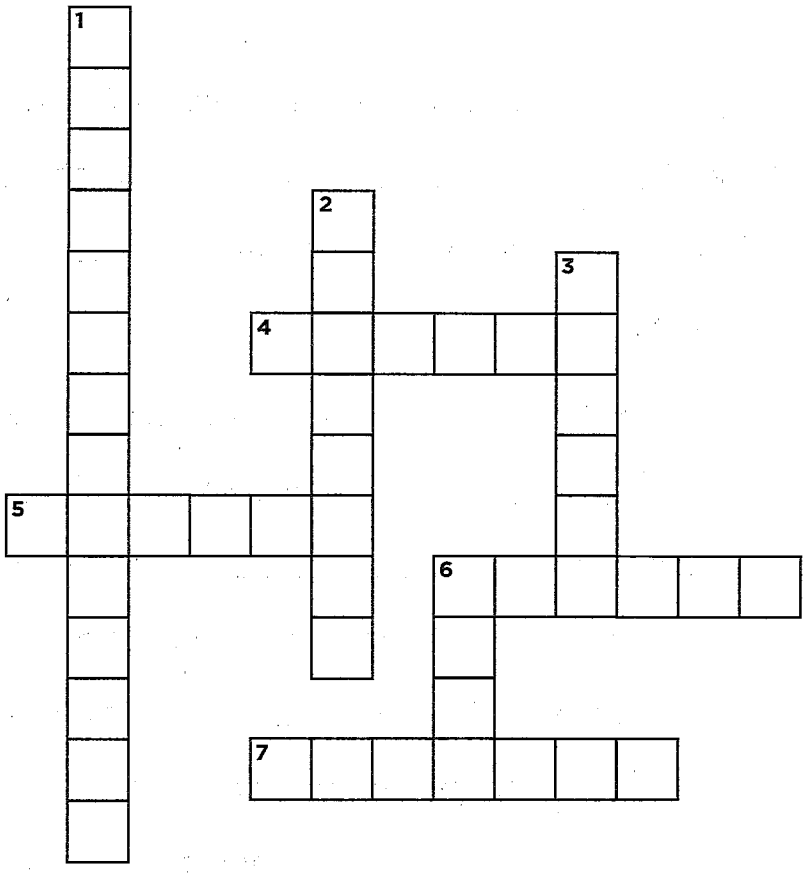
Name _____ Date _____

LESSON Vocabulary

Properties of Matter

Fill in the crossword puzzle from the clues below.

buoyancy	mass	Newton	volume
density	matter	surface tension	weight



Across

4. The amount of space that matter takes up
5. The metric unit used to measure weight
6. Anything that has mass and volume
7. The amount of mass for each milliliter of a substance

Down

1. The property of water that helps certain objects float
2. An object's resistance to sinking
3. How strongly gravity pulls on an object
6. The amount of matter in an object

LESSON
Cloze Activity

Name _____ Date _____

Properties of Matter

Fill in the blanks.

buoyancy	float	properties	solid
constant	gas	push	volume
density	mass	sink	weight

We describe matter in a number of ways. Matter can exist as a(n) _____ , a liquid, or a(n) _____ . Scientists use these and other _____ to identify matter.

The amount of matter in an object is the object's _____ , a property that is _____ . However, the _____ of an object changes as the force of gravity changes. The amount of space that an object takes up is its _____ . Scientists also measure the amount of matter for each milliliter of a substance, or its _____ . An object's resistance to sinking is _____ . When an object is placed on a fluid, the object and the fluid _____ against each other. If the fluid is denser, the object will _____ . If the object is denser, the object will _____ . Matter is anything that has mass and volume.

Name _____ Date _____

LESSON Outline

Elements

Use your textbook to help you fill in the blanks.

What is matter made of?

1. A substance that cannot be broken down chemically into simpler substances is a(n) _____ .

2. One important property of an element is its _____ at room temperature.

3. Another important property of an element is the way that it _____ with other elements.

4. Today we know that a(n) _____ is the smallest unit of an element that has that element's properties.

What are atoms and molecules made of?

5. The center of an atom is its _____ .

6. An atom's nucleus contains particles called protons that have a positive charge and particles called _____ that have no charge.

7. Negatively charged particles called _____ move around the nucleus.

8. Because an atom has the same number of _____ and electrons, the atom has no overall charge.

9. The number of protons in an atom is that atom's _____ .

Name _____ Date _____

10. An atom's protons and neutrons have about the same mass, which is one _____ unit, or amu.

11. If you add up the mass of all the protons and neutrons in an atom, you get the atom's _____ .

12. Two or more atoms joined into a single particle form a(n) _____ .

13. Molecules have properties that are different than the _____ that form them.

How are elements grouped?

14. Dmitri Mendeleev created the _____ of elements.

15. The table's columns group elements according to their _____ .

What are the most common elements?

16. In space, the most common elements are _____ and helium.

17. On Earth, elements such as _____ and any of these: oxygen, silicon, aluminum, nitrogen, iron, and calcium are among the most common.

Critical Thinking

18. What is matter made of?

_____

_____

_____

Name _____ Date _____

LESSON
Vocabulary

Elements

Read each clue. Write the answer in the blanks using the words below.

atom	element	molecule	nucleus
electron	metal	neutron	proton

1. The smallest unit of an element that retains that element's properties is a(n) _____ .
2. The particle in an atom that has a negative charge is a(n) _____ .
3. A substance that chemical reactions cannot break down into something simpler is a(n) _____ .
4. An element that has properties such as shine, conductivity, and flexibility is a(n) _____ .
5. Two or more atoms that are joined into one particle are a(n) _____ .
6. In the nucleus of an atom, a particle that has no electrical charge is a(n) _____ .
7. The center of an atom is its _____ .
8. In the nucleus of an atom, a particle that has a positive electrical charge is a(n) _____ .

LESSON
Cloze Activity

Name _____ Date _____

Elements

Fill in the blanks.

atoms	metal	nonmetal	properties
electrons	metalloid	nucleus	temperature
elements	neutrons	periodic table	

Every substance on Earth is made of one or more _____ . Dmitri Mendeleev created the _____ in the 1860s. It groups elements according to their _____ . One important property of an element is its state at room _____ . Another is the way that it combines or mixes chemically with other elements. A third property is the element's classification as a(n) _____ , a(n) _____ , or a(n) _____ .

Each element is composed of tiny particles called _____ , the smallest units that retain the element's properties. All atoms have the same parts. The center of an atom is its _____ . The nucleus contains protons and _____ . Atoms also contain _____ , which move around the nucleus. Protons and neutrons have a much larger mass than electrons do.

Name _____ Date _____

Reading in Science

Element Discovery

When Mendeleev shuffled his element cards to create the periodic table in 1869, he suspected he wasn't playing with a full deck. Many of the elements had already been discovered, but he believed others would come later.

1766 Hydrogen—The most abundant atom in nature is discovered by Henry Cavendish. In 1766, Cavendish is experimenting with materials in his lab when he isolates a gas that is flammable. He realizes that this gas might be a new element and calls it flammable air. The element later gets its name from the Greek words meaning "water forming," when another scientist discovers that water is made of hydrogen and oxygen.

1772–74 Oxygen—Scientists Joseph Priestley and Carl Wilhelm Scheele independently discover that when they heat certain compounds, a new kind of "air" or gas is given off. The new gas makes substances burn five times faster than ordinary air. The new gas is named oxygen from the Greek words meaning "acid former." That's because when oxygen combines with other elements, the compounds are usually acidic.

1868–1895 Helium—Joseph Lockyer discovers helium in 1868 by studying the Sun's spectrum with a spectroscope during a solar eclipse. He finds color lines that no element at the time was known to produce. He infers the lines must be due to a new element found only in the Sun. The element is named helium, after Helios, the Greek god of the Sun. In 1895, helium is finally found on Earth in uranium minerals.

1940 Plutonium—Scientists in Berkeley, California, create a new element by bombarding uranium with particles of deuterium, a special form of hydrogen. They name the element after the recently discovered planetary body Pluto.

Name _____ Date _____

1952 Einsteinium—A team of scientists find this element while studying the radioactive debris created when a hydrogen bomb explodes. They name it in honor of scientist Albert Einstein. Only a small amount of einsteinium has ever been produced, and it exists only for a fraction of a second before it transforms itself into other elements.

The periodic table isn't finished. Elements are still being added to it. In the past 75 years, 26 new elements have been added to the table. That's about one element every three years! If you found a new element, what would you name it?

Write About It

Classify

1. Which elements were discovered as gases?
2. Which elements have names that describe their properties? How are the other elements named?

Name _____ Date _____

LESSON Outline

Metals, Nonmetals, and Metalloids

Use your textbook to help you fill in the blanks.

What are metals?

1. Metals share certain properties, such as _____ surfaces.

2. Metals conduct _____ and _____ well.

3. Metals are also easy to shape because they have _____ .

4. The property of _____ allows a metal to be pulled into thin wires.

5. Almost all metals occur naturally in the _____ state, but they vary in _____ .

6. When left out of doors, many metals will _____ as they combine with nonmetals around them.

How do we use metals?

7. Metals such as steel are useful because they are both _____ and flexible.

8. Reactive metals such as cadmium and nickel are used to make electricity in _____ .

What elements are nonmetals and metalloids?

9. Nonmetals are not good _____ of electricity.

10. Instead of bending, nonmetals usually _____ or _____ .

Name _____ Date _____

11. Elements with properties that are between metals and nonmetals are _____ .

12. Solid metalloids look like metals, but they do not have _____ surfaces.

13. Because they do not bend well, metalloids are not _____ or ductile.

14. Metalloids are called _____ because they do not conduct electricity as well as metals but conduct it better than nonmetals.

How do we use nonmetals and metalloids?

15. Nonmetals are excellent _____ of electricity and heat.

16. Semiconductor metalloids such as _____ are used to make computer chips.

Critical Thinking

17. Describe the properties of metals, nonmetals, and metalloids.

_____

_____

_____

_____

_____

_____

_____

_____

_____

Name _____ Date _____

LESSON
Vocabulary

Metals, Nonmetals, and Metalloids

Who am I? What am I?

Choose a word from the word box below that answers each question.

a. corrosion	**d.** metal	**g.** nonmetal
b. ductility	**e.** metalloid	**h.** semiconductor
c. malleability	**f.** noble gas	

1. _____ I am a shiny solid that conducts electricity very well. What am I?

2. _____ I am very particular. I am an element that does not like to mix with others. What am I?

3. _____ Look for me in the middle of columns in the periodic table. I am located between the metals and the nonmetals. Who am I?

4. _____ I am a property of metals. Because of me, people can make copper into thin wires. What am I?

5. _____ I am a poor conductor of electricity. Try to bend or flatten me, and I will break or crumble instead. Who am I?

6. _____ I happen when metals are left outdoors and combine with nonmetals. I create rust in iron. Who am I?

7. _____ I am the property that lets you bend and shape a metal. What am I?

8. _____ I am a metalloid used in computer chips. I conduct electricity better than a nonmetal, but not as well as a metal. Who am I?

LESSON
Cloze Activity

Name _____ Date _____

Metals, Nonmetals, and Metalloids

Fill in the blanks.

break	electricity	metals
ductile	insulators	nonmetals
dull	malleable	opposite

Scientists classify an element as a metal, a nonmetal, or a metalloid on the basis of the element's properties. Most _____ can be polished until their surfaces are shiny. They conduct _____ and heat well. When bent and pulled, metals are both _____ and _____ .

Nonmetals have properties that are the _____ of those of metals. The surface of a nonmetal is _____ rather than shiny. Nonmetals are good _____ rather than conductors. Instead of bending, nonmetals _____ or crumble. Metalloids have some properties like those of metals and some that are more like those of _____ . Metalloids are semiconductors—materials that conduct electricity better than nonmetals do, but not as well as metals.

Name _____ Date _____

CHAPTER Vocabulary

Comparing Kinds of Matter

Choose the letter of the best answer.

1. A material that cannot be broken down into simpler chemical substances is a(n)
   - **a.** element.
   - **b.** metal.
   - **c.** chemical.
   - **d.** molecule.

2. What is the smallest particle of an element?
   - **a.** molecule
   - **b.** proton
   - **c.** atom
   - **d.** metalloid

3. The positively charged particles in an atom are called
   - **a.** neutrons.
   - **b.** electrons.
   - **c.** protons.
   - **d.** molecules.

4. Which particles share the nucleus of an atom with the protons?
   - **a.** neutrons
   - **b.** protons
   - **c.** elements
   - **d.** electrons

5. Which particles in an atom are negatively charged?
   - **a.** protons
   - **b.** neutrons
   - **c.** molecules
   - **d.** electrons

6. Two or more atoms can join to form a(n)
   - **a.** element.
   - **b.** neutron.
   - **c.** molecule.
   - **d.** superatom.

7. The amount of matter in an object is its
   - **a.** weight.
   - **b.** mass.
   - **c.** volume.
   - **d.** density.

CHAPTER
Vocabulary

Name _____ Date _____

Choose the letter of the best answer.

8. The pull of gravity on an object determines that object's

a. mass.

b. volume.

c. weight.

d. electrical charge.

9. The amount of space being taken up by matter is known as its

a. volume.

b. weight.

c. mass.

d. density.

10. Anything that has mass and volume is

a. metallic.

b. matter.

c. gaseous.

d. atomic.

11. The amount of mass for each milliliter of a substance determines the substance's

a. weight.

b. buoyancy.

c. density.

d. volume.

12. An object's resistance to sinking is called

a. weight.

b. buoyancy.

c. volume.

d. surface tension.

13. The property that allows matter to be bent, flattened, or hammered without breaking is

a. malleability.

b. surface tension.

c. ductility.

d. buoyancy.

14. What happens to a metal that is left exposed to the environment and combines chemically with a nonmetal?

a. It shrinks.

b. It becomes a metalloid.

c. It corrodes.

d. It becomes a nonmetal.