Contents

TEACHER GUIDE

STUDENT HANDOUTS

EASY-MARKING™ ANSWER KEY 20

MINI POSTERS 22

NAME: _____

Before You Read

What Are Molecules?

1. Circle T if the statement is TRUE or F if it is FALSE.

T F **a)** Connecting links between atoms are called **bonds.**

T F **b)** Atoms contain more than one molecule.

T F **c)** All particles in a pure material are the same.

T F **d)** Outer electrons form links that hold atoms together.

T F **e)** New molecules are formed during physical changes.

2. Put a check mark (✓) next to the answer that is most correct.

a) All organic molecules contain the element

- ○ **A** calcium
- ○ **B** carbon
- ○ **C** iron
- ○ **D** nitrogen

b) Which is true of all polymer molecules?

- ○ **A** They are all gases.
- ○ **B** They are all very long.
- ○ **C** They can all be used as fuel.
- ○ **D** They are all made in factories.

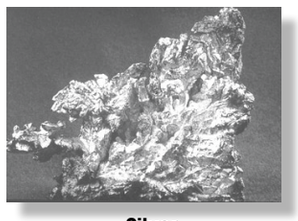
c) Which of these contains one or more bond?

- ○ **A** all atoms
- ○ **B** all materials
- ○ **C** all molecules
- ○ **D** all particles

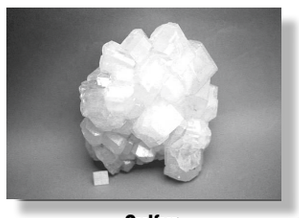
Reading Passage

NAME: _____

What Are Molecules?



Silver



Sulfur

Some atoms are separate from each other and other atoms are fastened together. Groups of atoms fastened together are called **molecules**. When atoms fasten together to form molecules it is called a chemical change. When molecules break up into separate atoms, that is a chemical change too.

In molecules, atoms are held together by connecting links. These links are called **bonds**. Atoms become connected when some of the electrons from each atom act together to form a bond. Not all electrons can help form bonds. Only the electrons farthest from the nucleus form bonds. Also, not all atoms can bond together. The atoms must have the right number of electrons with the right energy to form a bond. The pictures show what happens when silver atoms bond to sulfur atoms to form silver sulfide.

Silver atoms bond to sulfur atoms to form silver sulfide

Complete these sentences by filling the blanks with the words below. Use each word once.

chemical **molecules** **atoms**

Bonds connect _____ to form _____. A _____ change happens whenever bonds are formed or broken.

Atoms and molecules are two kinds of **particles**. When all the particles in something are the same, it is called a **pure material**. All the particles in pure gold are gold atoms. All the particles in pure water are water molecules.

Scientists often use **chemical symbols** instead of names to talk about atoms. For an atom of oxygen they write "O". For an atom of sulfur they write "S". For some atoms the symbol is a big letter and a little letter. Aluminum is "Al". The symbol can mean just one atom or it can mean a material made of those atoms.

After You Read

NAME: _____

What Are Molecules?

1. Circle T if the statement is TRUE or F if it is FALSE.

T F **a)** Water molecules are polymers.

T F **b)** Sodium chloride is an organic molecule.

T F **c)** The letter "O" can mean "one oxygen atom."

T F **d)** A "pure material" can contain many kinds of molecules as long as they are pure.

T F **e)** Chemical bonds between atoms are formed by outer protons.

T F **F)** Any atom can form a molecule with any other atom.

2. Write each word beside its meaning. Some words will not be used.

bond	material	molecule
organic	polymer	symbol

_____ **a)** a short way to write the name of an atom

_____ **b)** the connecting link between atoms on a molecule

_____ **c)** a molecule that contains carbon

_____ **d)** a long molecule with repeating groups of atoms

3. When two atoms bond together to form a molecule, which parts of the atoms become part of the bond?

_____

_____

NAME: _____

After You Read

What are Molecules?

4. What is part of every *organic* molecule?

_____

_____

5. What kind of molecule is a *polymer*?

_____

_____

Extensions & Applications

6. Learn more about atoms and molecules by studying the materials around you. Some things you often see around you are made of separate atoms. Others are made of molecules. All of the materials listed below are **pure materials**. Some are made of **atoms**, and some are made of **molecules**.

iron	**water**	**oxygen**	**helium**	**neon**	**aluminum**
baking soda	**silver**	**rust**	**charcoal**	**sugar**	

For this activity make a chart like the one below:

A. MADE OF SEPARATE ATOMS		B. MADE OF MOLECULES	
Common Name	Scientific Name	Common Name	Scientific Name

Put each material above in the correct list.
Some of these materials have scientific names. For those that do, write the **scientific name** next to its common name. Looking the names up in a large dictionary will help with some of the materials. Your teacher may also be able to tell you books or websites that will help.
See if you can find any other pure materials to **add** to the list. Try looking in the bathroom, kitchen, classroom, supermarket, and outdoors.

Hands-On Activity # 2

Compounds and Molecules

On page 14, you saw pictures of the elements silver and sulfur and of the compound silver sulfide.

Try to find more pictures of elements and the compounds they form.

You can usually find a picture of a material on the Internet by searching for its name. Some websites have pictures of all the elements and some have pictures of many compounds. You may be able to find a periodic table that shows a picture of each element in its square.

If you cannot copy and print the pictures, try to **draw** or **describe** the materials. It is interesting when the compound looks very different from the elements they are made of.

Here are some elements and compounds you can look for. You can ask your teacher for other ones.

- **Elements sodium (Na) and chlorine (Cl) form the compound sodium chloride.**
- **Elements silver (Ag) and chlorine (Cl) form the compound silver chloride.**
- **Elements calcium (Ca) and carbon (C) form the compound calcium carbide.**
- **Elements lead (Pb) and sulfur (S) form the compound lead sulfide.**
- **Elements magnesium (Mg) and iodine (I) form the compound magnesium iodide.**

If you can find how the compound is used, tell about it below the pictures. You may find other interesting compounds to look for in books or by asking your teacher.

NAME: _____

After You Read

Word Search

Find all of the words in the Word Search. Words are written horizontally, vertically, diagonally, and some are even written backwards.

B	O	C	P	E	R	I	O	D	I	C
D	X	F	G	H	P	J	N	K	L	W
R	I	T	Y	U	R	U	P	S	D	L
E	D	K	R	J	O	H	O	G	F	A
L	E	E	L	P	T	E	Z	R	X	I
C	S	Y	M	B	O	L	S	A	G	R
I	N	O	O	O	N	E	B	V	C	E
T	C	M	T	N	L	M	R	W	L	T
R	L	P	A	D	Y	E	T	E	R	A
A	E	K	J	H	B	N	C	G	F	M
P	V	T	C	M	X	T	Z	U	S	D
B	N	M	U	T	R	E	N	I	L	Q
Y	T	N	M	O	D	E	L	R	W	E
P	S	D	N	E	U	T	R	O	N	F

ATOM
BOND
COMPOUND
ELECTRON
ELEMENT
GAS
GROUP
INERT
MATERIAL
MOLECULE
NUMBER
OUTER
OXIDE
PARTICLE
PERIODIC
PROTON
SYMBOLS
NEUTRON
MODEL

NAME: _____

Reading Passage

Comprehension Quiz

Part B

Answer each question in complete sentences.

1. Use the word "particle" to explain what a **pure material** is. Name the **two** kinds of particles. (3)

2. Use the words "atom" and "material" to explain what an **element** is. (3)

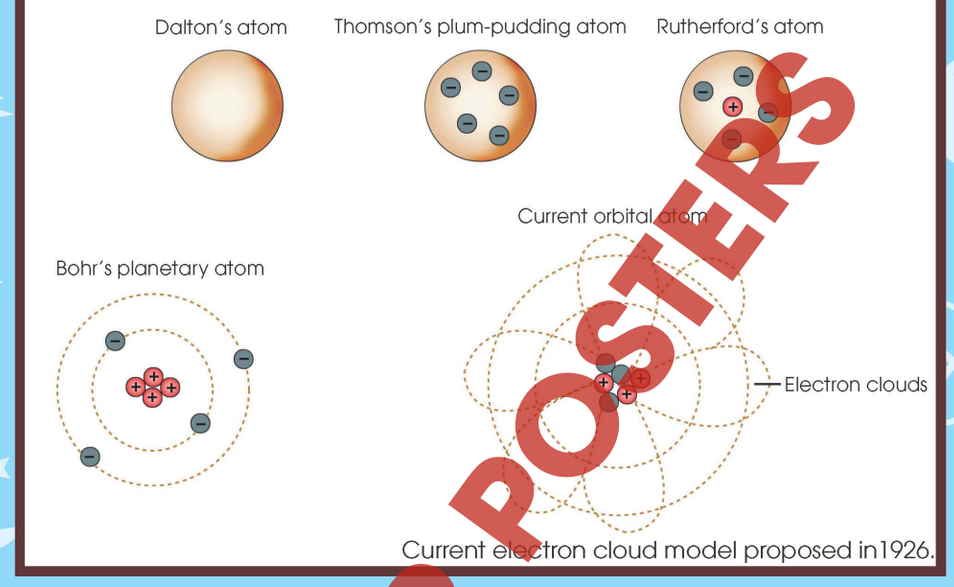
3. Use the words "element" and "material" to explain what a **compound** is. (3)

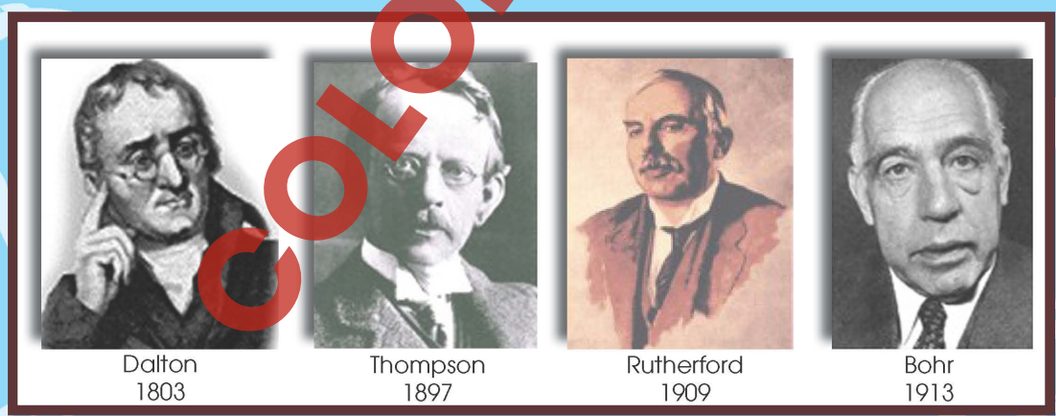
4. Tell how the elements in a "group" in the periodic table are arranged. Use the word "electrons" to explain why elements in a group have the same kind of properties. Where are the elements with the smallest atoms found in a group? (4)

5. Where are the **metals**, **nonmetals**, and **inert gases** found in the periodic table? (3)

SUBTOTAL: /16

History of the Atomic Model





NAME: _____

After You Read

What are Molecules?

4. What is part of every *organic* molecule?

_____

_____

5. What kind of molecule is a *polymer*?

_____

_____

Extensions & Applications

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EASY MARKING ANSWER KEY

4.

Carbon atoms

5.

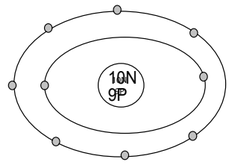
A very long molecule with repeating groups of atoms

6.

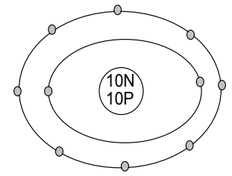
(Scientific names are in brackets)

A. iron, helium, neon, aluminum, silver, charcoal: (carbon)
B. water, oxygen, baking soda (sodium hydrogen carbonate), rust (iron oxide) sugar (sucrose)

Fluorine:



Neon:



Sodium: