Contents

TEACHER GUIDE

STUDENT HANDOUTS

EASY-MARKING™ ANSWER KEY

MINI POSTERS

Before You Read

NAME: _____

What Are Atoms?

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

T F **a)** People have always agreed that matter is made of atoms.

T F **b)** Some atoms are large enough to see with our eyes.

T F **c)** All molecules contain more than one atom.

T F **d)** Atoms and molecules are two kinds of particles.

T F **e)** Atoms are made of even smaller parts.

2. Complete each sentence with a word from the list. Use a dictionary to help you.

atom chemical change physical change molecule particle

a) Melting is a _____.

b) Molecules can break apart into _____s during a chemical change.

c) _____s can form new molecules.

d) All atoms are _____s.

e) Chemical properties tell how and when atoms form _____s.

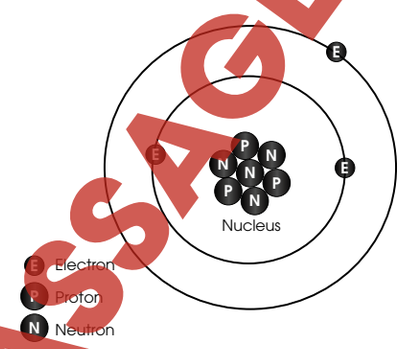
NAME: _____

Reading Passage

What Are Atoms?

Matter is made of **atoms.** Atoms are sort of like building blocks or bricks in a building. Like blocks and bricks, some atoms fit together well to make something larger and some don't.

To understand chemical changes, we need to understand what atoms are. Atoms are the smallest bits of matter that get changed around during a chemical change. But, like building blocks, atoms don't change so they will fit better. Think of a child playing with building blocks. She wouldn't saw a block in half to make it fit better.



Atomic Model

About 200 years ago, scientists agreed that matter is made of atoms. It took another 100 years to learn what the main parts of atoms are and how they are arranged. This picture shows the three main parts of an atom. They are electrons, protons, and neutrons.

This is called an **atomic model**. A model is not a true picture of a thing. Scientists use models like this to help explain things that are hard to picture exactly. These are some ideas that the atomic model helps us understand:

1. Atoms are mostly empty space.
2. The three main parts of an atom are **electrons**, **protons**, and **neutrons**.
3. Most of the mass of an atom is in the small center area called the **nucleus**. The nucleus is where all the neutrons and protons are found.
4. Electrons circle the nucleus at different distances.
5. Neutrons and protons have about the same mass. Electrons have much less mass than neutrons or protons.
6. The number of electrons in an atom equals the number of protons. The number of neutrons is about the same but can be a little different.
7. Electrons have a minus (or **negative**) electrical charge. Protons have a plus (or **positive**) electrical charge. Neutrons have no charge.

NAME: _____

After You Read

What Are Atoms?

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

a) Which is true about an atom?

- ○ **A** Atoms have no mass.
- ○ **B** Atoms are mostly empty space.
- ○ **C** Most of the space in an atom is taken up by the nucleus.
- ○ **D** Electrons have much more mass than protons or neutrons.

b) Which two things have about the same mass?

- ○ **A** protons and atoms
- ○ **B** atoms and electrons
- ○ **C** neutrons and protons
- ○ **D** electrons and protons

c) Which did scientists understand first?

- ○ **A** Matter is made of atoms.
- ○ **B** Electrons circle the nucleus.
- ○ **C** Atoms are mostly empty space.
- ○ **D** Atoms are made of electrons, protons, and neutrons.

2. Fill in each blank with a word from the list. Some words will be used more than once.

electron nucleus neutron proton

a) _____s circle the nucleus.

b) The _____ is made up of neutrons and protons.

c) _____s have a plus charge.

d) Most of the mass of an atom is in the _____.

e) Atoms have the same number of _____s and _____s.

f) _____s have no charge.

After You Read

NAME: _____

What Are Atoms?

3. Tell what kind of **electrical charge** electrons, protons, and neutrons have.

_____

_____

4. Where are electrons, protons, and neutrons found in an atom?

_____

_____

Extensions & Applications

5. On the next page are a table and a diagram about atoms for you to complete.

a) Show what you have learned about electrons, protons, and neutrons by filling in the table on the next page.

- **A.** In each box under Mass, write **a lot** or **a little.**
- **B.** In each box under Charge, write **plus, minus** or **zero.**
- **C.** In each box under Position, write **inside** or **outside.**
- **D.** In the last boxes on the right, put a **check mark** in the two boxes for the parts of an atom that have equal mass.

b) Show what you have learned about electrons, protons, and neutrons by labeling the diagram of the atom on the next page.

6. a) After scientists decided matter is made of atoms, it took about 100 years to figure out the parts of an atom. Why do you think it took so long?

_____

_____

b) Is an atomic model the same as a real atom?

_____

_____

c) How is an atomic model useful?

_____

_____

Hands-On Activity #1

Atomic Models

For this activity you will DRAW atomic models of these three atoms:

- fluorine (F)
- neon (Ne)
- sodium (Na)

Make them look like the model on page 8. Put two electrons in the first ring and no more than eight in the second. Make a third ring if you need it.

You do not have to draw each neutron in the nucleus. Just use numbers, and write **N** for neutrons and **P** for protons. For example, the nucleus of FLUORINE would look like this:

NEON has 10 neutrons, and SODIUM has 11 neutrons. Use the periodic table to find the number of protons and electrons. Remember to label each atomic model with the correct name.

After You Read

NAME: _____

Crossword Puzzle!

Across

2. All particles are the same in a ____ material
3. The kind of molecules that contain carbon
6. The smallest bit of an element
8. An element that reacts easily with metals
12. Elements that don't react with anything are _____
13. An up-and-down row in the periodic table
14. A pure material made of more than one element
15. It connects atoms in a molecule

Down

1. A metal and oxygen form a metal _____
2. Found inside the nucleus of an atom
4. Groups 1 and 17 are very _____
5. What you call an atom or a molecule
7. It circles the nucleus
9. Bonds are formed by the _____ electrons
10. An atomic _____ shows how the parts of an atom are arranged
11. It is in the nucleus and has no charge

Word List

Bond	Reactive	Inert
Outer	Oxide	Atom
Pure	Proton	Neutron
Organic	Compound	Model
Particle	Group	Electron
Nonmetal		

Reading Passage

NAME: _____

Comprehension Quiz

25

Part A

This is a model of a beryllium atom.
Label each part of the atom. Tell the name, charge, and mass of the part. For charge, write **minus**, **plus**, or **zero**. For mass, write **not much** or **a lot**.

1. Name _____
2. Charge _____
3. Mass _____

3

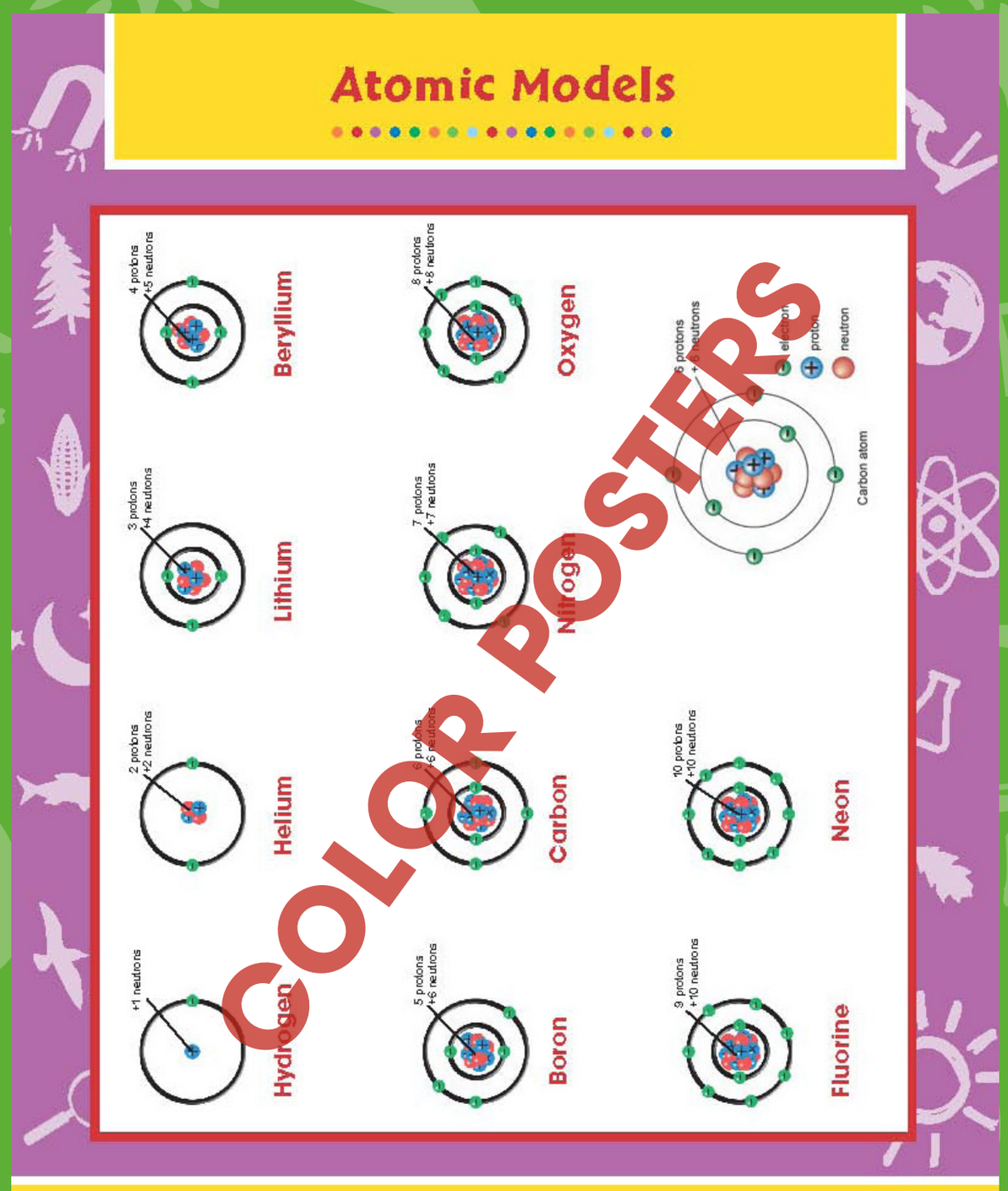
1. Name _____
2. Charge _____
3. Mass _____

3

1. Name _____
2. Charge _____
3. Mass _____

3

SUBTOTAL: /9



After You Read

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What Are Atoms?

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_____

_____

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_____

_____

b) Is an atomic model the same as a real atom?

_____

_____

c) How is an atomic model useful?

_____

_____

EZ

3.

Electrons – minus/ negative charge
Protons – plus/ positive charge
Neutrons – no charge

4.

Electrons circle the nucleus, protons and neutrons are found in the nucleus (or in the center).

5.

a)

A. E - a little, P - a lot, N - a lot
B. E - minus, P - plus, N - zero
C. E - outside, P - inside, N - inside
D. P - ✔, N - ✔

b) (E) (P) (N)

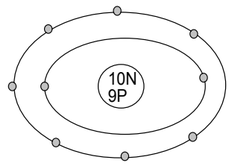
6.

a) Answers will vary

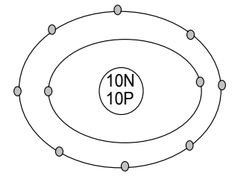
b) No

c) Helps us explain what atoms are by giving a model of what is hard to picture exactly. Answers will vary.

Fluorine:



Neon:



Sodium: