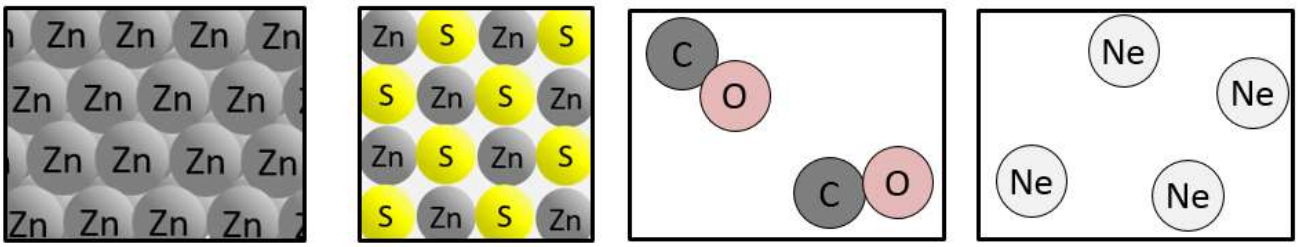
Chapter 1 Practice

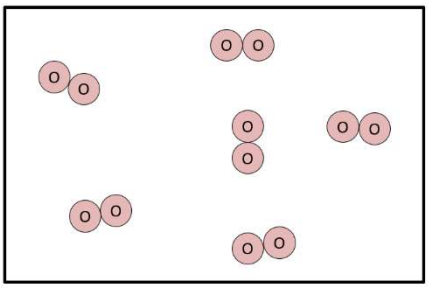
1.2 Describing Matter

1. In the images below, the spheres represent atoms. The symbols within the spheres indicate the type of atom present. Describe the components of each box as an element or a compound.



Element Compound Compound Element

2. In the image below, each sphere represents an oxygen atom. Does this picture indicate an element or a compound? How many atoms are present? How many molecules are present?



Element—only one type of atom.
There are 12 atoms present.
There are 6 molecules.

3. How does the arrangement of particles differ between a solid, liquid, and gas?

Solid—particles pack closely together and are held in fixed positions.
Liquid—particles are close together but move freely past each other.
Gas—particles are far apart and move freely with very few interactions between particles.

4. What is the difference between a homogeneous mixture and a heterogeneous mixture?

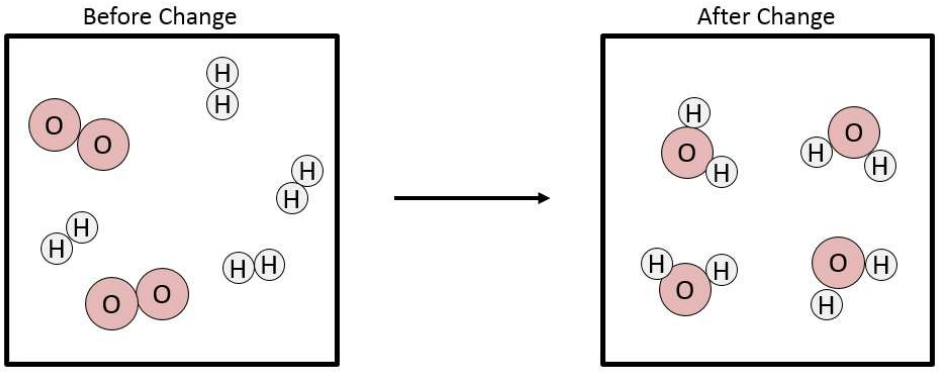
Homogeneous mixture—components are blended evenly throughout.
Heterogeneous mixture—components are <u>not</u> blended evenly.

5. Identify each of these properties as physical or chemical:

a. The temperature of the water in a lake is 15 °C. physical
b. When paper burns, it forms two new compounds, carbon dioxide and water. chemical
c. A tire weighs 23 pounds. physical
d. hydrogen gas reacts with oxygen gas to form water. chemical
e. Ice melts at 0 °C. physical

1.3 Energy and Change

6. The image below represents the atoms of a substance before and after a change occurs. Use this image to complete the table below.



	Before Change	After Change
Is this an element, a compound, or a mixture?	Mixture	Compound
How many atoms are present?	12	12
How many molecules are present?	6	4

7. Is the change shown in Question 6 a chemical change or a physical change? chemical

8. In the change shown in Question 6, hydrogen gas and oxygen gas combine to form water. This change releases heat energy. Based on this, is this reaction endothermic or exothermic? Which has more potential energy—hydrogen gas and oxygen gas or water? Which is more stable?

Releases energy—exothermic.
The mixture of hydrogen gas and oxygen gas had more potential energy.
The water is more stable.

1.4 The Scientific Method

9. What is the difference between a hypothesis and a theory?

A hypothesis is a tentative explanation that has not been tested. A theory is an idea that has been tested and refined; it is also a way of thinking about a particular topic.

10. What does "paradigm" mean? Which is most closely related to a paradigm—a hypothesis, a theory, a scientific law, or an experiment?

A paradigm is a way of thinking about a particular topic. A theory is closely related to a paradigm.