

Attainment's
EXPLORE

CHEMISTRY

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STUDENT BOOK



Attainment's
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CHEMISTRY

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An Attainment Company Publication

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Printed in the United States of America.

ISBN: 978-1-64856-116-0

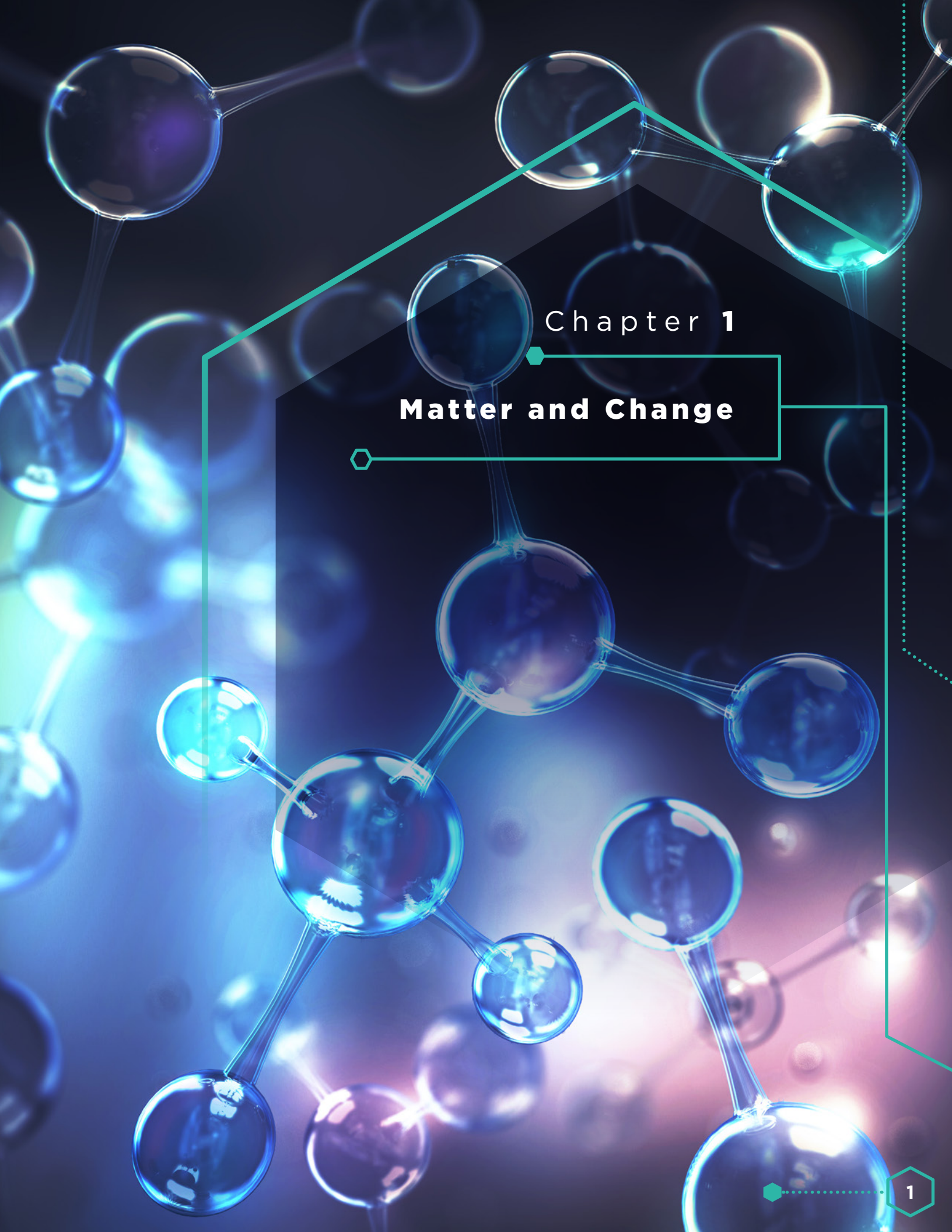


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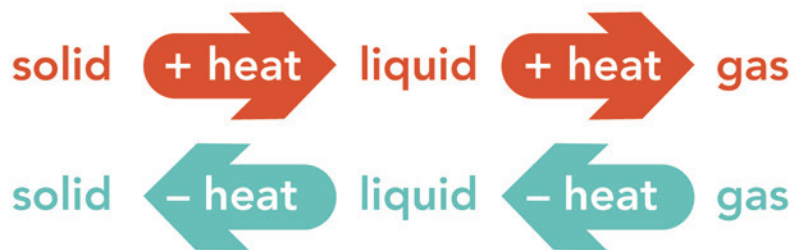
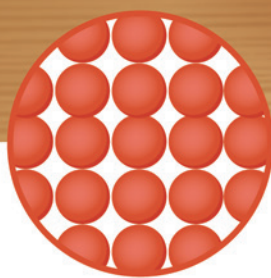
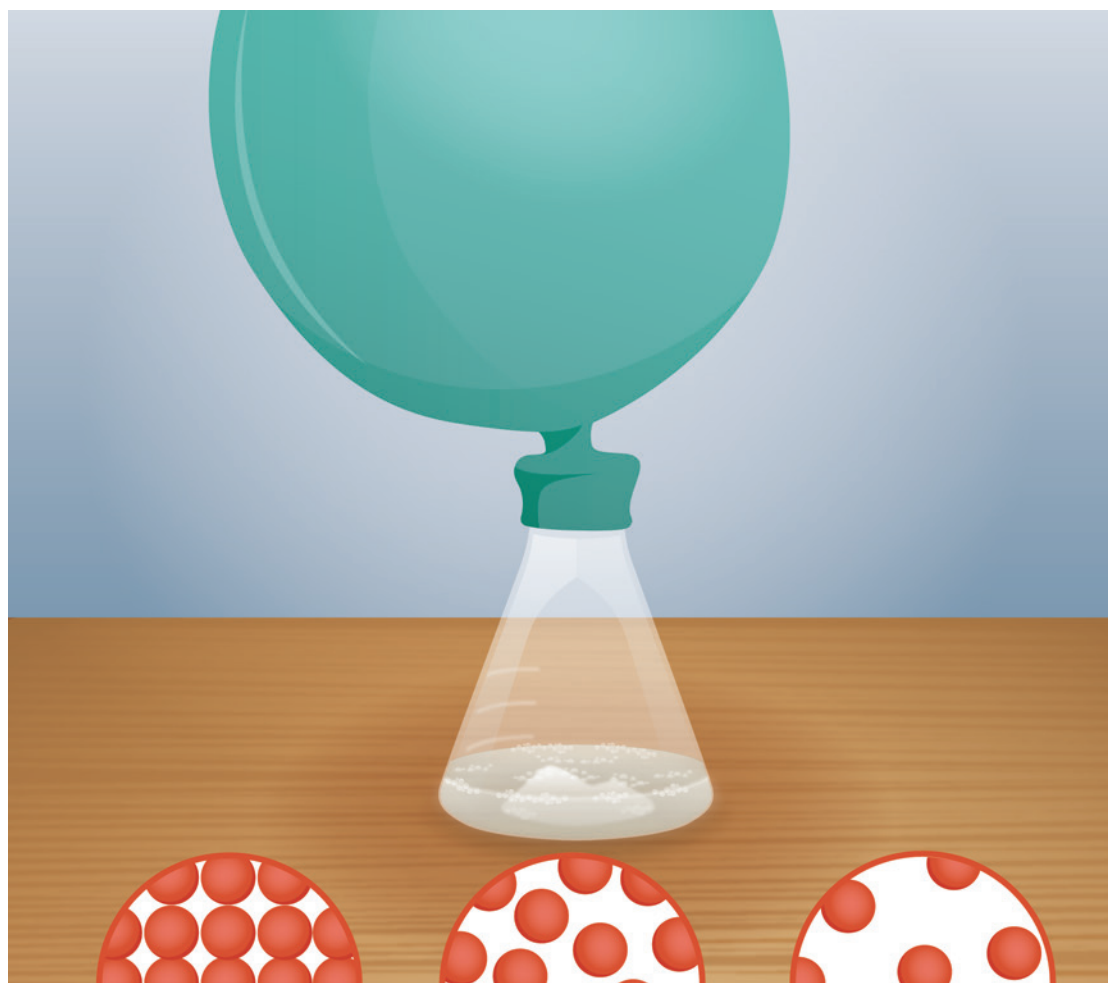


Chapter 1

Matter and Change

Chemistry studies matter and how it changes.

CHAPTER 1





BIG IDEAS



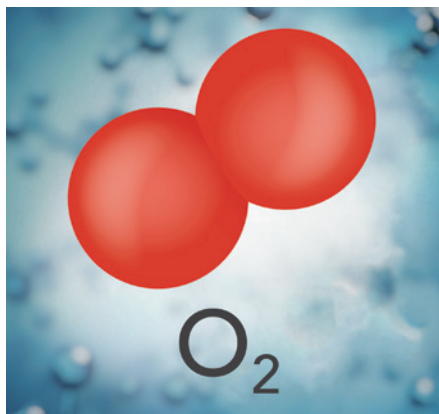
1

Matter makes up the stuff around us and takes up space.



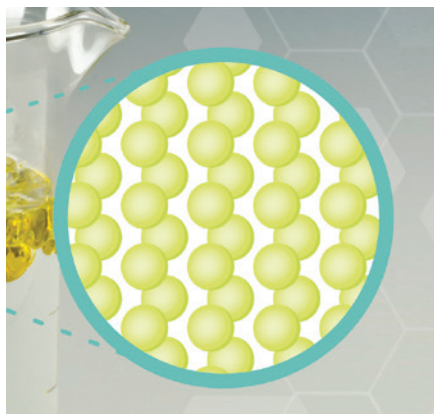
2

All matter is made of atoms.



3

Molecules are a combination of two or more atoms.



4

Elements have different properties.



5

Chemistry uses the metric system of measurement.

VOCABULARY



Mass

The amount of matter an object has



Atom

The smallest part of matter that keeps all its properties



Element

Matter that cannot be broken down into a simpler substance



States of matter

The different forms of matter, including solid, liquid, and gas



Chemical bond

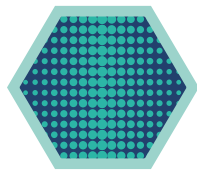
A force that holds atoms or molecules together

VOCABULARY



Compound

Two or more elements held together by a chemical bond



Density

How much space an object takes up compared to its mass



Periodic table

A table of all chemical elements in order of atomic number



Meter

How length is measured in the metric system, equal to 100 centimeters



Kilogram

How mass is measured in the metric system, equal to 1,000 grams



1

Matter makes up the stuff around us and takes up space.

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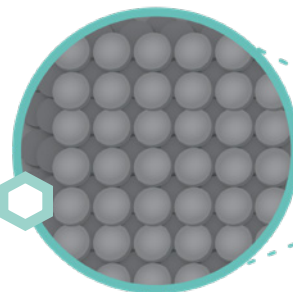
Chemists do experiments to understand the world around us.

Chemistry explains the world we live in and how things work. Everything involves chemistry—living and nonliving things, our food, and our clothes. It is the study of matter and how matter changes. Matter is anything that has **mass** and takes up space. Chemists make observations about the world around them and then use experiments to discover why things are the way they are.



Mass

The amount of matter an object has



Everything around us is made of tiny atoms.



The water you drink is matter.

Matter is made up of tiny **atoms**, which will be discussed in detail in future chapters. Matter can look different at certain temperatures. It can also combine with other matter. Certain properties of matter can be seen, like its color, while experiments must be done to find out other information.



Atom

The smallest part of matter that keeps all its properties



Sometimes matter is so tiny that you can't see it without using a tool, like a microscope. Some things are so small they can't even be seen with a microscope.

DID YOU KNOW





DISCOVERY

Why do some things float on water and others sink?

Have you ever wondered why certain things, like beach balls, float on water, while other things, like rocks, immediately sink?



Many pool toys float on water.

Why do you think some things float on water and others don't? Think about which of the following you believe will float on water: a coin, a sponge, an apple, a marble, a can of soda, and a can of diet soda. Let's try it out. Fill a large container with water and add these items to it. Are you surprised? What does this tell you about the density of each object?



The compound sodium chloride is found in ocean water.

Do you think the same things that float on fresh water will also float on salt water in the oceans?

Salt water has a higher density than the fresh water you drink. Does this mean that more or less objects will float on salt water? Let's try it out again! Add an uncooked egg to the same container of water that you used before. What do you notice? Does it sink or float? Now, let's add some salt to this water. Does the egg sink or float? What does this tell you about salt? Is it more or less dense than water?



CHAPTER 1 QUIZ

Choose the correct answer.

1 What does chemistry study?

- (A) Life on Earth
- (B) Different mathematics classes
- (C) Matter and how it changes

2 What can make matter look different?

- (A) Changes in temperature
- (B) The metric system
- (C) The periodic table

3 Why can't atoms be seen with our own eyes?

- (A) They don't exist
- (B) They're extremely small
- (C) They're only in the air

4 In what state of matter do atoms move the fastest?

- (A) Gas
- (B) Solid
- (C) Liquid

5 Which atoms can combine?

- (A) Only atoms from the same element
- (B) Only atoms from different elements
- (C) Atoms from the same or different elements



CHAPTER 1 QUIZ

Choose the correct answer.

6 What makes one molecule different from another?

- (A) The number of atoms of each element they contain
- (B) The kilogram
- (C) The meter

7 Can the same element have different properties?

- (A) Yes, based on what form it is in
- (B) Elements do not have properties
- (C) No, all elements have the same properties in all forms

8 What is true about the physical properties of an element?

- (A) They can only be seen through a reaction with other matter
- (B) They can be seen or felt without changing the element
- (C) They only show us the element's color

9 Why does chemistry use the metric system of measurement?

- (A) It is the only way to measure length
- (B) Most countries do not use the metric system in everyday life
- (C) So scientists can use the same measurements when sharing information

10 What is true about the metric system of measurement?

- (A) All units are either divided or multiplied by a factor of 10
- (B) Units are divided or multiplied by a factor of 15
- (C) Units cannot be divided or multiplied