MODULE 1

The Basics

Introduction & Atoms and Molecules

Read pages 1–7 in the text. To help you remember the new information you will learn as you read, explain what elements, atoms, molecules, and compounds are in the graphic organizer below.

Complete experiment 1.1 and fill out the lab report. Then answer "On Your Own" questions 1.1–1.2.

Pure Substances

Elements

Compounds

Atoms

Molecules

Elemental molecules are two or more atoms of any one pure substance. Examples include hydrogen gas (H_2) and oxygen gas (O_2).

Molecules

Molecular compounds are

ON YOUR OWN

1.1 A molecule is broken down into its constituent atoms. Do these atoms have the same properties as the molecule?

ON YOUR OWN

1.2 When salt is dissolved in water, it actually breaks down into two different substances. Is salt composed of atoms or molecules?

Measurement and Units & The Metric System

Read pages 7–9 in the text. As you read about the different physical quantities scientists may need to measure, complete the table below to help you remember their base units in both the metric and English systems. Afterwards, you can learn about the history of measurement and what God's Word has to say about measuring by completing the following activities.

PHYSICAL QUANTITY	BASE METRIC UNIT	BASE ENGLISH UNIT
Mass		
Distance		
Volume		
Time		

DIGGING DEEPER
The History of Measurement and Metrics

If you'd like to know more about how people have measured things through the ages, as well as how the metric system was developed, check out the following website. Very interesting!

link.apologia.com/ECPS2N/1.1

Write in the space below one fact that you didn't know before you looked up this website.

WHAT DOES GOD'S WORD SAY?

The Bible talks about measuring! Look up the following scripture and write down what God tells us to measure or number and why.

Psalm 90:12

Manipulating Units & Converting between Units

Read pages 10–14 in the text, paying careful attention to example 1.1. If you still need more help with manipulating and converting units, look up the video at the following website.

link.apologia.com/ECPS2N/1.2

Then answer "On Your Own" questions 1.3–1.5, making sure to show all your work.

ON YOUR OWN

1.3 A student measures the mass of a book as 12,321 g. What is the book's mass in kg?

ON YOUR OWN

1.4 If a glass contains 0.121 L of milk, what is the volume of milk in mL?

ON YOUR OWN

1.5 In the National Basketball Association (NBA), the distance from the three-point line to the basket is 723.9 cm at the top of the arc. What is this distance in meters?

Converting between Systems

Read pages 14–17 in the text, paying careful attention to example 1.2. As you read, complete the table below to help you remember the relationship between the English and metric systems. Complete "On Your Own" questions 1.6–1.8, showing all your work. Then complete experiment 1.2 and fill out the lab report."

MEASUREMENT	ENGLISH/METRIC RELATIONSHIP
Distance	
Mass	
Volume	

ON YOUR OWN

1.6 A piece of yarn is 3.00 inches long. How many centimeters long is it?

ON YOUR OWN

1.7 How many slugs are there in 12 kg?

ON YOUR OWN

1.8 If an object occupies 3.2 gallons of space, how many liters of space does it occupy?

Concentration

Read pages 17–20 in the text. Complete experiment 1.3 and fill out the lab report. Use the space below to explain the scientific term "concentration" in your own words. Then answer "On Your Own" questions 1.9–1.10.

Concentration

ON YOUR OWN

1.9 Muriatic acid is sold in hardware stores for use in cleaning. Pool owners, for example, use it to clean hard water stains and algae stains from their pools. Its active ingredient is hydrochloric acid. The Works® is a toilet bowl cleaner with hydrochloric acid as its active ingredient. There are approximately 350 grams of hydrochloric acid in a liter of muriatic acid, and there are approximately 30 grams of hydrochloric acid in a liter of The Works. Why is muriatic acid a more powerful cleaner than The Works?

ON YOUR OWN

1.10 Sodium (so' dee uhm) is a necessary part of a healthy diet. If a person does not ingest enough sodium every day, that person will get sick and perhaps die. Nevertheless, some people try to limit their sodium intake by eating a low-salt diet. How can it be good to limit your sodium intake, even though sodium is a necessary part of body chemistry?

Complete the study guide questions and have your parent correct them. If you need additional practice, you may wish to complete the optional summary for this module, located in the summary section at the back of this notebook. Take time to understand anything that you may have missed and review your notes before taking the test for this module.

Study Guide

1 Write out the definitions for the following terms:

a. Atom

b. Molecule

c. Concentration

2 Fifty grams of a carbon disulfide can be broken down into 42.1 grams of sulfur and 7.9 grams of carbon. Is carbon disulfide made up of atoms or molecules?

3 If you put iron near a magnet, the iron will be attracted to the magnet. Rust is made up of molecules that contain iron atoms and oxygen atoms. Rust is not attracted to a magnet. If rust contains iron atoms, and iron is attracted to a magnet, why isn't rust attracted to a magnet?

4 A statue is made out of copper and displayed outside. After many years, what color will the statue be?

5 Have scientists actually seen atoms?

6 Give the numerical meaning for the prefixes "centi," "milli," and "kilo."

centi _____ kilo _____

milli _____

7 If you wanted to measure an object's mass, what metric unit would you use? What English unit would you use?

metric unit _____ English unit _____

8 If you wanted to measure an object's volume, what metric unit would you use? What English unit would you use?

metric unit _____ English unit _____

9 If you wanted to measure an object's length, what metric unit would you use? What English unit would you use?

metric unit _____ English unit _____

10 How many centimeters are in 1.3 meters?

11 If a person has a mass of 75 kg, what is his or her mass in grams?

12 How many liters of milk are in 0.500 gallons of milk? (1 gal = 3.78 L)

13 A meterstick is 100.0 centimeters long. How long is it in inches? (1 in = 2.54 cm)

14 Ozone is a poisonous gas that can build up in the air in dense cities. Thus, there are many environmental initiatives to lower the amount of ozone in the air we breathe. One way you can make ozone, however, is by baking bread. The nice smell you associate with baking bread is actually due, in part, to ozone. If ozone is poisonous, why is baking bread not considered a dangerous activity?