

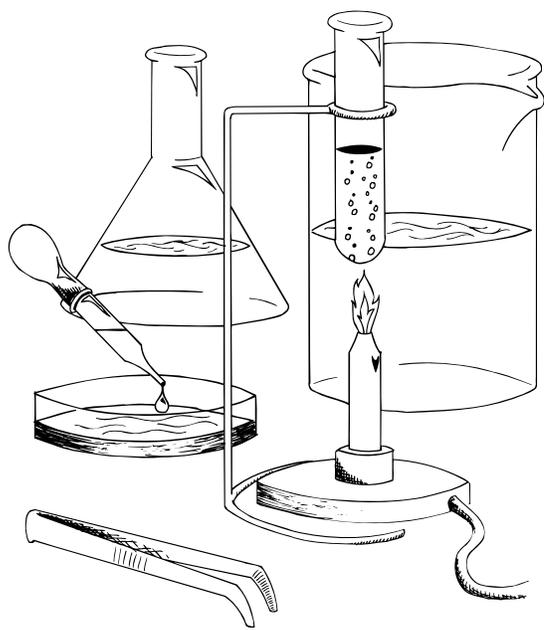
Christian Kids Explore

Chemistry



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Unit One

The Basics of Chemistry

In this unit we will begin exploring the world of chemistry and see just how wonderfully God has made the universe and every living thing. Studying chemistry, like other sciences, is a way to appreciate creation more deeply and examine the beauty of all that God has made.

The universe was created by God and is made up of matter and energy that can be studied. Everything that we see or touch is matter. Chemistry shows us God's laws about how that matter behaves and helps us to take better care of our resources. We will start by defining chemistry and looking at the tools of the chemist.

Additional Notes

Upon completing Unit One, the student should understand:

- The basic objectives of chemistry
- The chemistry laboratory and tools of the chemist
- The definition of matter
- The composition of matter

Unit One Vocabulary Words

- chemistry
- chemist
- matter
- biology
- biochemistry
- organic chemistry
- inorganic chemistry
- lab coat
- safety glasses
- apparatus
- interpolate
- atoms
- energy
- physics
- states
- physical properties
- chemical properties
- element
- compound
- mixtures

Materials Needed for This Unit

- cereal box
- a cleaning agent (such as window cleaner or general purpose cleaner)
- shampoo
- ordinary household measuring cup marked in metric units (milliliters) or a graduated cylinder if available
- small juice glass or cup
- notebook
- pencil
- salt (regular table salt)
- a cup of fine sand
- bowl (like a cereal bowl)
- ordinary coffee filter
- a funnel
- clear 16-ounce glass jar or drinking glass
- aluminum pie pan
- water
- measuring cup
- one hundred 3x5 lined index cards.
- cooking oil
- sugar
- mustard
- six small bowls (like cereal bowls)
- paper adhesive labels
- clear 16-ounce glass jar or drinking glass
- safety glasses and smock

Additional Notes





Lesson 1

INTRODUCTION TO CHEMISTRY



Teaching Time:

What Is Chemistry?

What do you think of when someone says the word *chemistry*? Do you think about test tubes and glass containers filled with mysterious looking yellow-green liquid? Do you think of jars of white powder? Maybe you think of a scientist wearing a white lab coat, mixing things together, and watching as the mixture bubbles and rumbles. It is true that chemists usually wear lab coats and often use various white, powder solids and colorful liquids. However, chemists also study substances that are familiar to us such as gold, silver, salt, water, and even food items, such as sugars and fats.

So, just what is chemistry anyway? **Chemistry** is the structured and formal study of matter, how it can change, and how it reacts with other matter. A **chemist** is a specially trained scientist that studies and works with matter. The word **matter** is used to mean anything that takes up or occupies space. A few examples of matter include dirt, sand, water, metals, rocks, salt, and wood. There are many other examples. Even the air we breathe is matter.



➔ Name It!

chemistry

The structured and formal study of matter, how it can change, and how it reacts with other matter.

chemist

A specially trained scientist that studies and works with matter.

matter

Anything that takes up or occupies space.

➔ Name It!**biology**

The study of living things.

biochemistry

The study of the matter of living things.

organic chemistry

The study of matter that contains a substance called carbon.

carbon

The main ingredient in the fuels and oil used in our cars and aircraft. It is also part of the clothes we wear and the food we eat. One of the main ingredients for life itself and an essential ingredient for parts of our bodies and how we function.

inorganic chemistry

The study of matter that does not contain any carbon.

Living things (such as animals, plants, tiny bacteria, and really tiny viruses) are made up of matter also. **Biology** is the study of living things, and chemistry has an important role in biology. When chemists study the matter of living things, it is called **biochemistry**. Another very important type of chemistry, called **organic chemistry**, works with matter that contains a substance called carbon. **Carbon** is the main ingredient in the fuels and oil used in our cars and aircraft. It is also part of the clothes we wear and the food we eat. Did you know that a diamond is made of carbon? Carbon is also one of the main ingredients for life itself and an essential ingredient for parts of our bodies and how we function. **Inorganic chemistry** is the study of matter that does not contain any carbon. This would include substances like pure metals, salts, acids, and bases.

But chemistry is more than studying; it has many practical uses. Medical doctors, pharmacists, geologists, archaeologists, farmers, builders, and even cooks benefit from the knowledge and use of chemistry. It is the science of chemistry that gives us ways to make new materials or products that will help us in everyday life. Chemistry also provides the building blocks for medicines used to cure sicknesses like colds and flu or even more serious diseases like cancer and heart disease.

In our beginning study of chemistry we will be looking more closely at the different types of chemicals, how they react together, and what makes them unique. By learning about chemistry, we can better appreciate the created world. It is important to remember that when we study chemistry, we are really looking at God's creation. Chemists can see what matter is made of and how that matter reacts with other matter. The way matter behaves isn't an invention of the chemist — it is a creation of God. Remember, Genesis 1 tells us about the creation of the world, including the creation of matter.

God created the very first chemicals. He created the order of the entire universe, which includes the properties of all the chemicals. He created each and every living thing, which is made up of those chemicals. Most importantly, He made each one of us in a

special way. That means we are more than just chemicals — we have a spirit that can relate to God as our Creator.

In our study of chemistry, we will see the beauty of God's created world in the structure of the matter that is our world. In studying chemistry, we can see the work and thoughtfulness and intelligence of God.

Additional Notes

Review It

1. Chemistry is the structured and formal study of _____.
2. A _____ is a specially trained scientist that studies and works with matter.
3. God _____ the very first chemicals, and He created the order of the entire universe.
4. Organic chemistry is the study of matter that contains a substance called _____.
5. When chemists study the matter of living things, it is called _____.

Additional Notes

**Hands-On:****Discovering Matter**

You may not realize it, but one place we see lots of chemistry is in our homes. Besides the obvious matter that exists all around us, there are also some great examples of chemical substances. Chemistry has a great impact on our daily lives. It's surprising just how many chemical products we have around us. Fortunately, there are labels on things that allow us to view their contents and see just what chemicals there are inside. In this first Hands-On, we will examine the labels on three products and then list their ingredients.

Equipment Needed

- cereal box
- a cleaning agent (such as window cleaner or general purpose cleaner)
- shampoo

Activity

1. Choose one product in each of the three categories listed in the chart that follows.
2. Write the product name in the space provided at the top of the chart.
3. List the ingredients for each product in the chart.
4. See the example in the first column.

(Note: some of the ingredients may be unfamiliar and may even seem like an impossible word to pronounce, but it will help you

Soft drink	Cereal	Cleaning Agent	Shampoo
Name: <i>Coke</i>	Name:	Name:	Name:
<i>Carbonated water</i>			
<i>Sucrose</i>			
<i>Caramel color</i>			
<i>Phosphoric acid</i>			
<i>Natural flavors</i>			
<i>Caffeine</i>			

understand that the things that seem common to our lives may actually be complicated chemicals.)

Additional Notes

Think about It

1. Had you ever heard of any of the ingredients before?
Which ones?

📖 Scripture

In the beginning God created the heavens and the earth. (Genesis 1:1)

🔍 Discovery Zone

Did you know that butter floats? Try it! Put a spoonful of butter in a glass of water and see what happens. We will find out why in lesson 24.

2. Which products had the most ingredients?

2. Do you think the ingredients were listed in a particular order?

3. Were there any ingredients in more than one product? Which ones?

