LIFE

The World of Plants

1:1 Answers IN GENESIS™

GOD'S DESIGN®

4th Edition

Debbie & Richard Lawrence

God's Design® for Life is a complete life science curriculum for grades 3–8. The books in this series are designed for use in the Christian school and homeschool, and provide easy-to-use lessons that will encourage children to see God's hand in everything around them.

Printed January 2016

ISBN: 978-1-62691-424-7

Published by Answers in Genesis, 2800 Bullittsburg Church Rd., Petersburg KY 41080

Book design: Diane King
Editor: Gary Vaterlaus

Printed in China

Welcome to GOD'S DESIGN®

LIFE

You are about to start an exciting series of lessons on life science. *God's Design® for Life* consists of three books: *The World of Plants*, *The World of Animals*, and *The Human Body*. Each of these books will give you insight into how God designed and created our world and the things that live in it.

No matter what grade you are in, third through eighth grade, you can use this book.

3rd–5th grade

Read the lesson.

Do the activity in the light blue box (worksheets will be provided by your teacher).

Test your knowledge by answering the **What did we learn?** questions.

Assess your understanding by answering the **Taking it further** questions.

Be sure to read the special features and do the final project.

There are also unit quizzes and a final test to take.

6th–8th grade

Read the lesson.

Do the activity in the light blue box (worksheets will be provided by your teacher).

Test your knowledge by answering the **What did we learn?** questions.

Assess your understanding by answering the **Taking it further** questions.

Do the challenge section in the light green box. This part of the lesson will challenge you to do more advanced activities and learn additional interesting information.

Be sure to read the special features and do the final project.

There are also unit quizzes and a final test to take.

When you truly understand how God has designed everything in our universe to work together, then you will enjoy the world around you even more. So let's get started!

UNIT 1

Introduction to Life Science

- **Identify** the six characteristics of living things.
- **Identify** the five kingdoms of living things.
- **Identify** the method of classification of living things.
- **Describe** the need for scientific names.
- **Describe** basic parts of a cell using models.

1

Is It Alive?

Biology is the study of living things.

How do we know if something is alive?

Words to know:

respiration

Challenge words:

spontaneous generation
abiogenesis
law of biogenesis
chemical evolution

How can we tell if something is alive? Look at the things around you. Is an animal alive? Is a plant alive? Is the table alive? How about your computer? Some things are obviously alive while other things are obviously not alive. Still other things might be a little more confusing. We are getting ready to study plants, and the study of plants is part of the study of life science. Before we can study life science, we need to know what is considered alive scientifically and what is not. It will help you to identify living things if you realize that all living things have six common characteristics:

1. Living things eat or absorb nutrients. All living things need food and water. Most animals take in food and water through their mouths. Plants absorb nutrients from the soil through their roots.
2. Living things perform **respiration**—they "breathe" or exchange oxygen and carbon dioxide as they turn food into energy. Both plants and animals need oxygen to survive. Animals get oxygen from their surroundings in many different ways. We are most familiar with animals that breathe with lungs. But some animals, such as fish, breathe with gills, and others, such as Earthworms, can absorb

oxygen through their skin. Plants also "breathe" by exchanging carbon dioxide and oxygen through their leaves. During the day, when sunlight is abundant, plants use carbon dioxide to produce food through photosynthesis; however, at night, plants use oxygen to break down some of that food for energy to grow. The type of respiration performed by all living things is called cellular respiration. It involves using oxygen to break down sugars to release energy needed for the processes of life. Different processes are used to exchange the gases required for and produced by cellular respiration—how it "breathes"—but all organisms use energy.

3. Living things grow. All plants and animals have a life cycle in which they are born, develop and grow, and then die.
4. Living things reproduce. Animals and plants reproduce in many different ways, but God designed each living thing to be able to produce more of its own kind. Most animals have babies and most plants produce seeds, but there are other ways of reproducing such as dividing or producing spores.
5. Living things move and respond to their environment. Animals can move in many different ways: some run, some fly, some slither, some swim. Plants can't move around like animals but they do respond to their environment. Plants turn their leaves to face the sun. Their roots grow down and their stems grow up. Many flowers close at night and open in the morning. This is their way of moving and responding.
6. Living things have cells. Even though we can't see plant and animal cells without the aid of a microscope, we know that all living things are made up of living cells.

Are Plants Alive Biblically?

When we talk about the study of living things from a scientific perspective, we use a definition of living things that is based on what we can observe about the organism God has created. But, according to the Bible, there is a difference between plant life and animal and human life. Throughout the Bible, the Hebrew words *nephesh chayyâh* are used to describe human and animal life. When referring to mankind, *nephesh chayyâh* means "living soul" or "soulish creature," and when it refers to animals, it means "living creature." However, this word is never applied to plant life. There is a plain distinction. It is easy to see that plants do not experience pain, suffering, or death in the same way that humans and animals do. Plant death is not the death of a "living soul" or "living creature."

As you consider the six characteristics above, keep in mind that we are using the scientific definition of a living thing. To see a biblical example of the distinction, read the following passages and compare how they talk about humans or animals and plants: Genesis 2:7, 6:17, 7:15, 7:22; Leviticus 17:10–12; Psalm 104:24–30; Matthew 6:25–34.

What did we learn?

- What are the six questions you should ask to determine if something is biologically alive?
- Does the Bible refer to plants as living things?

Taking it further

- Do scientists consider a piece of wood that has been cut off of a tree living? (Hint: Is it growing? Can it respond?)
- Is paper alive?
- Is a seed alive?

Is it alive? scavenger hunt

Use a copy of the "Is it Alive? Scavenger Hunt" worksheet to determine whether items inside and outside of your house are alive or not.

Law of biogenesis

Now that you know how to determine if something is alive, you understand that living things come from living things. An apple tree produces seeds that grow into new apple trees; a dog gives birth to puppies that grow up to be dogs. This observation is completely consistent with the Bible when it says in Genesis that plants and animals were created to reproduce after their own kind. Also, in Matthew chapter 7, Jesus said that people could tell a plant by its fruit—a thorn bush does not produce grapes and a thistle plant does not produce figs. Today, scientists better understand plant and animal reproduction and realize that DNA in the cells determines what kind of plant or animal will be produced.

However, people did not always understand that living things must come from living things. At one time, people thought that rats were produced by garbage because they observed that rats were more abundant when there was more garbage. People also thought that rotting meat produced maggots, which grow into flies, because they observed that when meat was left to rot, maggots often appeared within a few days. This idea is called **spontaneous generation**. People believed that these animals were somehow suddenly produced by their surroundings. It took the work of a some very persistent scientists to dispel this idea.

In about 1665 an Italian scientist named Francesco Redi did several experiments to show that spontaneous generation did not occur. He believed that maggots came from flies, not from rotting meat. To prove this he put some meat into three different jars. The first jar was left open to the air. The second jar was covered with a layer of gauze which allowed air to pass through. The third jar was covered with a thick parchment that prevented anything from passing into or out of the jar. What do you think happened in each of the three jars?

In the first jar maggots appeared in a few days, just as people had seen before. In the second jar, eggs and later maggots were found on top of the gauze, but no maggots were found inside the jar. There were no eggs, maggots, or flies in or around the third jar. This experiment showed that the maggots came from eggs that were laid by flies which were attracted by the smell of the decomposing meat. When the jar was sealed the flies did not smell the meat and did not lay their eggs, so there were no maggots. This experiment did much to dispel the idea of spontaneous

generation; however, many people still believed that simple organisms such as bacteria might still be produced without parents.

In the 1800s Louis Pasteur worked to show that even simple organisms such as bacteria only come from other bacteria. Pasteur experimented with different samples of broth. He showed that bacteria freely reproduced in an open container of broth. He then boiled the broth to kill all of the bacteria. Some of this broth was exposed to the air and other broth was kept in a sealed container. The broth exposed to the air developed new bacteria but the sealed jar did not. Pasteur believed that bacteria were entering the jar on dust particles in the air. To show that this was true, he created a bottle with a zigzag neck that allowed air to enter but prevented dust and other particles from entering the jar. The broth in this jar did not develop any bacteria even after four years. In fact, even after 100 years, no bacteria were found in this jar, which is now on display in the Pasteur Institute in Paris. Pasteur's experiments laid to rest the idea of spontaneous generation.

These experiments proved that life only comes from other life. This is such an important idea that it is called the **law of biogenesis**. Every experiment has shown that in order to get something that is alive, you must start with one or more living things and that you always get what you started with. Bacteria produce bacteria, flies produce flies, and people produce people. This is exactly how God designed the world to work.

Despite the fact that biogenesis is what we always observe, many scientists today believe that at one time life came from nonlife. They refer to this occurrence as **abiogenesis** or **chemical evolution**. These scientists believe that many millions of years ago under just the right circumstances, chemicals accidentally combined to form proteins, which are the building blocks of living cells, and that these proteins combined to form simple living creatures. Scientists have even tried to reproduce this event in the laboratory; however, even with a very controlled environment, no one has ever built living cells from just chemicals. Even if they could produce life in a lab, all it would prove is that intelligence can produce life. It would not prove that life can evolve from chemicals on its own.


Louis Pasteur

God's Word is true, and as you learn more about living things, you will be amazed at how beautifully God designed each living thing to reproduce to continue the cycle of life.