

SCIENCE

Student Book

► **5th Grade | Unit 10**

.....

SCIENCE 510

LOOK AHEAD

Introduction | **3**

1. Living Things **5**

The Life of Plants, Fungi, Protists, and Monerans | **7**

Life of Animals and Animal-Like Protists | **14**

Balance of Nature | **24**

Human Impact on the Balance of Nature | **27**

Self Test 1 | **29**

2. The Earth **32**

Records of Life | **33**

Records in Rock | **40**

Self Test 2 | **48**

3. Order in Creation **51**

Energy | **52**

Matter | **57**

Self Test 3 | **62**

LIFEPAC Test | **Pull-out**

Author:

Barry G. Burrus, M.Div, M.A., B.S.

Editor:

Brian Ring

Illustrator:

Brian Ring

Media Credits:

Page 3: © m-gucci, iStock, Thinkstock; **5:** © Stocktrek Images, Thinkstock; **10:** © andegro4ka, iStock, Thinkstock; **11:** © Dole08, iStock, Thinkstock; **17:** © blueringmedia, iStock, Thinkstock; **18:** © Micha? Adamczyk, iStock, Thinkstock; **21:** © cynoclub, iStock, Thinkstock; **24:** © john shepherd, iStock, Thinkstock; **25:** © mycola, iStock, Thinkstock; **27:** © Mike Watson Images, moodboard, Thinkstock; **32:** © Zoonar RF, Thinkstock; **33:** © Nadine Wickenden, Dorling Kindersley, Thinkstock; **34:** © LUNAMARINA, iStock, Thinkstock; © Eric Thomas, Dorling Kindersley, Thinkstock; **37:** © Hemera Technologies, PhotoObjects.net, Thinkstock; **38:** © artisticco, iStock, Thinkstock; **41:** © bubaone, Thinkstock; **43:** © walencienne, iStock, Thinkstock; **44:** © Jupiterimages, Photos.com, Thinkstock; **51:** © Dzhulbee, iStock, Thinkstock; **52:** © Ivan Cholakov, iStock, Thinkstock; **53:** © Digital Vision, Thinkstock; **55:** © sv-time, iStock, Thinkstock; **57:** © Leonid Karchevsky, iStock, Thinkstock; **59:** © stock_shoppe, iStock, Thinkstock



804 N. 2nd Ave. E.

Rock Rapids, IA 51246-1759

© MM by Alpha Omega Publications, Inc. All rights reserved.

LIFEPAC is a registered trademark of Alpha Omega Publications, Inc.

All trademarks and/or service marks referenced in this material are the property of their respective owners.

Alpha Omega Publications, Inc. makes no claim of ownership to any trademarks and/or service marks other than their own and their affiliates, and makes no claim of affiliation to any companies whose trademarks may be listed in this material, other than their own.

LOOK AHEAD

One of the best ways to prepare for what is ahead is to have a good knowledge of what you have covered. This LIFEPAC® is something like that. You will review much of the material that you have covered in the previous nine science LIFEPACs of this series. You will cover many of the same ideas in this LIFEPAC, but they will be presented somewhat differently. The previous topics will be related in new ways in this LIFEPAC. This LIFEPAC will give an *overview* of the topics previously covered in order to help you “look ahead” as you learn more about God’s wonderful creation in the future.

This LIFEPAC can also help you to consider ways to use your information wisely. By knowing more about science, you can make better decisions on how to be a good steward of the world as God created it and meant it to be.

You will not have new vocabulary in this LIFEPAC. Instead, you will review the vocabulary presented in some of the previous nine LIFEPACs. You will do several creative activities, and you will continue to use the Bible. Some questions may not have the answers given in the text of this LIFEPAC. You may need to refresh your memory by returning to earlier LIFEPACs. By covering the material in this LIFEPAC in a new way, you will be strengthened in your new science knowledge and better able to “look ahead” to the future.

Objectives

Read these objectives. The objectives tell you what you will be able to do when you have successfully completed this LIFEPAK. Each section will list according to the numbers below what objectives will be met in that section. When you have finished this LIFEPAK, you should be able to:

1. Describe types of plants and animals.
2. Explain the relationship of cells to living things.
3. Describe the balance of nature.
4. Explain geological records.
5. Compare physical records and Biblical records of the earth's past.
6. Identify types of energy and work.
7. Tell about the order in matter, its structure, properties, and changes.



1. LIVING THINGS

God has created a rich variety of living things on the earth. Scientists today classify all living things into five *kingdoms*: (animals, plants, fungi, protists, and monerans). Examples of living things in each of these five kingdoms is given in Table 1. These living things are all around us: on the land, under the ground, in the water, and in the air. All living things are made of the basic unit of living things: a cell. Some living things consist of only one cell and are called *unicellular* organisms. Other living things consist of many cells and are called *multicellular*. All living things go through life cycles: they are born, reproduce, and die.

The cells of all living things have some similar parts. Every cell has a cell membrane and protoplasm (or cytoplasm) within the membrane. Some cells contain only these two parts and are called *prokaryote* cells. Bacteria, which are monerans, are an example of living things that contain only prokaryote cells. Many other cells contain three basic parts. These cells contain a cell membrane, cytoplasm, and a nucleus. These 3-part cells are called *eukaryote* cells. Unicellular organisms can be either prokaryote cells or eukaryote cells. All multicellular living things consist of eukaryote cells.

In this section of the LIFE PAC, you will examine the relationship of cells to living things, especially plants and animals. You will also review various types of plants, animals, fungi, protists, and monerans. Finally, you will learn more about the natural and human influences that impact the balance of nature.

Objectives

Review these objectives. When you have completed this section, you should be able to:

- 1. Describe types of plants and animals.
- 2. Explain the relationship of cells to living things.
- 3. Describe the balance of nature.

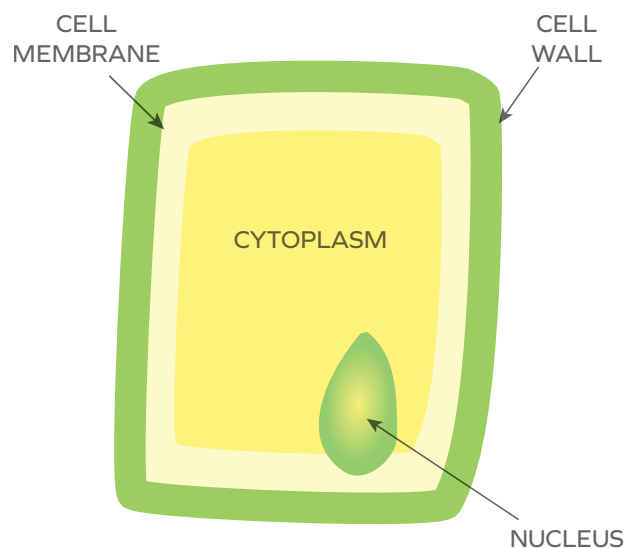
TABLE 1. CLASSIFYING LIVING THINGS			
KINGDOM	CELL TYPE	FOOD	EXAMPLES
Animals	multicellular	obtains from outside sources	worms, insects, fish, birds, mammals
Plants	multicellular	produces their own	moss, trees, flowering plants
Fungi	unicellular or multicellular	obtains from outside sources	mushrooms, yeast, molds
Protists	unicellular or multicellular	produces their own and obtains from outside sources	protozoa, paramecium, green algae, red algae
Monerans	unicellular or multicellular	engulfed from outside sources	bacteria, blue-green algae

The Life of Plants, Fungi, Protists, and Monerans

The cells of all living things are alike in some ways. For example, all cells have cell membranes and protoplasm. Yet, there are also important differences among living things of the five kingdoms. These differences among cells cause living things of one kingdom to function somewhat differently from those of another kingdom. Even within the same kingdom of living things, differences in the structures of cells cause the living things to function differently. Let's now look at some common and some different features of the cells of plants, fungi, protists, and monerans. We will especially examine some important differences among plants.

Cells. In most plant and fungi cells, there is a fourth part of the cell: the *cell wall*. Cell walls surround the cell membrane. Cellulose in the cell walls helps to make the plants and fungi more rigid. Plants and fungi need rigid cell walls in order to stand and keep shape. Otherwise, they would be lying on the ground. By having cell walls, plants and fungi do not need skeletons or hard shells.

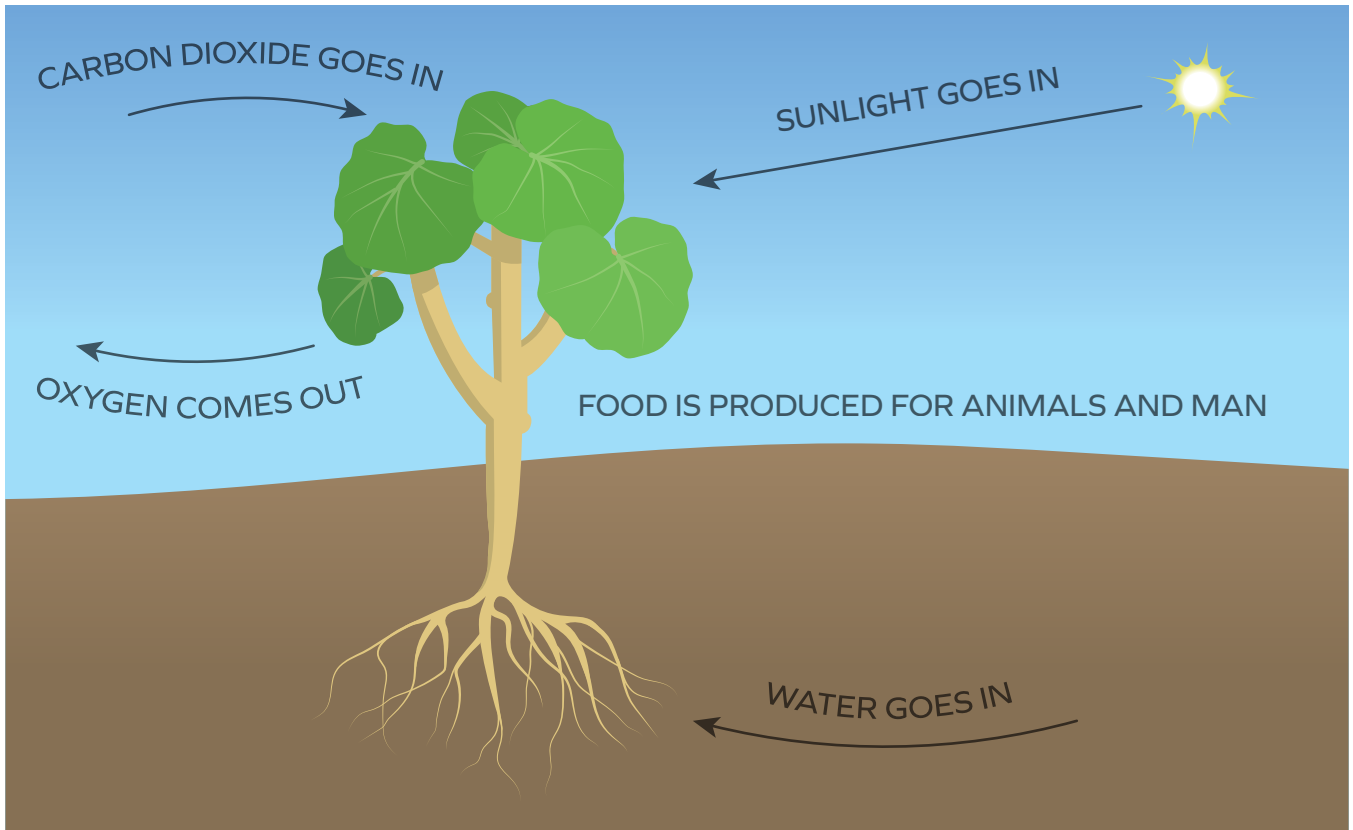
Plant cells, along with the cells of some protists and monerans, contain *chloroplasts*. These chloroplasts are some of the tiny parts of a cell within the cytoplasm called *organelles*. The chloroplasts contain *chlorophyll*—a green pigment. Chlorophyll absorbs energy from the sun. Fungi do not have chloroplasts nor chlorophyll. Only plants and some protists and monerans (like green algae) contain chlorophyll. The chlorophyll is what gives plants their green color.



| Plant and fungi have a cell wall surrounding the cell membrane.

When sunlight shines on the chlorophyll within living things, *photosynthesis* takes place. In photosynthesis, the energy from the sun is used by the chlorophyll to combine carbon dioxide and water in the plant. This process forms oxygen and sugars that are used within the plant for food. The oxygen is released from the plant to the atmosphere as a product of photosynthesis. The oxygen released from the plants is used by other living things, mainly animals and human beings, in order to breathe.

As part of God's plan for living things, only plants and some protists and monerans go through the process of photosynthesis. They receive energy directly from the sun and store this energy in their cells during photosynthesis and the production of "food" and oxygen. Other living things, like animals and fungi, cannot receive their energy directly from the sun. They must use the energy stored in plants or some protists and monerans for food in order to receive energy.



| The process of photosynthesis

Cells in plants or fungi that perform a similar function are called *tissue*. Plants and fungi have epidermal, connective, storage, and supportive tissues. Connective tissues carry needed materials through the plant or fungus. Storage tissues store food.



Write the correct letter and answer in the blank.

1.1

Some living things consist of only one cell and are called _____ organisms.

- a. multicellular b. unicellular c. regular

1.2

Three-part cells are called _____ cells.

- a. prokaryote b. eukaryote c. complex

1.3

In most plant and fungus cells, there is a fourth part of the cell called the _____.

- a. protoplasm b. cavity c. cell wall

- 1.4** The chloroplasts within a cell contain _____, a green pigment.
 a. proteins b. chlorophyll c. oxygen
- 1.5** In _____, the energy from the sun is used by the chlorophyll to combine carbon dioxide and water in the plant.
 a. photosynthesis b. hydration c. oxidation





Complete this list.


- 1.6** List the five kingdoms of all living things.
 a. _____ b. _____
 c. _____ d. _____
 e. _____




Do this activity. In the first two LIFEPAcs of this series—Science 501 and Science 502—you learned many new vocabulary words. Some of these vocabulary words are listed below; however, the letters in these words are scrambled within the little “cells” below. Unscramble the vocabulary words and write them correctly within the cell. Note that the first letter of each correctly spelled word is in bold print. After you have written the word correctly, write the definition on the lines following the cell.

- 1.7**  _____

- 1.8**  _____

- 1.9**  _____

- 1.10**  _____

1.11



1.12



1.13



1.14



Types of plants, fungi, protists, and monerans. Each living organism must reproduce if its species is to survive. Its method of reproduction helps determine its *classification* among the kingdoms of living things. For example, some plants are seed-bearing, and other plants are cone-bearing. Each plant type includes many varieties of plants. These plants often look very different. They have different parts, and their life cycles may vary greatly.

Seed-bearing plants reproduce by means of a seed. The seed is formed only after an egg from the plant has been fertilized by sperm. The fertilized egg grows into an embryo through *mitosis*, a process in which the cells of the organism grow, split, and divide. A seed coat is formed around the embryo.

In a flowering plant, the seed is surrounded by the flower's ovary. The ovary becomes fruit. In a cone-bearing plant, the seed grows inside the



| An avocado is a seed-bearing plant.

female cone. The cone functions much like fruit, but it is not considered a fruit.

The seeds of both flowering and cone-bearing plants begin to grow when they fall to the ground and are covered by soil. Warmth and water help the new plants to mature. The life cycle continues as these plants mature into adults and produce new seeds.

Spore-bearing plants do not produce seeds.

They reproduce by means of spores. Ferns are an example of plants that reproduce by spores. Spores of fern plants do not grow into adult plants. They grow into tiny green plants through mitosis. Then, the egg cells and sperm cells are formed. After fertilization, embryos begin to develop. These embryos grow into adult ferns.

Many types of fungi also reproduce by spores. The spores in fungi function somewhat differently than they do in plants. Spores are released into the air by the parent fungus. When they settle onto something warm and damp, they begin to grow. They grow into adult fungi through mitosis.

Many one-celled organisms reproduce by giving up part of themselves. The parent organism divides into two new cells. Each new organism cell can perform all the functions needed to survive. Algae, which may be either protists or monerans, divide through mitosis. The algae cell grows and reproduces in a short time. Yeast, a type of fungus, reproduces through budding. Colonies of yeast cells may be connected, but each yeast cell is a separate organism. Reproduction of yeast happens very fast in warm, damp conditions.



| Certain pine trees are cone-bearing plants.



| Different Types of Algae



1.15

Draw a diagram.

In this space, draw a diagram of a flowering plant. Label the parts. Use arrows to show what happens during reproduction. (You may need to use the Science 502 LIFE PAC for review.)

**Match these items.**

- | | | |
|-------------|-----------------------------|----------------------------|
| 1.16 | _____ sperm | a. male part |
| 1.17 | _____ stamen | b. female part |
| 1.18 | _____ mitosis | c. neither male nor female |
| 1.19 | _____ sac | |
| 1.20 | _____ cone near top of tree | |
| 1.21 | _____ ovary | |
| 1.22 | _____ seed | |
| 1.23 | _____ hyphae | |
| 1.24 | _____ anther | |
| 1.25 | _____ pistil | |
| 1.26 | _____ egg cell | |
| 1.27 | _____ fruit | |
| 1.28 | _____ larger cone | |
| 1.29 | _____ stigma | |
| 1.30 | _____ pollen | |

**Complete this activity.****1.31**

Mitosis is important for the growth of cells and for reproduction. Budding is also a form of reproduction. In the spaces below, describe what happens in these processes.

a. mitosis _____

b. budding _____

Life of Animals and Animal-Like Protists

The cells of animals have a similar general structure. All animal cells are eukaryote cells; that is, they have a cell membrane, cytoplasm, and nucleus. Yet, there are many variations in the cells of animals. Size, shape, and specific inner structure determine whether animal cells are part of muscle, blood, bone, or other tissues. The animals cells are joined together to make a specific organism. Each organism is part of a species of animal. All of these species survive through reproduction.

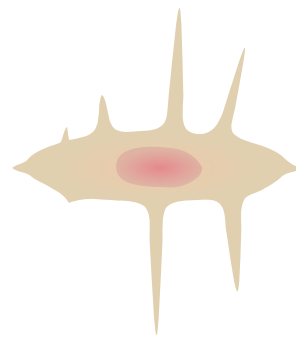
Many animal species exist. They may be classified in several ways. One way to classify animals is to group them according to whether or not they have a backbone. Thus, animals are either vertebrates (with a back-bone) or invertebrates (no backbone). Within these two groups are animals of various types. God placed a great variety of animals on the earth!

Cells. The cells of animals do not have to be rigid like those of plants and fungi. Thus, animal cells do not need cell walls. Also, animals do not undergo photosynthesis. They have no chloroplasts or chlorophyll within their cells.

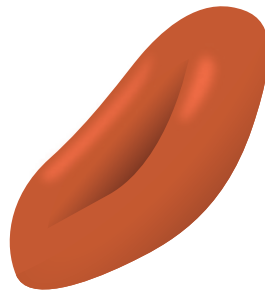
Animal cells need to vary in size and shape because of the functions they perform. Blood cells must be round and unattached in order to move throughout the body system. Epithelial cells need to be long and thin to cover the body's surface. All of these cells are joined together to form tissues and the animal's body.

Animal cells function somewhat similar to those of plants and fungi. They take in food and store it. They use the food stored in cells for survival. However, animal cells use oxygen and give off carbon dioxide. In plants, it is just the opposite because photosynthesis takes in carbon dioxide and produces oxygen.

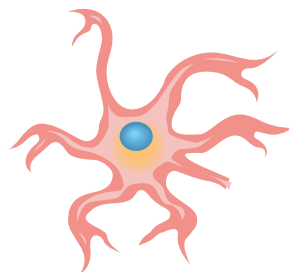
Animal tissues include epithelial, connective, muscular, and nervous tissue. In each of these tissues, the cells are similar and are grouped to perform similar body functions. Muscle tissues help move the body. Nervous tissues carry messages. Connective tissues join and support all of the body's cells. Epithelial cells cover the body and protect it. Linings within the body are also made of epithelial cells.



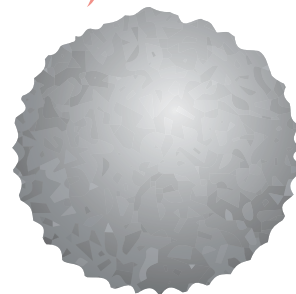
| Bone cell



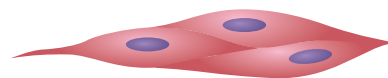
| Red blood cell



| Nerve cell



| White blood cell



| Muscle cells

**Write true or false.**

- 1.32** _____ Animal cells take in oxygen and give off carbon dioxide.
- 1.33** _____ Animal cells contain chloroplasts.
- 1.34** _____ Photosynthesis is the same as mitosis.
- 1.35** _____ Food is stored in animal cells.
- 1.36** _____ Epithelial cells are skin cells.
- 1.37** _____ Cells in a tissue do not perform a similar function.
- 1.38** _____ The size and shape of cells can indicate what they do.
- 1.39** _____ Invertebrates have a backbone.

**Use the Internet or library.**

- 1.40** Organs of animal bodies are composed of tissues. These organs function in special ways. Use the Internet or library to learn more about one of the body's organs or tissues. Then write a summary of your findings. Include ideas about the importance of cell size and shape for organ or tissue function. Here is a list of some animal organs or tissues. Choose one of these or one of your own choice.

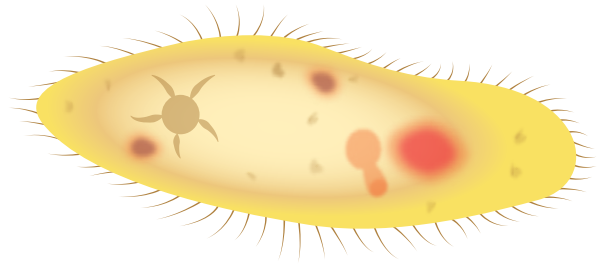
heart	eye	liver	bone
nerve	brain	ear	stomach
blood	gland	skin	nose
muscle	cartilage	lung	

**Teacher check:**

Initials _____ Date _____

Types of animals and animal-like protists.

Animals can be classified as invertebrates or vertebrates. Some protists have animal-like qualities, such as the ability to move from place to place and the ability to take in oxygen and give off carbon dioxide (like animals do). All of these living organisms—animals and animal-like protists—go through a life cycle involving birth, reproduction, and death.



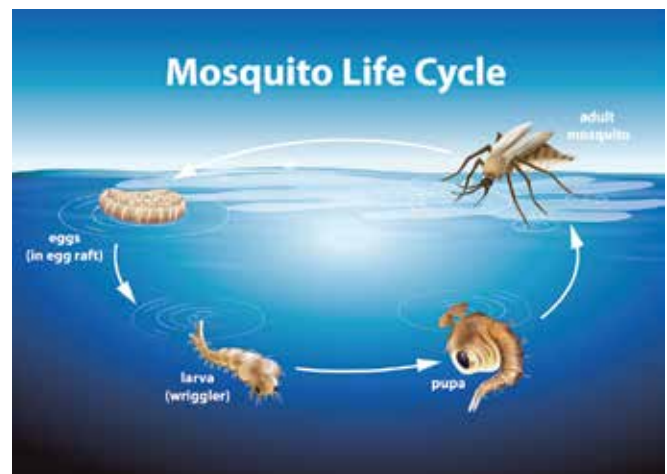
| Paramecium

Protozoans are one type of animal-like protists. These organisms obtain food through their cell membranes. In much the same way, their waste passes back through the membrane of their cell. Through a process called osmosis, oxygen passes into the cell of the protozoan, and carbon dioxide is released from the cell.

Reproduction in most protozoans occurs through mitosis. The nucleus of the parent cell divides. Cytoplasm surrounds each new nucleus. Then the two parts of the cell divide and split, forming two new offspring. Other types of protozoans reproduce through budding. Some protozoans reproduce by forming spores. Still others show the beginnings of sexual reproduction, requiring a male and female parent. God has provided an amazing variety of reproduction in these tiny creatures!

Invertebrate animals can be classified as insects, worms, or mollusks. These creatures do not have backbones. All of these groups of invertebrates are egg-layers; however, each of these groups differs in body structure. Some stages in the life cycle are also different from group to group.

The beginning of insect reproduction occurs when the female forms eggs in her ovaries. Sperm from a male are deposited in another special part of her body. When the female lays her eggs, the sperm fertilize them. After hatching, the new insects undergo a growth stage. A few insects grow into adults when a tiny copy of the parent is hatched (for example, the silverfish). Other insects go through a nymph form before becoming adults (like the cricket). Some insects are hatched into larvae, change into pupae, and finally become adults. (The housefly is an example.)



Worms come in many varieties. The most commonly known worm is the earthworm. Tapeworms, flatworms, roundworms, and leeches are other types of worms. Worm eggs are fertilized inside the female body (or, for an earthworm, the female part of the body).

Then the eggs are released before they are hatched. Many baby worms are copies of their parents. However, some worm species (such as the tapeworm) hatch into larvae. These larvae need a host (such as a cat) in order to survive. During this stage, the larvae are called parasites. Later, they become adult tapeworms and continue to be a parasite requiring a host.

Mollusks are soft-bodied invertebrates that have no bones. Most species of mollusks grow hard shells to protect themselves. Snails, clams, and oysters are examples of hard-shelled mollusks. Some mollusks, like the squid and octopus, do not have a hard, outer shell for protection.

Some mollusks’ eggs are fertilized inside the females’ bodies. Other mollusk species lay their eggs before fertilization. The eggs are in small cases when they are laid. Larvae are hatched. Some mollusk larvae come out of the cases and must find a plant or animal host until they reach adulthood. Other mollusk larvae remain in the case and come out as young adults. Shells are grown by some mollusk larvae, but most mollusks grow their main shell during the adult stage.



| The octopus is a mollusk.



1.41

Complete this list.

On another piece of paper, list the names of as many animal-like protists, insects, worms, and mollusks as you can. When you have finished, write your total numbers in the spaces below.

The number of names on my list is:

- Animal-like protists _____
- Insects _____
- Worms _____
- Mollusks _____



Use the Internet or library.

1.42

Now use the Internet, other books, or the Science 503 LIFEPAK, to find the names of other animal-like protists, insects, worms, and mollusks. Using your list in number 1.41 plus the additional names that you discover, write the names of the various creatures in the table below. (You may not have room for all of them that you find. Choose those that have different features.)

	ANIMAL-LIKE PROTISTS	INSECTS	WORMS	MOLLUSKS
A.				
B.				
C.				
D.				
E.				
F.				
G.				
H.				
I.				
J.				



Teacher check:

Initials _____ Date _____



Complete these vocabulary activities.

1.43 What is the difference between mitosis and osmosis? _____

1.44 How are hosts and parasites related? _____

1.45 How are pupae, larvae, and nymphs similar? _____

1.46 How are pupae, larvae, and nymphs different? _____

Vertebrates are animals with backbones. Their backbones and other bones form their skeletons. Skeletons give shape to the bodies of these animals and protect their internal organs. All vertebrates are multicellular. They have many varieties of bodies and differing life cycles. Fish, amphibians, reptiles, and birds are egg-laying vertebrates. Mammals are vertebrates that are live-bearing.

Fish are vertebrates that live in the water. They use gills to breathe. Most fish are egg-layers. Their eggs are laid by females and then fertilized by the sperm of males. After fertilization, the parents do not stay near the eggs. The eggs hatch into tiny copies of the parents. A few of the adults grow into adulthood and reproduce. Several fish species are live-bearing. The parents do not care for or protect the offspring.

Amphibians live part of their lives in the water like fish, but then change and live part of their lives on land. This process of change is called *metamorphosis*. Frogs are an example of amphibians. Their eggs are laid and fertilized in the water. After the eggs hatch, the new offspring appear more like fish than their parents. During this part of their life cycle, the amphibians live like small fish and cannot survive out of the water. Soon, the amphibians begin to change and grow lungs and legs. Tails disappear, and the offspring now appear more like their parents. They can no longer live underwater without coming to the surface for air.

Reptiles are vertebrates that are covered with scales, or plates, for protection. Reptiles include alligators, lizards, snakes, and turtles. They usually live near water but cannot breathe underwater. Female reptiles lay their eggs on land rather than in water. Once they lay their eggs on the land, they do not stay near the nest to warm or protect their eggs. Newborn baby reptiles usually look like the parents, except their scales or plates are not yet hard.

Birds are the only animals that have feathers. All birds have wings, and almost all of them can fly. They have two legs. Their eggs are fertilized when still inside the females' bodies. Shells of the fertilized eggs become hardened before the female lays them. Parents need to keep the eggs warm and moist before hatching.



Newborn birds are nearly helpless and are fed and protected by the parents. As the baby birds grow and become stronger, they look more like their parents. Before long, they are pushed from their nest and learn to survive on their own.

Mammals are a very important group of vertebrates. They differ from almost all other animals in several important ways. Among these differences, only female mammals are able to nurse their babies with the milk they produce, and only mammals have hair. There are a great variety of mammals. They differ greatly in sizes, shapes, and life styles. Mammal embryos develop inside the female bodies. The *gestation period* of embryo development varies among mammals. Mother mammals produce milk to feed their offspring. Baby mammals are very weak at birth and need the care, protection, and training of their parents.

**Draw a diagram.****1.47**

In this space, draw a diagram of the life stages of a frog. Label the parts and stages. (You may need to refer to the Science 503 LIFEPAK.)



- a. Define each word below as it is used in the study of animals.**
b. Write a sentence using the word in another way.

1.48

plate

- a. _____
 b. _____

1.49

scale

- a. _____
 b. _____



Write the correct letter and answer in the blank.

1.50

A _____ has a backbone.

- a. vertebrate b. worm c. mollusk

1.51

Amphibians live part of their lives like _____.

- a. birds b. fish c. carrots

1.52

Mammal mothers produce _____ for their young.

- a. bones b. milk c. friends

1.53

Fish eggs are usually laid and fertilized _____.

- a. underwater b. in the warm sand c. on hosts

1.54

Newborn birds could not survive without _____.

- a. milk b. parasites c. parents

1.55

An example of a reptile is a(n) _____.

- a. tiger b. alligator c. bear

Balance of Nature

God has planned that all living things depend upon one another. Plants need animals to survive. Animals need plants to survive. All living things need energy. Some organisms need oxygen. Others need carbon dioxide. These life-supporting needs can be supplied from one organism to another. When the life needs of all living things in an area of the earth are met, we say that there is a *balance of nature*.

The balance of nature is influenced by many sources. Disease, weather, fire, and human beings affect the balance of nature. Some of these influences can cause all members of a certain animal or plant species to die or to move to another area of the earth. Let's examine some natural influences and some human influences on the balance of nature.

Natural influences. Plants receive energy from the sun. This energy is stored in green plant cells to be used later by the plants. Plants are also a source of energy for other living things that consume the plants.

Green plants are called *producers* because they are the main living things that produce food. Animals, fungi, and some other plants cannot make their own food. They must receive food from green plants. Examples of producers are grass and trees.

Organisms that receive their energy directly from plants are called *primary consumers*. These primary consumers can digest green plants or the seeds from green plants and receive energy from the food stored in plants. However, some animals cannot digest plants. They must eat other animals to receive food and energy. These animals are called *secondary consumers*.



| A primary consumer (cow) gets energy from a producer (grass).

Another group of organisms that contribute to the balance of nature are called *decomposers*. Bacteria and fungi are examples of decomposers. Decomposers feed on the waste products or dead bodies of other plants or animals. Decomposers receive their energy from the cells of those other sources.

Producers, consumers, and decomposers are parts of *food chains* in nature. These food chains are important to the balance of nature everywhere. Only a certain number of higher-order consumers (secondary consumers, third-level consumers, etc.) can be supported in a certain location, or *ecosystem*. A growth in the number of higher-order consumers could kill off many primary consumers. If that happened, certain plants would begin to be too numerous.

The higher-order consumers would begin to starve, and the balance of nature would be upset.

However, the balance of nature would eventually be restored. This is because more higher-order consumers would begin to die. Then, the primary consumers would be more likely to survive. Their numbers would grow. More plants (the producers) would be eaten, and the balance of nature would be restored.

The *water cycle* also influences the balance of nature. Plants and animals need water to survive. Cytoplasm contains water, and the water helps the cells of living things do their work. Photosynthesis in green plants also depends upon water. Without the water cycle functioning correctly, plants could not get enough water. Thus, when a drought occurs, plants can die. When it rains too much, plants can be flooded and destroyed. All of life is affected by too little or too much rain.

Life also depends upon the *carbon cycle*. Plants use the carbon dioxide given off by animals. Animals need the oxygen given off by plants. When one of these needs is not filled, both plants and animals have problems. Sometimes this exchange between plants and animals occurs underwater. God has planned that there be a great balance of nature in all of His creation.



| When the water cycle prevents a producer (grass), from surviving it can affect the whole food chain.



Complete these activities.

1.56

Why are baboons, sparrows, and human beings considered both primary and secondary consumers? _____

1.57

Why are there more primary consumers than secondary consumers? _____

- 1.58** Describe a food chain in an environment near you. (You may need to refer to the Science 504 LIFEPAK to complete this activity.)



List some general characteristics of the following groups of organisms that are special to each group.

- 1.59** producers _____

- 1.60** primary consumers _____

- 1.61** secondary consumers _____

- 1.62** decomposers _____



Write true or false.

- 1.63** _____ The food chain is part of the balance of nature.

- 1.64** _____ Cytoplasm is made up largely of water.

- 1.65** _____ Drought could affect the balance of nature.

- 1.66** _____ The lack of oxygen in a lake could cause problems for the animal life of that lake.

- 1.67** _____ Photosynthesis depends upon water.

- 1.68** _____ Green plants are the only producers.

- 1.69 _____ An oversupply of secondary consumers could cause the numbers of other forms of life to become smaller.

Human Impact on the Balance of Nature

Human influences. Human beings can also affect the balance of nature. God has given us the ability to make decisions. We can decide to preserve nature or destroy it. These decisions can be very important for the balance of nature. Loss of life and pollution can be the results of wrong decisions.

Even the decisions to build homes or clear land can affect the balance of nature. Some species can no longer survive after land is cleared or homes are built. Other plants and animals may increase in numbers with such human-caused changes. In such circumstances, human beings may need to become *predators* in order to keep the balance of nature.

Plant and animal life are affected by pollution. Waste chemicals in the air can slow growth in plants and cause problems with photosynthesis. Lungs of animals can be harmed and lives shortened. Chemicals polluting the water can cause similar problems for plants and often poison animals. These human influences work against the natural balance of nature.

God has given human beings responsibility for life (Genesis 1:28). We have been told to care for other living things. God wants us to be good *stewards* of His creation. Our choices determine whether or not we will have good stewardship of these things.

How can you be a good steward of plants and animals? Good stewardship would involve being careful. For example, you can properly dispose of waste products and recycle materials if possible. You can conserve natural resources like water. You can walk or ride a bicycle instead of taking a car or truck. You can decide not to bother animals in nature or their nests. You can hunt or fish within the law. You may need to feed some animals or kill others because you, too, are part of the balance of nature. It is not always easy to determine what would be the best way to be careful, but God will help you make the right choices as you pray to Him and ask for guidance.



| Clearing land for construction affects the plants and animals in that area.



Write the correct letter and answer on the blank.

- 1.70** Good stewardship involves _____ things.
a. polluting b. wasting c. caring for
- 1.71** Human beings _____ predators.
a. never are b. sometimes are c. should not kill
- 1.72** Pollution is not caused by _____.
a. photosynthesis b. chemicals c. human beings
- 1.73** One way to _____ nature is to recycle wastes.
a. destroy b. be good stewards of c. upset
- 1.74** The balance of nature is sometimes helped by _____ decisions.
a. human b. animal c. plant



Use the news.

- 1.75** Newspapers and magazines often contain articles about pollution or other ways that human beings influence the balance of nature. Look for some of these articles in recent newspapers or magazines. Write a summary of one of the articles. Include ideas about the effects of human beings on the balance of nature. Explain why you think these effects are good or bad. Give your completed summary and this LIFEPAK to your teacher.



Teacher check:

Initials _____ Date _____



Review the material in this section to prepare for the Self Test. The Self Test will check your understanding of this section. Any items you miss on this test will show you what areas you will need to restudy in order to prepare for the unit test.

SELF TEST 1

Match these items (each answer, 3 points).

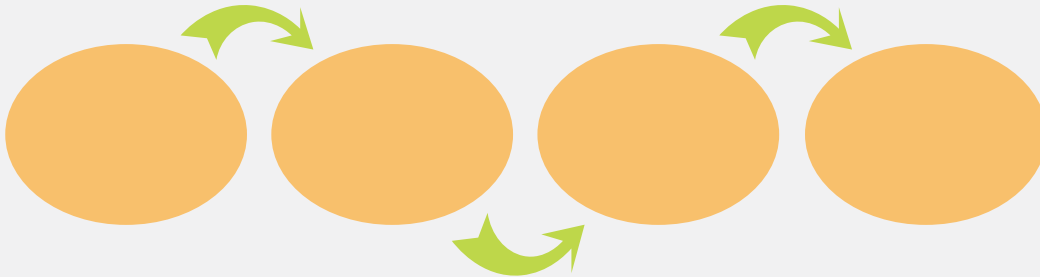
- | | | |
|-------------|------------------------|----------------------------|
| 1.01 | _____ bacteria | a. moneran |
| 1.02 | _____ mammal | b. animal-like protist |
| 1.03 | _____ insect | c. seed-bearing plant |
| 1.04 | _____ flowering | d. fungi |
| 1.05 | _____ blue-green algae | e. egg-laying invertebrate |
| 1.06 | _____ amoeba | f. egg-laying vertebrate |
| 1.07 | _____ reptile | g. live-bearing vertebrate |
| 1.08 | _____ fruit | |
| 1.09 | _____ yeast | |
| 1.10 | _____ cone-bearing | |

Write the correct letter and answer on the blank (each answer, 5 points).

- 1.011** All living things may be classified into _____.
 a. five kingdoms b. plants or animals c. mammals
- 1.012** A(n) _____ organism has many cells.
 a. unicellular b. multicellular c. moneran
- 1.013** In _____, the energy from the sun is used by the chlorophyll in a green plant to combine carbon dioxide and water.
 a. osmosis b. photosynthesis c. migration
- 1.014** Only mammals have _____.
 a. wings b. shells c. hair

Label this diagram (this question, 10 points).

- 1.015** Use these words to label the diagram of a food chain: primary consumer, decomposer, secondary consumer, producer.



Write true or false (each answer, 3 points).

- 1.016** _____ Flowering plants produce seeds for reproduction.
- 1.017** _____ Prokaryote cells have three basic parts.
- 1.018** _____ Fish care for and nourish their young after birth.
- 1.019** _____ Animal cells contain chloroplasts.
- 1.020** _____ Mollusks are a type of fish.
- 1.021** _____ Only plants and fungi have cell walls.
- 1.022** _____ The balance of nature depends upon the water cycle.
- 1.023** _____ Birds are the only animals that have feathers.
- 1.024** _____ Humans cannot affect the balance of nature.
- 1.025** _____ Riding a bicycle instead of taking a car can show good stewardship.

Complete these activities (each answer, 5 points).

1.026 Explain how the carbon cycle is important to the balance of nature.

1.027 Why is mitosis important to plants and animals? _____



Teacher check:

Score _____

Initials _____

Date _____

