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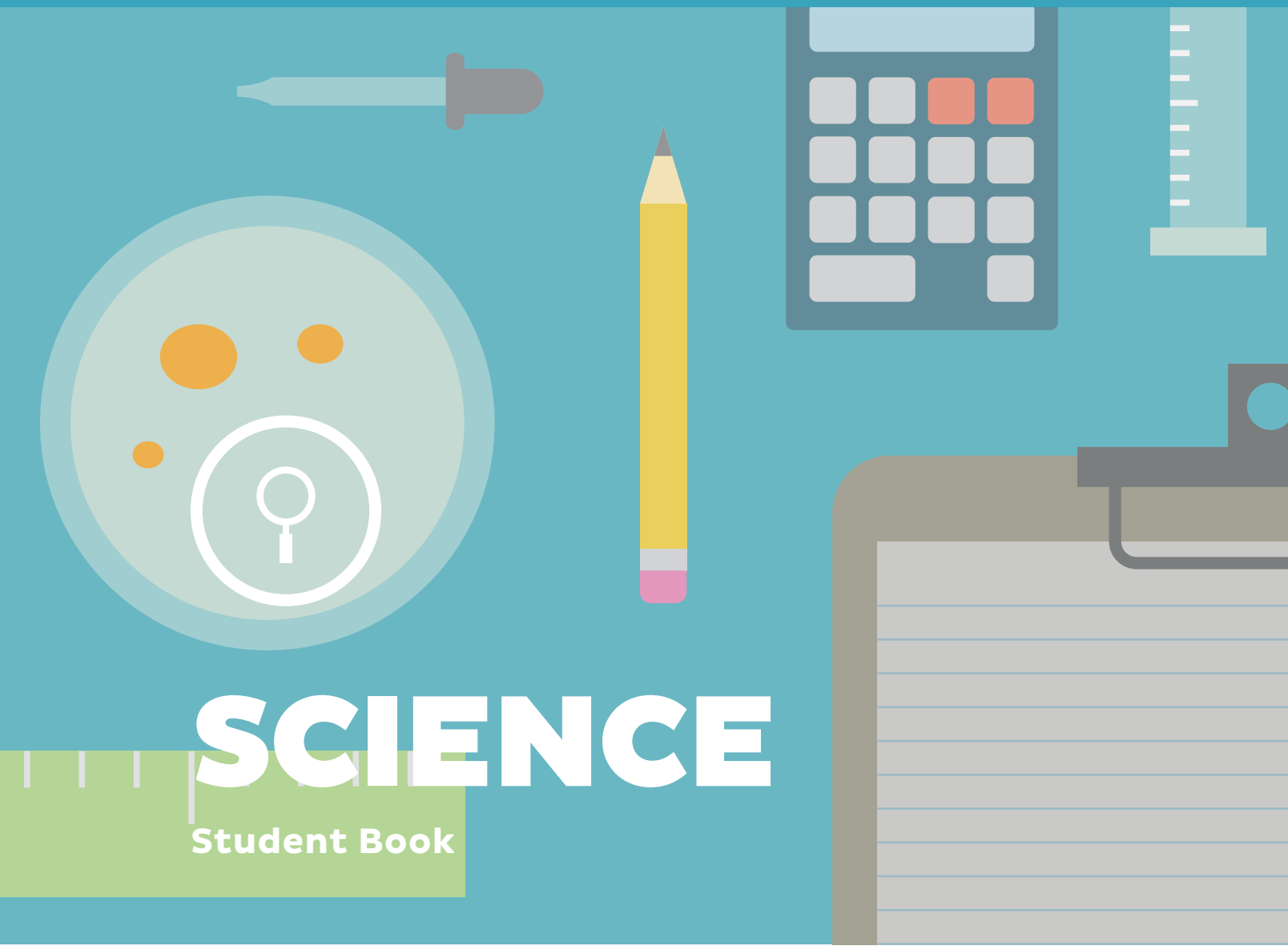

SCIENCE

Student Book

4th Grade | Unit 3

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MAN AND HIS ENVIRONMENT

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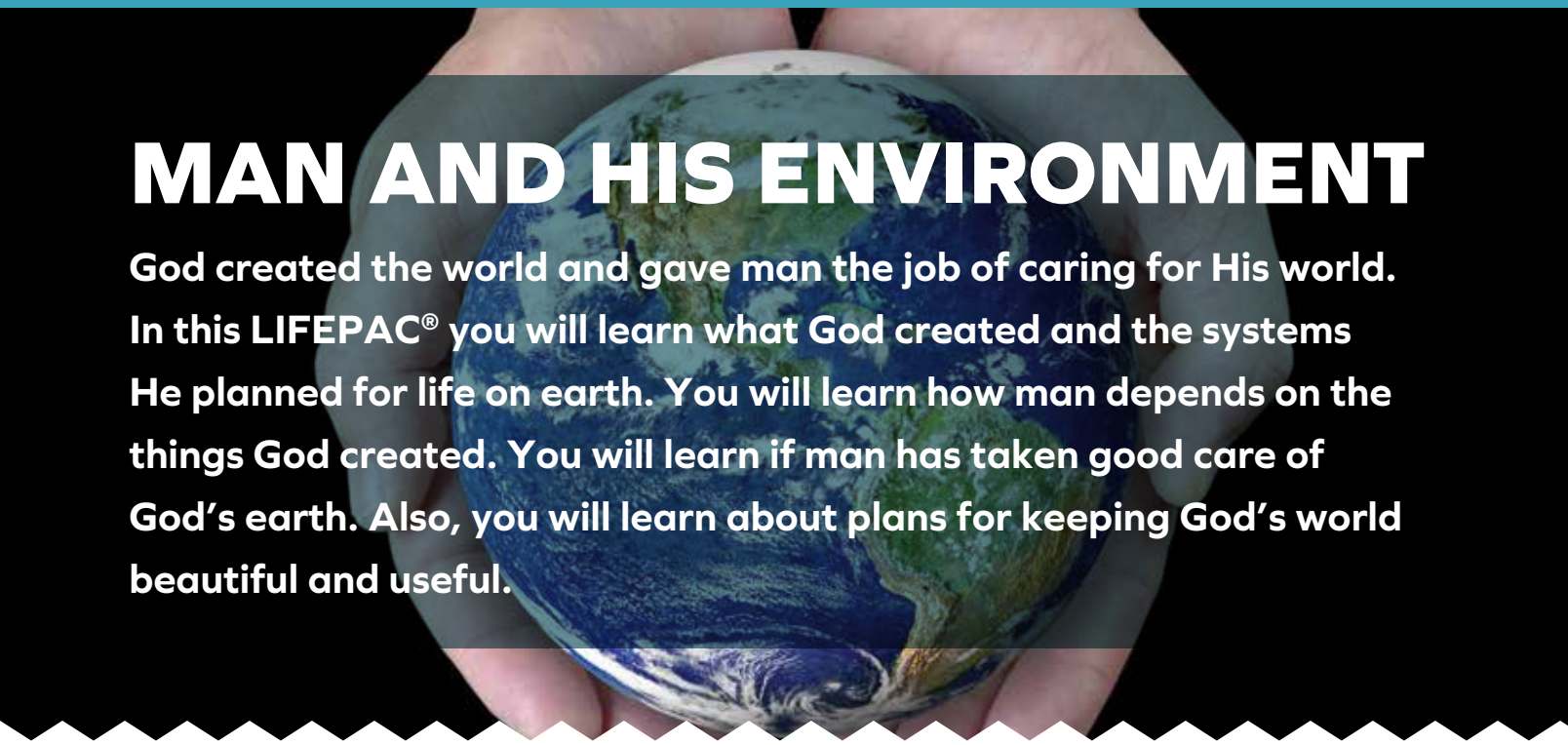


MAN AND HIS ENVIRONMENT

God created the world and gave man the job of caring for His world. In this LIFEPAC® you will learn what God created and the systems He planned for life on earth. You will learn how man depends on the things God created. You will learn if man has taken good care of God's earth. Also, you will learn about plans for keeping God's world beautiful and useful.

Objectives

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

1. Tell four resources that God provided on earth.
2. Tell the meaning of ecology.
3. Explain the meaning of a food chain.
4. Tell about the kinds of living things in a population.
5. Explain about the balance of nature.
6. Tell about some communities of living things and how the living things depend on each other.
7. Tell ways man has been careless with the environment.
8. Tell ways that the resources can be conserved.
9. Tell ways that the resources can be preserved.

1. MAN DEPENDS ON GOD'S PLAN

You are going to study in this LIFEPAC about your environment. In the first section you will learn about the meaning of the word ecology and how God has provided for His earth.

Objectives

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

1. Tell four resources that God provided on earth.
2. Tell the meaning of ecology.
3. Explain the meaning of a food chain.
4. Tell about the kinds of living things in a population.
5. Explain about the balance of nature.

Vocabulary

Study these new words. Learning the meanings of these words is a good study habit and will improve your understanding of this LIFEPAC.

bacteria (bak tir' ē u): Very small organisms, so small that they can usually be seen only through a microscope.

carbon dioxide (kar' bun dī ok' sīd): A colorless gas that is present in air.

chlorophyll (klōr' u fil): The green coloring matter in plants.

consumer (kun sü' mur): A person who uses food, clothing, or anything grown by producers.

create (krē at'): To make something that has not been made before.

decay (di kā'): To become rotten.

decomposer (dē' kum pō' zur): Something that rots something else.

ecologist (e kol' u jist): A person skilled in ecology.

ecology (e kol u je): The science that deals with the relation of living things to their environments and to each other.

energy (en' ur jē): The power to do work.

environment (en vī' run munt): All the surrounding things, conditions, and influences that have to do with the growth of things.

fungi (fun' jī): Plural of fungus. Plant without flowers, leaves, or green coloring matter.

mold (mōld): A fungus that appears on food when it is left in a warm, moist place.

nitrogen (nī' tru jen): A gas that is in the air.

nutrient (nu' trē unt): A nourishing substance.

oxygen (ōk' su jun): A gas that is in the air.

pest (pest): A thing or person that causes trouble.

photosynthesis (fō' tu sin' thu sis): The process in a green plant that produces carbohydrates by the action of sunlight on the chlorophyll.

population (pop' yu lā' shun): A part of the inhabitants of an area.

producer (pru dü' sur): One who makes things that are used by others.

recycle (re si' kul): To treat or process so it may be used again.

resource (re' sôrs): Any supply that will meet a need.

rot (rot): To become rotten, to decay.

termite (tėr' mīt): An insect with a soft body that eats wood.

vapor (va' pur): A large bird that eats dead animals.

Note: *All vocabulary words in this LIFEPAC appear in* **boldface** *print the first time they are used. If you are unsure of the meaning when you are reading, study the definitions given.*

Pronunciation Key: h**a**t, **ā**ge, c**ă**re, f**ä**r; l**e**t, **ē**qual, t**ė**rm; **i**t, **ī**ce; h**o**t, **ō**pen, **ô**rder; **oi**l; **ou**t; c**u**p, p**u̇**t, r**ü**le; **ch**ild; lo**ng**; **th**in; /ŦH/ for **th**en; /zh/ for mea**s**ure; /u/ or /ə/ represents /a/ in **a**bout, /e/ in tak**e**n, /i/ in penc**i**l, /o/ in lem**o**n, and /u/ in circ**u**s.

Everyone in Mrs. Turner's class at Good Hope School was busy. Today was a special day. The award for the most cans was being presented. Stacks of cans were in front of the building. Boxes of cans lined the driveway. In every corner cans peeked out of sacks, garbage cans, and containers of every size.

Mrs. Turner, the teacher, said to the class, "Why did you collect all these cans?" No one spoke.

Then Ken raised his hand and said, "My mother was glad to have the cans taken away from the house."

Kim added, "My neighbors wanted the alley cleaned up."

"We should use things again and again. These cans will be used to make other cans," said Jane.

"You are right," said Mrs. Turner.

Ecology

You have heard the word **ecology** used often. When the air is dirty, when rivers are not clean, when beaches are covered with oil, are times that you hear ecology mentioned. You have probably collected cans or papers to be **recycled**. People are concerned about God's world. Ecology is the study of the way all living things relate to each other in the world God has made for us.

Ecology comes from two Greek words which mean *the study or science of the home*. Home doesn't mean just your home but the homes and **environments** of all plants and animals and how they are related to each other.

Answer these questions.

1.1 What does *ecology* mean in Greek?_____

_____

1.2 What is ecology? _____

_____

Scientists call life on earth "the web of life" because life is connected much like the threads of a spider web are joined. Think about a spider web.

Notice how each thread depends on the other threads to make a complete web. If one thread breaks, the other threads would not be in place either. Life on earth is like the web. If one part of life stops, the rest of the living things will have trouble living in the same way.

Think and write your answers on the lines.

1.3 In the web of life, how do you depend on a tree? _____

_____

_____

1.4 In the web of life, how do you depend on a cow? _____

_____

_____

_____

Ecology studies the web of life. In ecology you study how life connects together, lives and adjusts to each environment.

Environment has a broader meaning. Environment means the place where you live. Environment means more than just your home environment, for the meaning also reaches to the area in which you live. You may live in a city environment. You may live in a desert environment, too.

Think and answer the questions.

1.5 In what kind of environment do you live? _____

_____

1.6 You know someone who lives in a different environment. What kind of environment is it? _____

_____

Environment has become important because man has made a special environment for himself that has changed other environments. Big cities have changed the environment around them. Trees have been cut, land moved, streets paved, and many buildings built. The climate becomes warmer in winter and summer in the crowded cities. The city has changed the environment. **Ecologists** are concerned about these changes.

Think and answer the questions.

1.7 How would building a city change the environment of a field mouse? _____

_____

1.8 How would the building of many new houses on the edge of town change the environment of John, a boy who lives on a farm near the new houses? _____

_____

_____

Ecology is more than the study of your home. It is the study of the life that God put on earth and the homes provided by God for each kind of life. Scientists, called ecologists, have worked out an order system for the study of homes. As you study this LIFEPAC you will find that homes, or environments, may seem to be different from each other, but in many ways they are the same.

Think and answer the questions.

1.9 Write a meaning for ecology now that you have read more about the science.

_____

1.10 What is the meaning of environment? _____

_____

1.11 What is the name of the scientist who studies ecology? _____

1.12 What does "web of life" mean? _____

_____

Resources

All living things were provided by God with the things each one would need. God knew exactly what kind of things you and other living creatures would need to be able to live and grow. So He put **resources** on the earth to be used by His creatures. The four resources you will study are *water, air, light,* and *soil*.

Water. All living things must have *water* in order to live and grow. Think of some ways that water is used. Some uses of water are easy to list. Other uses are harder to remember because you do not know how much you depend on water. You do not see everything water does for you.

Water greatly changes the temperatures of areas close to it. Water warms slowly and cools even more slowly. Land heats and cools very quickly. Therefore, land changes its temperature more often than does water. Land that is near water changes its temperatures less often than land that is not near water. For this reason land is much hotter and much colder inland, or away from water. The areas inland do not feel the good results of the water. Therefore, inland areas get very hot or very cold. For this reason plants, animals, and people often try to live near the water. Of course, they also need water for many other reasons. Have you thought of some?

Write your answers on the lines.

1.13 Name some ways to use water. _____

_____

1.14 Tell why inland areas get very hot or very cold. _____

_____

Air. Another resource God put on the earth for living things is *air*. In order to live and grow, all living creatures need air. Air is largely made up of two gases called **nitrogen** and **oxygen**. Air also contains water in the form of a gas called water **vapor**. Air is the earth's blanket. The earth takes heat from the sun, and the air stores it for your use, like water does. The water vapor in the air holds heat much as do bodies of water. However, there is much less water vapor than in a body of water. As a result, the amount of heat held is also much less.

After the sun goes down, the air still holds heat. This heat keeps the earth from getting as cold during the night. Without the air, our earth would be very hot in the daytime and would be freezing cold at night. The change in temperature from season to season would also be much greater. All life on earth needs the protection of the air.

Write the correct word from the following list on each line.

air	nitrogen	oxygen	vapor
sun	water	blanket	heat

1.15 God provided living things with both water and _____ .

1.16 The earth takes heat from the _____ , and the air stores it for our use.

1.17 Air is largely made up of two gases called a. _____ and b. _____ .

1.18 The air also contains water in the form of a gas called water _____ .

1.19 Air is the earth's _____ .

1.20 Heat is held in the air by _____ vapor.

1.21 After the sun goes down, the air still holds _____ .

Light. The third resource in your study is *light*. God made light. He made the sun. The source of earth's light is the sun. Light brings heat from the sun to the earth. Without light, plants could not grow and make food. Therefore, no animals would be able to live. Even the smallest animals, which grow in the dark places, feed on living things that need light. Light is necessary for life.

Answer these questions.

1.22 Who made light? _____

1.23 What is the source of the earth's light? _____

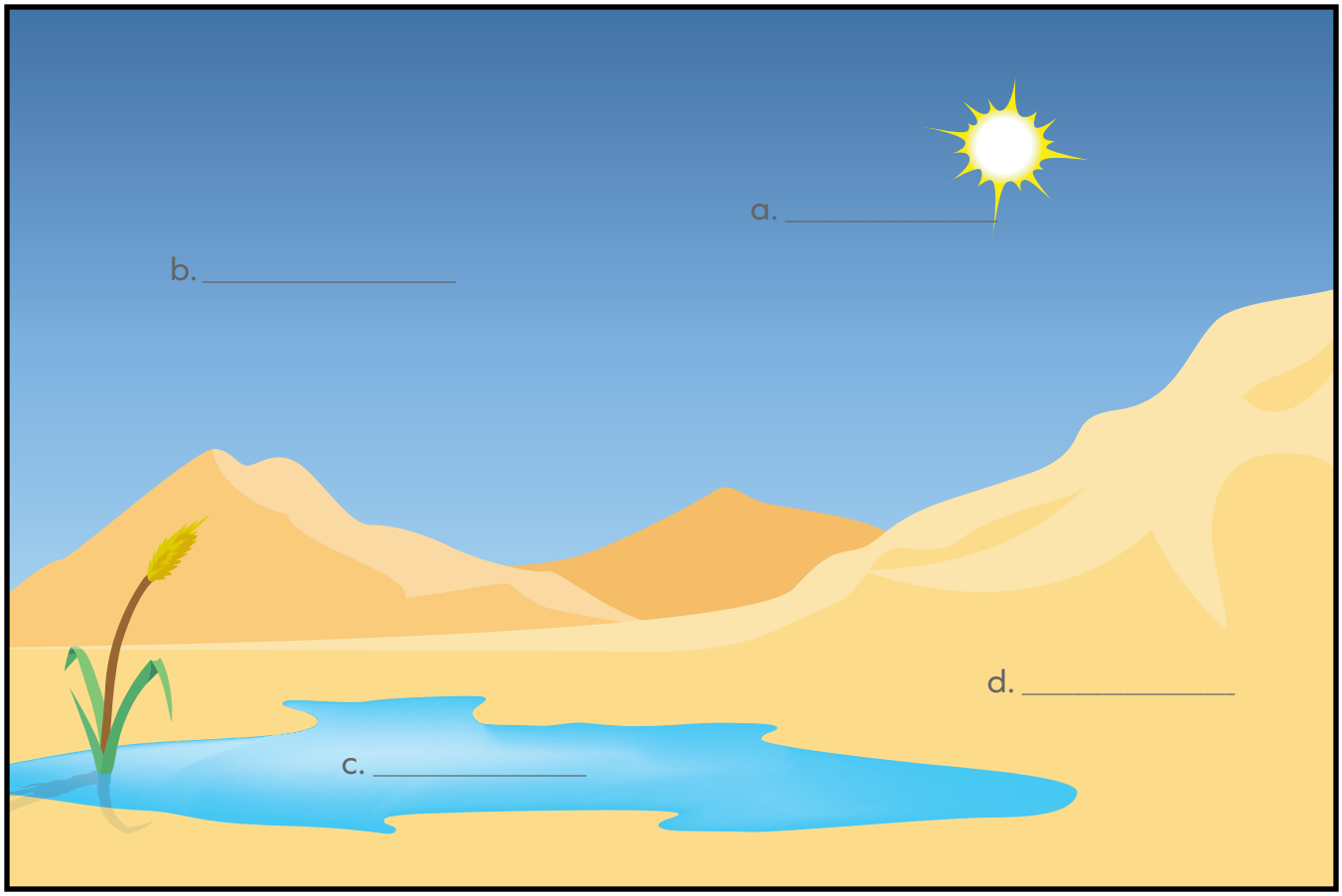
1.24 What do plants need in order to make food and to grow? _____

Soil. The fourth resource in your study is *soil*. Plants need soil in which to grow. You have learned that animals must have plants for food. Plants help to make the soil in which they live. They make soil as they decay, putting **nutrients**, or food back into the soil.

Water, air, light and soil are all parts of your natural environment. They work together to make your environment right for you.

Look at the picture.

1.25 On the lines write the name of each resource that God has given His creatures.



Think and draw.

1.26 What is your environment like? Does it include natural things and people-made things? Does it include people and animals? Does it include pleasant and unpleasant things? On a sheet of drawing paper make a picture of your environment. When you have finished it, put it in your LIFEPAC at this page. You will want to look at it again when you study about human communities.

Teacher check:

Initials _____ Date _____

Food Chain

You have learned that a plant makes food. You know that animals eat plants. Other animals or people eat the animal that eats the plants. You eat hamburger from the cow who ate the grass. The grass made food from the sun. The plants and the animals are part of a food chain.

You can make a food chain to show how you get your energy. Suppose you drank milk for breakfast. Here is how your food chain would look:

Think of some of your other favorite foods. Make food chains to trace the energy you receive back to the sun.

1.27 You ate a peach.

1.28 You ate a beefsteak.

1.29 You drank a milkshake.

Make four food chains from the plants and animals in this picture.

Example:

owl | mouse | grass | sun

1.30

1.31

1.32

1.33

Populations

In earth's life system there are many **populations**. Each kind of living thing makes up a population. In the town where you live, there is a dog population, a cat population, a bee population, a flower population, and more. You are a member of the human population.

Think and Write.

1.34 How many populations, both plant and animal, can you find in your environment?

Make two columns on a sheet of paper. Label one "Plant Population". Label the other "Animal Population." List as many as you can see about you. When you think you have found all of them, ask a friend to compare lists with you. Are you surprised to see how many different populations there are about you.

Teacher check:

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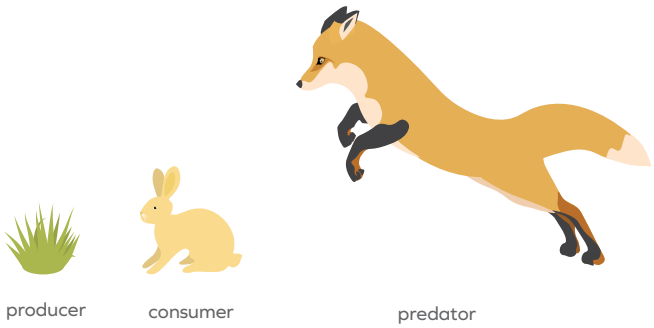
A population may be large, or it may be small. It may also be a part of some larger population. Each population is part of the web of life. Each population has a place that no other population can fill. All populations depend on each other in many ways.



Most important, the populations depend on each other for food. In any population three kinds of living things are present. These living things are **producers**, **consumers**, and **decomposers**. All living things depend on plants for life. If no plants grew, there would probably be no life on earth. So plants are the most important producers. Plants produce the food that gives animals and people **energy**. Since energy comes from the sun, where do the plants get their energy?

In order to make food, plants go through a wonderful process called **photosynthesis**. Only plants which have a green coloring called **chlorophyll** can carry on this process. The plants get water from the soil through their roots. From the air they take in a gas called **carbon dioxide**. With the chlorophyll in their leaves, the water from the soil, and the carbon dioxide from the air, plants must also get energy from the sun in order to make food. At the same time they are making food, the plants are putting oxygen into the air for you to breathe. You breathe in the oxygen that comes from plants. You also breathe out the carbon dioxide that plants use to make food. What a wonderful God, Who has made such a well-balanced creation. The plants can be eaten by either animals or humans, who take into their own bodies the energy in the plants. Those who eat the plants are called the plant-eating consumers. Every living thing is either a producer or a consumer.

The consumers who eat other consumers are called predators. They do not get their energy as directly from the sun as they would if they ate the producers. The consumers who eat plants are getting their energy more directly from the sun. Our source of food and energy was designed by God, our Creator

And God said, Behold, I have given you every herb [plant] bearing seed, which is upon the face of all the earth, and every tree, in which is the fruit of a tree yielding seed; to you it shall be for meat [food]. And to every beast [animal] of the earth, and to every fowl of the air, and to every thing that creepeth upon the earth, wherein there is life, I have given every green herb [plant] for meat [food]: and it was so.

Genesis 1:29 –30

Think and write the answers. Choose one of the words under the sentence. Write the word in the blank.

1.35 A dog eats meat. He is a _____ .

a. predator b. producer

1.36 A cow eats grass. She is a _____ .

a. consumer b. producer

1.37 A carrot grows in the soil. It is a _____ .

a. producer b. consumer

1.38 A robin eats a worm. The robin is a _____ .

a. predator b. producer

1.39 A fox eats a rabbit. The fox is a _____ .

a. producer b. predator

1.40 The rabbit eats some lettuce. The rabbit is a _____ .

a. consumer b. producer

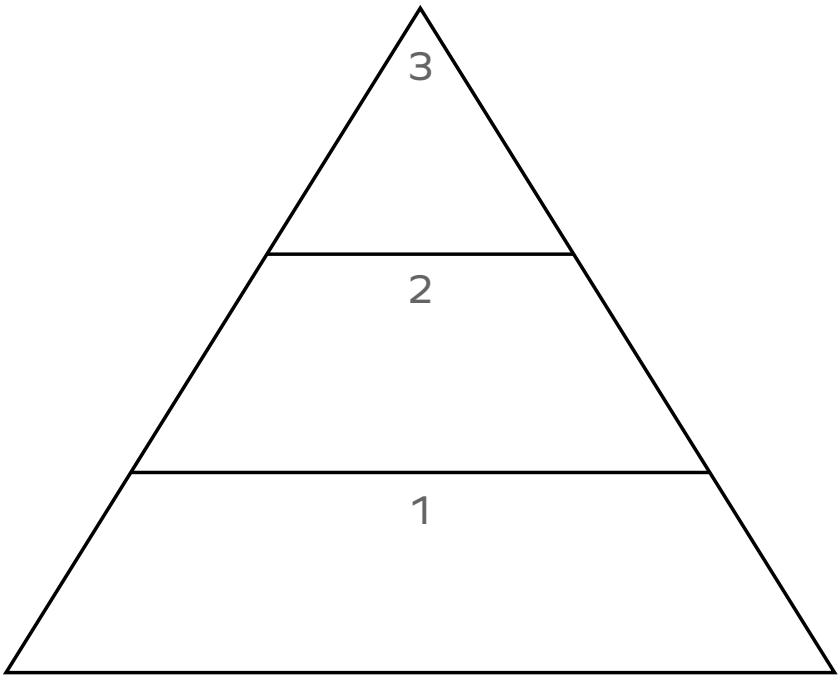
1.41 The lettuce grows in the soil. The lettuce is a _____ .

a. producer b. consumer

Think and Write.

1.42 You can make a pyramid to help you understand who the producers and consumers are. A list of living things is near the pyramid. Read in other books if you need to find out about any words on the list.

- ☐ 1. From this list take the producers and write them in the blanks on the lowest level.
- ☐ 2. Take the plant-eating consumers who eat only producers and put them on the second level.
- ☐ 3. Put all predators on Level 3.



acorns	carrots	cows	frogs
horses	owls	squirrels	apple trees
chickens	deer	grains	lettuce
potatoes	wolves	cabbage	corn
eagles	grass	mice	rabbits
worms			

Teacher check:

Initials _____ Date _____

Notice that there are more producers than consumers on your pyramid. There are also more consumers than there are predators in the life system. For instance, a mouse eats 100 times his own weight in grain in a lifetime. You can see that plants must produce a great amount of food for just one mouse.

The third large population in the life system is made up of decomposers. They are often very small and are considered **pests** by some people. But they are a very important part of the community.

The job of the decomposers is to recycle plants and animals. When an animal dies or a plant finishes its work, the decomposers break down their bodies. This action is called **rotting** or **decaying**. This action is necessary so that dead plants and animals can go back into the earth. Decomposers might be called the clean-up crew. Without their help, waste materials and remains of dead animals and plants would lie around, causing smells and diseases.

One type of decomposer is known as **bacteria**. They do not have chlorophyll. They are very small. You can see them only with a microscope. Some bacteria are useful, others cause disease. The bacteria which are part of earth's clean-up crew are very valuable.

Molds are decomposers. You have seen mold on bread and on fruits and vegetables that are no longer fresh. Molds are part of the **fungi** family.

Termites are decomposers. People don't like to have termites eat houses, but termites are very helpful in the forest. They take care of dead trees which, without the termites, would soon pile up, leaving no room for other plants and trees to grow.

Think and write the answers.

1.43 The population that helps dead animals and plants to rot is the _____ .
(producers / decomposers)

1.44 The decomposers are thought to be _____ by many people.
(nice / pests)

1.45 Small decomposers that can be seen only with a microscope are _____ .
(termites / bacteria)

1.46 Two fungi that are decomposers are _____ .
(flies and bees / bacteria and mold)

1.47 The decomposer that helps to clean up old wood in the forest is the _____ .
(termite / deer)

Balance of Nature

You know how important balance is when you ride a bicycle, play on a seesaw, or try to walk a balance beam.

Balance is just as important in nature. God has provided ways to keep a balance among living things. Often man has not understood its importance and has done things to upset this balance.

For instance, man has looked upon wolves as enemies. He has killed so many that they are in danger of disappearing. But in a forest region, when there are too few wolves, soon the number of deer increases. Wolves are predators who kill deer.

It might seem good for the deer when the wolves are killed. However, the balance of nature has been upset. Soon the environment has too many deer for the food supply. Then many of the deer starve to death. What seemed good for the deer population was really very bad. Some of the hungry deer might eat the bark of trees, and soon these would die. Then other animals would lose homes and food. The balance of the entire forest would be upset.

| A pack of European wolves

Read, think and write.

1.48 Read about another true example of how the balance of nature was upset. Look it up in an encyclopedia or online. Write a couple of sentences to tell what happened.

Rabbits in Australia

_____

_____

_____

_____

_____

You have learned that plants are the main food producers in any community. Since animals depend on plants for food, only a limited number of animals can live in a community. If the environment has too many animals, they will soon use up the plant supply. They will then go on a search for food. When they find another community where there is plenty, they will move in. Soon too many animals will be there for the supply of food, so the balance of both communities has been destroyed.

The balance of nature between plants and insects can be destroyed. Too many insects for the supply of plants will destroy the plant life. Then the insects will die, too.

Every animal and plant has its predator. The predators help to keep the number of animals and plants balanced. As you read, if predators are removed, the living things they eat may increase so much that the animals will starve or become pests.

If nature is not disturbed, plant and animal communities keep themselves balanced. They have to change continually to keep the balance. Sometimes weather conditions will cause the balance to be lost. Sometimes man disturbs it. Every time their environment changes, the plant and animal communities must change, too.

You have studied the food chain and the food pyramid. You have learned how nature keeps communities of living things balanced. In the next section you will take a close look at some of these communities.

Think and write. Look back in Section 1 if you have trouble remembering the answers.

1.49 What are the kinds of living things in a community?

a. _____ b. _____ c. _____

1.50 What is the job of each kind of living thing in 1.49? _____

_____

_____

1.51 How do plants make food?_____

1.52 Explain what happens in the process of plants making food. _____

_____

_____

1.53 With what four resources did God make your environment just right for living things? _____

_____

_____

1.54 Tell in your own words what "balance of nature" means. _____

_____

_____

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, 2 points).

1.01	_____	chlorophyll	a. disappeared
1.02	_____	plant-eating consumers	b. make food
1.03	_____	extinct	c. plant process of making food
1.04	_____	ecology	d. green in plants
1.05	_____	predators	e. nature's clean-up crew
1.06	_____	web of life	f. eat producers
1.07	_____	photosynthesis	g. all life is connected
1.08	_____	environment	h. feed on other animals
1.09	_____	decomposers	i. study of the home
1.010	_____	producers	j. where you live

Write the correct word in each blank (each answer, 2 points).

sun	light	ecologist	bacteria
mold	water	communities	population
food chain	God	soil	air
water			

1.011 The scientist who studies ecology is an _____ .

1.012 People belong to the human _____ .

1.013 One decomposer is _____ .

1.014 All energy comes from the _____ .

1.015 Plants and animals live together in _____ .

1.016 To show how your food gets energy you can make a _____ .

1.017 A growing plant needs a. _____ , b. _____ ,
c. _____ , and d. _____ .

1.018 Small decomposers seen only under a microscope are _____ .

1.019 Temperatures are neither as hot nor as cold near _____ as they are inland.

1.020 Resources were given by _____ .

Follow directions carefully (each answer, 2 points).

Draw a line under each of the following words that is a producer. Circle each plant-eating consumer. Draw a box around each predator. Put an X on each decomposer.

1.021 grasshopper	**1.022** birds	**1.023** bear
1.024 fungi	**1.025** clover	**1.026** water lily
1.027 rabbit	**1.028** frog	**1.029** cow
1.030 mold	**1.031** cat	**1.032** spider
1.033 snake	**1.034** termite	**1.035** orange tree

Complete these sentences (each answer, 3 points).

1.036 Air and water store _____ for the earth's use.

1.037 All of your light and heat come from the _____ .

1.038 A food chain shows how you get your _____ .

Complete these items (each answer counts 5 points).

1.039 The *balance* of *nature* means _____

_____ .

1.040 What does the web of life mean? _____

_____

1.041 Explain why a successful life system must have more producers than consumers.

_____

_____

Teacher check: Initials _____

Score _____ Date _____

80/100

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