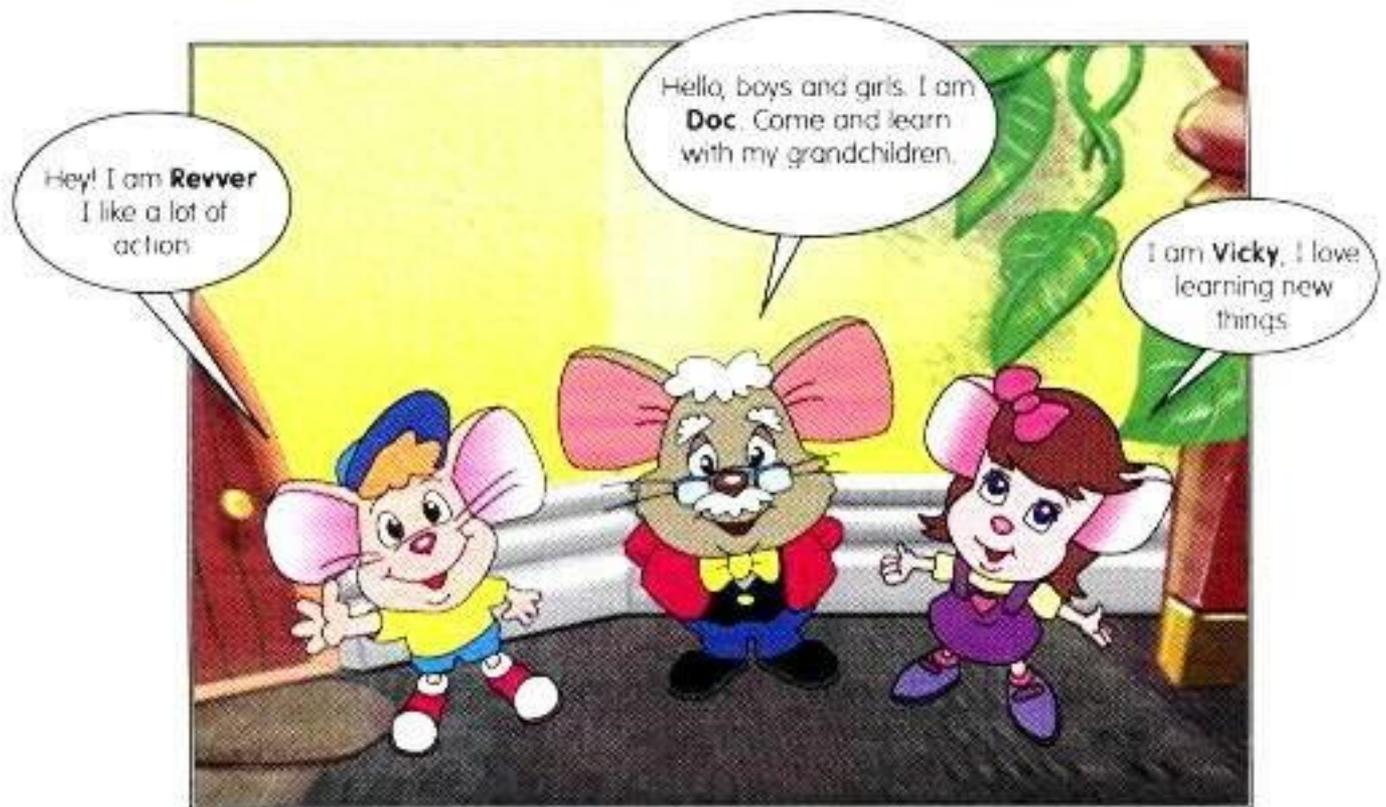


SCIENCE

Learn with the Bridgestone characters:



When you see me, I will help your teacher explain the exciting things you are expected to do.



When you do actions with me, you will learn how to write, draw, match words, read, and much more.



You and I will learn about matching words, listening, drawing, and other fun things in your lessons.

ANIMALS: GROWTH AND CHANGE

God created many **environments** on the earth. He also created many animals to live in the air, water, and land environments.

Temperature, water, light and soil must be just right if living things are to live, grow, and multiply in an environment. An animal is made in a special way to survive in its environment.

Animals are different in many ways. Three of the ways that animals are different are (1) how they are made, (2) what they eat and how they get their food, and (3) how they **breathe**.

You need to learn how animals grow and change. In this LIFEPAC you will learn how animals grow. You will be finding that God's plan for all the animals on the earth is orderly and good.



Read these objectives. They tell you what you will be able to do when you have finished this LIFEPAC.

1. You will be able to tell what changes the environment in which animals grow.

2. You will be able to tell some ways in which animals are different.
3. You will be able to put some animals in groups or classes.
4. You will be able to describe changes in some of the animals that God has created.



abdomen (ab do men). The last part of the three parts of an insect's body.

adult (a dult). A full-grown animal or plant.

amphibian (am phib i an). Animals such as frogs, toads, and salamanders.

antenna (an ten na). A long feeler on the head of an insect.

aquarium (a quar i um). A tank for living fish.

breathe. To inhale and exhale.

Celsius (cel si us). A scale of temperature.

cold-blooded (cold blood ed). Animals whose body heat changes with the temperature of their environment.

design (de sign). Pattern.

energy (en er gy). Power or force.

environment (en vi ron ment). The things around something.

evaporate (e vap o rate). Water turns to vapor in air.

expand (ex pand). To become larger and take up more space.

Fahrenheit (fahr en heit). A scale of temperature.

gills. An organ in the body of water animals used to get oxygen.

invertebrate (in ver te brate). An animal with no backbone.

larva (lar va). An early form of an insect.

lungs. Organs used for breathing.

mammals (mam mals). Animals who have hair or fur, give birth to their young, and make milk for their young.

metamorphosis (met a mor pho sis). A complete change in form.

microscope (mi cro scope). Makes small things look large.

moderate (mod er ate). Between hot and cold.

moisture (mois ture). Water.

molt. To shed.

multiply (mul ti ply). To increase.

observe (ob serve). To look, to see and learn.

pattern (pat tern). A design.

pupa (pu pa). An insect when changing from a larva to an adult.

scavenger (scav en ger). An animal who eats dead animals.

sow bug (sow bug). A small animal that lives in dead wood.

stage. A time period in metamorphosis.

survive (sur vive). To stay alive.

tadpole (tad pole). A very young frog that still lives in water.

talon (tal on). A claw of a bird of prey.

temperature (tem per a ture). A measure of heat.

thermometer (ther mom e ter). To measure heat.

thorax (thor ax). The middle part of an insect's three-part body.

vertebrates (ver te brates). Animals that have backbones.

warm-blooded (warm blood ed). Animals who keep the same body temperature.

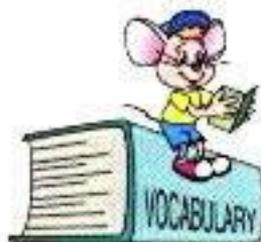
These words will appear in **boldface** (darker print) the first time they are used.

I. WHAT CHANGES AN ENVIRONMENT?

God created many **environments** on the earth. He made many kinds of animals and placed them to live on this earth. God had a special plan. He made all animals in special ways so that they would be just right for the place he wanted them to live. Only in this way would animals be able to live, grow, and **multiply**.

Each kind of environment is like it is because of the **temperature**, kind of soil, and amount of light and water in that place. Because environments are different, the kinds of animals and plants living in different places will be different.

You will learn something about each of the four things that change an environment – temperature, kind of soil, light, and water. To know about these things will help you to better understand God's plan.



Celsius	(cel si us)	A scale of temperature.
energy	(en er gy)	Power or force.
environment	(en vi ron ment)	The surrounding things around something.
evaporate	(e vap o rate)	Water turns to vapor (in air).
expand	(ex pand)	To become larger and take up more space.
Fahrenheit	(fahr en heit)	A scale of temperature.
moderate	(mod er ate)	Between hot and cold.
moisture	(mois ture)	Water.
multiply	(mul ti ply)	To increase.
observe	(ob serve)	To look, to see and learn.
survive	(sur vive)	To stay alive.
temperature	(tem per a ture)	A measure of heat.
thermometer	(ther mom e ter)	To measure heat.



Ask your teacher to say these words with you.

Teacher check _____

Initial

Date

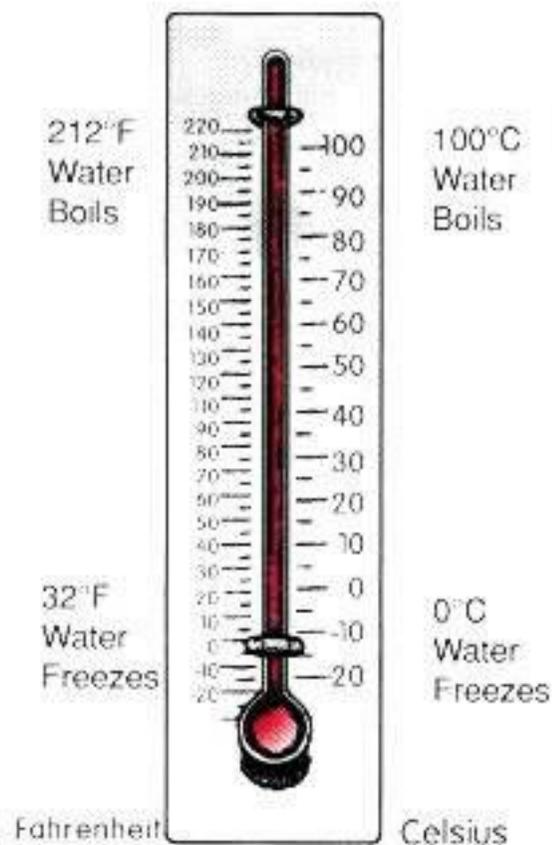
TEMPERATURE

God created some parts of the earth very hot. He made some parts very cold. Some parts have **temperatures** that are in between

hot and cold [**moderate**]. Plants and animals are able to live everywhere on the earth. God made each living thing just right so it could **survive** in its own environment. For example, animals that live where the temperature is very hot must be able to store water or to go for long periods of time with small amounts of water. Animals that live where the temperature is very cold must be able to keep warm. Heavy coats of fur and layers of fat help these animals to survive.

God gave man a brain. Man was able to make a thermometer to measure the temperature of places and things on the earth. The **thermometer** will show 100 degrees **Celsius** (100°C) or 212 degrees **Fahrenheit** (212°F) when water is boiling. The thermometer will show 0 degrees Celsius (0°C) or 32 degrees Fahrenheit (32°F) when water freezes or ice melts. Water is the only thing on earth that will boil at 100°C and will freeze at 0°C . This fact too, is part of God's plan.

Animals are not able to live in places



where it is hot enough for water to boil. If water in the oceans became hot enough to boil, the oceans would **evaporate**. But this does not happen.



Write your answers in the blanks.

- 1.1 Name one thing that changes an environment

- 1.2 Water boils at _____ and

- 1.3 0°C (Celsius) and 32°F (Fahrenheit) is the
temperature at which _____
freezes or _____ melts.
- 1.4 Some animals are able to survive in very cold
environments because they _____



Try this study.

You will need these things:

a clock

a thermometer



Follow these directions. Put a check in the box as you do each step.

1. Choose a place outside at your school. Measure the temperature. Record the temperature in this chart.
2. Wait one hour and measure the temperature in the same place again. Record it in the chart.
3. Take the temperature every hour for one school day.

1.5 Record the temperatures from the study in this chart.

Time	Temperature	
	°Celsius	°Fahrenheit



Teacher check _____

Initial

Date



Something else for you to do!

You will need this thing:
a thermometer

Follow these directions. Put a check in the box as you do each step.

1. Go outside and measure the temperature in at least five different places. Record the temperatures in this chart.
2. Read the different temperatures. How are they different?

1.6 Record the temperatures in this chart.

Name of Place	Temperature	
	°Celsius	°Fahrenheit



Teacher check _____

Initial

Date

- 1.7 Write what you learned about the temperature at your school. _____

-

WATER

Water is a very special thing that God has created. All living things must have water to survive.

Animals must have the right amount of water if they are to live, grow, and **multiply**. Animals are made in special ways to survive on the amount of water in their **environment**. Some animals need much water and others need little.

Water is special too because it **expands** when it freezes. For this reason ice will float in a glass of water. Have you noticed that ice floats? If you have not, **observe** the next time you put ice into water. God planned it this way.

Because ice floats, the tops of lakes will be covered with ice while the water underneath can still be liquid. The animals that live there can survive. The ice acts like a blanket on top of the water.



Try this activity at home.

1. Fill an ice tray completely full.
2. Observe the water level.
3. Place the ice tray in the freezer. Be careful not to spill any water.
4. Let the water freeze. Observe the level of the ice cubes.

1.8 In the space write what you observed. You can draw a picture if you wish. _____

Water takes much heat **energy** to cause it to get warmer. Does it take more heat energy to heat water or soil? You will find out in this activity.

Find out more about energy.



You will need these things:

two pint glass jars or bowls

water

two thermometers

ruler

soil



Follow these directions. Put a check in the box as you do each step.

Part A

1. Put water in one jar or bowl. Measure the height.
2. Put soil in the second jar or bowl. Be sure to have it reach the same height.
3. Put both jars in a sunny place close together. Be sure one is not shading the other.
4. Place a thermometer in each one. Be sure the thermometer is in at the same depth and is at the same angle.
5. Read the temperature on each thermometer every five minutes and record the temperature in the chart.

1.9 Record the temperatures in the chart.

Time	Water		Soil	
	C°	F°	C°	F°

Data Table for Part A: Heating Up Temperatures

Part B

1. Move the two jars to a shady place. Be sure they are still close together but are not in the sun.
2. Read the temperature on each thermometer every five minutes and record the temperature in the following chart.

1.10 Record the temperatures in the chart.

Time	Water		Soil	
	C°	F°	C°	F°

Data Table for Part B: Cooling Off Temperatures



Teacher check _____

Initial

Date



Study the temperatures in the two tables. Write the correct answers.

1.11 Heat is taken in by the _____ faster than the _____.

1.12 Heat is lost by the _____ faster than by the _____.

- 1.13 The _____ will heat up faster (land / ocean) than the _____ (land / ocean)
-

The facts you have just found let you know another important thing about water. It takes much heat energy to cause water to get hot. Water does not lose its heat as fast as soil. Water is able to store heat energy and this fact is an important part of God's plan. The sun shines on the ocean, but it does not make the ocean get hot enough to boil or to hurt the animals that live in it. When night comes or the season changes, the ocean does not become too cold for the animals who live there. The ocean is able to store heat energy. Land that is near the ocean will neither become too hot nor too cold because the ocean can store heat energy. The temperature of these places is moderate. This fact is part of God's plan too.



Complete these activities.

- 1.14 Look in the newspaper or listen to the weather news on the radio and find the temperatures for the following cities.

Fairbanks, Alaska
Honolulu, Hawaii
Miami, Florida
Los Angeles, California

F°	C°	F°	C°
High		Low	

- 1.5 Two things that change an environment are _____ and _____.
-

Some environments do not contain much water or **moisture**. These environments do not receive much rain or snow. If an environment receives ten inches or less of rain or snow each year it is thought to be a desert. Plants and animals that live in deserts must be able to use wisely the moisture they get if they are to live, grow, and multiply. Deserts do not have to be hot to be called a desert. Some deserts are not hot.



Do this activity.

- 1.16 Look in an encyclopedia under deserts and find the names and location of five deserts on the earth. Write in the chart on page 16.

Name of Desert	Location



Teacher check _____

Initial

Date

LIGHT

And God said, "Let there be light, and there was light." Light is an important part of an environment. Different environments have different amounts of light. Green plants use light energy to make food. Green plants are able to make food and oxygen for themselves and for other living things.

Some environments are very sunny. Others are shady. Different animals like different amounts of light. Animals will not be able to live, grow, and multiply if they do not have the right amount of light for their kind. For example, some animals like to live underground.



Try this study.

You will need these things:

quart jar

moist soil tray

two earthworms

a watch with

a second hand



Follow these directions. Put a check in the box as you do each step.

1. Place moist soil in the jar.
2. Put Earthworm A on top of the soil.
3. Time Earthworm A until the worm goes into the soil.
Record the time on your chart. Write about what you see under Earthworm A on the chart.
4. Put Earthworm B on top of the soil.
5. Time Earthworm B until the worm goes into the soil.
Record the time on your chart. Write about what you see under Earthworm B on the chart.
6. Empty soil and earthworms into the tray.
7. Repeat steps 2, 3, 4, 5, and 6 for two more times.

1.17 Record each fact on the chart on page 18.

Trial	OBSERVATIONS			Time to go underground
	Earthworm A	Time to go underground	Earthworm B	
1				
2				
3				

Data Chart



Teacher check _____

Initial _____

Date _____



Write the answers.

1.18

Name three things that change an environment:

_____, _____
and _____.

SOIL

The kind of soil that is found where the animal lives is important. God created many different kinds of rocks. These rocks change to make different kinds of soil. In an environment the kind of soil, temperature, light, and water needed by each plant and animal living there will be found.

What kind of soil is in your home environment? What kind is in your school environment? You can collect some samples that will give you an answer.



Study your soil.

You will need these things:

cup

water

two jars with lids



Follow these directions. Check the box as you complete each step.

1. Fill a cup with soil from your yard. Gently rake back loose leaves and sticks before getting your sample.
2. Put soil into jar.
3. Add water to the soil until the jar is three-fourths filled. Put lid on jar tightly.
4. Shake well until soil and water are thoroughly mixed.
5. Place jar in a place and do not move it until the next day.
6. Observe the different layers that you see. Measure the thickness of each one.
7. Draw the different layers as thick as your measurements show in Rectangle A.
8. Measure the height of the water and draw that on Rectangle A.
9. Fill another cup with soil from the school and repeat all of the steps.

1.19 Put your answers in these Rectangles.

Rectangle A



Home Yard Soil

Rectangle B



School Yard Soil



Teacher check _____

Initial

Date

1.20 Name four things that can change an environment.



For this Self-Test, study what you have read and done.
The Self Test will check what you remember.

SELF TEST 1

Fill in the circle before the right answer.

- 1.01 What is the freezing point of water in degrees Celsius?
 32° C 212° C 0° C
- 1.02 What is the melting point of ice on the Fahrenheit thermometer?
 32° F 212° F 0° F
- 1.03 Ice floats because it:
 is cold is hard expands
- 1.04 Which heats faster, soil or water?
 soil water
- 1.05 Which cools faster, soil or water?
 soil water

Write the answers on the lines.

- 1.06 Name four things that can change an environment.



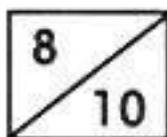
Teacher check _____

Initial

Date



My Score



II. HOW ARE ANIMALS DIFFERENT?

The Bible tells you that God created many different animals to live on this earth. Some live in the water. Some live above, on, or under the land. Some fly in the air. Some animals are large, and some are small. Some are so small that you need a **microscope** to see them. Others are larger than your automobile or even a school bus! These many different kinds of animals that God created are alike in some ways. Each kind must have the right kind of environment, food, water, and air to live, grow, and multiply. So you see, each kind of animal is like every other kind in that each was made by God and each has the same basic needs. But the animals are different in many ways.



Do this activity.

2.1

Write the names of ten animals on the lines.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____



abdomen	(ab do men)	The last of the three parts of an insect's body.
amphibian	(am phib i an)	Animals such as frogs, toads, and salamanders.
antenna	(an ten na)	A long feeler on the head of an insect.
aquarium	(a quar i um)	A tank for living fish.
breathe		To inhale and exhale.
cold-blooded	(cold blood ed)	Animals whose body heat changes with the temperature of their environment.
design	(de sign)	Pattern.
gills		An organ in the body of water animals used to get oxygen.

invertebrate (in ver te brate)	An animal with no backbone.
lungs	Organs used for breathing.
mammals (mam mals)	Animals who have hair or fur, give birth to their young, and make milk for their young.
microscope (mi cro scope)	Makes small things look large.
pattern (pat tern)	A design.
scavenger (scav en ger)	An animal who eats dead animals.
talon (tal on)	A claw of a bird of prey.
thorax (thor ax)	The middle part of an insect's three-part body.
vertebrates (ver te brate)	Animals that have backbones.
warm-blooded (warm blood ed)	Animals who keep the same body temperature.



Ask your teacher to say these words with you.

Teacher check _____

Initial

Date



Think about animals.

2.2

Study your list of animals. Write four ways these animals are different from each other. Do not read ahead until you do this activity!

1. _____
2. _____
3. _____
4. _____

Did you say they have different sizes, shapes, or colors? If you did, you are right. God did make animals of different sizes, shapes, and colors. Did you say they have different **patterns** or **designs**? If you did, you are right. God did make animals that have different designs or patterns. Did you say they are different where they live? If you did, you are right. Animals are not able to live just anywhere. Their environment must be just right for them if they are to survive. Did you say they are different in how they **breathe**? If you did, you are right because animals do not all breathe in the same ways. Did you say they are different in their body coverings? If you did, you are right because

they do not all have the same kind of body coverings. Did you say they are different in how they have their babies? If you did, you are right again. Some animals multiply by dividing in two parts. These animals are so small that you need a microscope to observe them. Some animal babies hatch from eggs, and other animal babies are born alive.

Animals are different in many ways.

STRUCTURE

You have just been thinking about how animals are different. Now let us think about the many different kinds of animals in another way. You can study animals by grouping them in the ways they are alike. When you put things into groups because of their likenesses you are doing something important in science. You can choose what likeness you want to use to group animals. You could group all the animals by color, size, how they have their babies, or where they live. Any of these groups would be right. But most of the time, scientists will study how an animal is made. For example, a scientist will study an animal and will find out whether it has a backbone.

If it has a backbone, the scientist will say the animal is a **vertebrate**. If it does not have a backbone, the scientist will say the animal is an **invertebrate**.

This fact may surprise you! Only about five of every hundred animals that God has made have a backbone. Ninety-five of every hundred animals belong to the invertebrate group.



Use your animal list to do this activity.

- 2.3 How many on that list had hair or fur? _____
- 2.4 How many were birds? _____
- 2.5 How many were fish? _____
- 2.6 How many were reptiles (snakes, lizards, turtles)?

- 2.7 Did you name any toads or frogs? How Many?

- 2.8 Add the numbers you have in all of these blanks.
_____ The number will tell you
how many vertebrate you listed in your ten animals.

Most of the time people will name vertebrates when they are asked to name animals. And yet most of the animals that God has placed on this earth are invertebrates.

Five groups of animals are vertebrates. These animals are all alike because they have backbones. The five groups are fish, **amphibians**, reptiles, birds, and **mammals**. Great differences are within each of these groups. Think of all the different kinds of birds you have seen. Each kind is different in some ways from all other birds, and yet it is like all other birds in that it has a body covering of feathers; it has two wings, two feet, a beak; its young hatches from eggs; it is **warm-blooded**; and it uses **lungs** for breathing.



Fill in the blanks.

2.9

Name five groups of animals that are vertebrates.

a. _____

d. _____

b. _____

e. _____

c. _____

- 2.10 Animals that do not have backbones are called _____ (vertebrates / invertebrates)
- 2.11 Of every hundred animals on earth, _____ are invertebrates.
- 2.12 Animals can be grouped in many ways. Name an important way that scientists group animals.
- _____



Read about birds in another book.

- 2.13 Find the "Bird" article in an encyclopedia. Read the article to see if you can find unusual facts about birds. (How many kinds of birds? What is the largest kind? Smallest kind? How do their eggs differ?) Write some of these facts down.

On our earth are different kinds of reptiles. Each snake, lizard, or turtle is a little different from others of its kind. You would never think of them as being just like alligators or

crocodiles, which are also reptiles. It would be impossible for you to think of reptiles as being birds. What makes a reptile different? A reptile has a backbone like a bird. It also breathes with lungs and lays eggs. But the body covering is different. Reptiles have a scaly skin and are **cold-blooded**. When temperatures in the environment become cold, the body temperatures of reptiles, amphibians, fish, and all other animals on the earth except birds and mammals, will become colder. When the outside temperature is hotter, cold-blooded animals' inside temperature will get hotter, too. When their body temperature changes, their way of life changes too.

Mammals and birds are the only groups of animals that are warm-blooded. When their temperature changes, it is usually because they are sick. Mammals are like birds in that they are warm-blooded, breathe with lungs, and have backbones. Mammals usually give birth to their babies and the mother mammals are able to feed their babies with their milk. Mammals have a body covering of hair or fur.

All of the vertebrates you have read about so far have breathed with lungs. But not all vertebrates use lungs. Fish breathe with **gills**

all their lives. They usually have scales and lay eggs. Fish are cold-blooded.

Amphibians are vertebrates that are able to breathe with gills during the first part of their lives. While they are breathing with gills they must live in the water. Female amphibians must lay eggs in the water for the babies to survive. During the first part of their lives they look and act much like a fish. But as they grow, important changes are taking place inside and outside their bodies. They change from gill-breathers to lung-breathers. They lose their tails and grow legs and are able to live on the land. Study the diagram on page 51.



Complete the following chart.

- 2.14 Place a check in the box that tells what is true for each of the vertebrates.

ANIMAL PARTS	VERTEBRATES				
	Fish	Amphibians	Reptiles	Birds	Mammals
Hair or fur					
Scales					
Feathers					
Lays eggs					
Live birth					
Lungs					
Gills					
Warm-blooded					
Cold-blooded					
Feed babies their milk					
Beak and two wings					



Have some fun!

2.15

Group the five groups of vertebrates:

Warm-blooded

Cold-blooded

2.16

Group the five groups of vertebrates:

Gill-Breathers

Lung-Breathers

2.17

Group the five groups of vertebrates:

From Eggs

Born Alive

Only God could work out a plan to create so many different kinds of animals and have it be possible for you to group them. Most of the animals that you know the most about fit into the vertebrate group. But remember, most of the animals on the earth are invertebrates.



Think about other animals.

2.18

Make a list of ten animals which are not vertebrates.

Remember, they can't be fish, amphibians, reptiles, birds, or mammals!

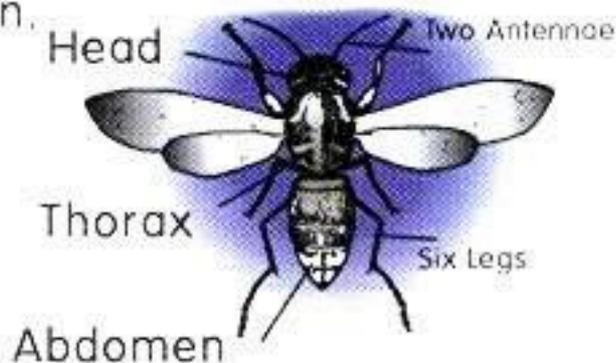
- | | |
|----------|-----------|
| 1. _____ | 6. _____ |
| 2. _____ | 7. _____ |
| 3. _____ | 8. _____ |
| 4. _____ | 9. _____ |
| 5. _____ | 10. _____ |

- 2.19 Look at your list of ten animals. How many animals on the list had six legs? _____
- 2.20 How many had eight legs? _____
- 2.21 How many had no legs? _____
-

Usually, most people will name insects (animals with six legs). Many will name spiders (animals with eight legs). Some will name worms. How did you do? Insects, spiders, and worms are all invertebrates.

Each insect is alike in these ways:

1. It has three body parts: the head, thorax, and abdomen.
2. It has six legs.
3. It has two antennae.



Have some fun creating.

- 2.22 Create some insects. Put a check in the box as you do each step.

1. Draw three body parts. Use circles or ovals of different sizes.
2. Draw the six legs. These legs must be connected to the middle body part.
3. Draw either two, four, or no wings.
4. Draw two antennae on the front body part.

What kind of seafood other than fish, do you like to eat?
I like _____, _____ and
_____.

Did you name shrimp, lobster, scallops, or crab? If you did, you named some more invertebrates.

Have you used a sponge today? If you used a real sponge, you were using the remains of an invertebrate.

Many more kinds of invertebrates live in and on the land of the earth. Many more kinds live in the waters of the earth, too. All the different kinds of invertebrates are alike because they do not have a backbone.

Scientists find it easy to group animals by their backbones but there are other ways to group them, too.

KINDS OF FOOD

All animals must have food if they are to be able to survive in their environment. They do not all eat the same kinds of food. Some animals eat mostly plants or something from plants. These animals are plant-eating animals. Other animals eat mostly meat. These animals are meat-eating animals. Like man, some animals eat both plants and meat.



2.23

Do this activity.

Group the following as plant eaters, meat eaters or plant and meat eaters.

rabbit

lion

man

cow

zebra

dog

horse

woodpecker

mountain lion

bear

hawk

owl

Plant Eaters

Plant and Meat

Meat Eaters

Eaters

Some animals do not hunt live animals to eat, but eat only animals which are found dead. These animals are called **scavengers**. Scavengers are very important in God's plan. According to God's plan, nothing is to be wasted.

Sometimes you can figure out what an animal eats by observing its shape. For example, you can study birds carefully and the type of beak and feet that a bird has will tell you much about what it eats and how it gets its food.

Beaks that are long and pointed like a nail let you know that the bird can dig into a tree to pull out insects.



When you see a beak that is short, small and pointed, you will know that the bird can crack open seeds and nuts.



If the beak has a sharp hook you will know that the bird can tear meat from the bones of animals.



Some beaks are like shovels. This kind of beak will let the bird scoop up small fish and plants from the water.



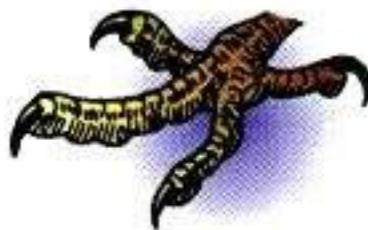
The next time you see a bird, look at its feet and you will learn a lot. When the feet have long toes with two backward and two forward, that bird will be able to hold onto a tree trunk that is standing straight up.



Some birds have short curved toes. They have three toes that are forward and one that is backward. These birds can perch on round tree limbs.



The bird that has sharp **talons** has a foot that can be used for holding animals.



Then there are the birds with webbed feet. This kind of foot will tell you that the bird can walk on mud or paddle in the water.



Do this study activity.

2.24

Follow these directions. Put a check in the box when you do each step.

1. Collect some bird pictures.
 2. Sort the pictures into these groups: seed-eaters, insect-eaters, and meat-eaters.
 3. Check your groups by reading bird books and encyclopedias.
-

RESPIRATION

Animals in every kind of environment are made in special ways so that they can get oxygen from the environment. God has planned it this way.

Some of the ways that different animals can take in oxygen into their bodies are

1. through their skin,
 2. through openings along the sides of an insect's body,
 3. through gills, and
 4. through lungs.
-



Try this study.

You will need these things:

four jars (same kind) clock
four earthworms



Follow these directions. Put a check in the box as you do each step.

1. Fill two jars with water and leave two jars empty.
2. Place an earthworm in each jar.
3. Set one full and one empty jar out of direct sunlight. Do not move them for a day.
4. Set one full and one empty jar in the refrigerator but not in the freezer.
5. Second day. Place all four worms on a sheet of waxed paper. Be sure to place them so that you do not get them mixed up.
6. A large blood **vessel** is on top of each earthworm's body. Look for the pulse of blood in this vessel. Count the number of pulses per minute.

2.25 Record in the chart.

Minute	ROOM TEMPERATURE		REFRIGERATOR TEMPERATURE	
	WET	DRY	WET	DRY
1				
2				
3				

7. Compare the pulse rates. Write a sentence telling about each change in pulse rate you find on your chart.
-

The earthworm does not have a special organ for breathing. Oxygen goes directly through its skin to its blood.

Study the abdomen of an insect. Look for tiny openings along the side. These openings are used in breathing.

If you are interested, you can try to observe breathing in animals. If your classroom has an **aquarium**, you can count the number of times a fish opens and closes its mouth per minute. What happens to the flap or gill covers? Count how many times this happens per minute. Read in an encyclopedia to learn more about fish breathing.



Teacher check _____
Initial Date



Study what you have read and done for this Self Test. This Self Test will check what you remember of this part and other parts you have read.

SELF TEST 2

Fill in the circle before the right answer.

- 2.01 212°F is the _____
 freezing point boiling point
of water of water
- 2.02 All vertebrates have _____
 feet lungs backbones
- 2.03 An animal is grouped as an insect if it has _____
 eight legs six legs a backbone
- 2.04 One animal that would not be grouped with the
vertebrates is the _____
 mouse hawk butterfly
- 2.05 The animal that belongs to the mammal group is the

 dog tadpole parrot

Write the answers on the lines.

- 2.06 Name the five groups of vertebrates.

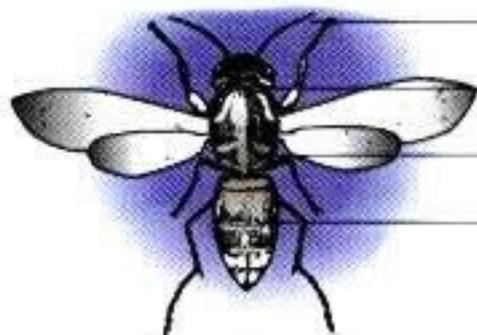
2.07

Four things that can change an environment are:

2.08

Write these words on the right line.

antenna head thorax abdomen



a. _____

b. _____

c. _____

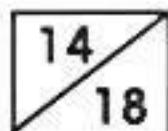
d. _____



Teacher check _____

Initial

Date



III. HOW DO ANIMALS GROW AND CHANGE?

Some animals change in form as they go through their lives. These animal babies hatch from eggs and do not look like the mother who laid the eggs. They go through changes as they grow. They begin to look like different kinds of animals. Scientists call these changes **metamorphosis**.



adult	(a dult)	A full-grown animal or plant.
larva	(lar va	An early form of an insect.
metamorphosis	(met a mor pho sis)	A complete change in form.
molt		To shed.
pupa	(pu pa)	An insect when changing from a larva to an adult.
sow bug	(sow bug)	A small animal that lives in dead wood.
stage		A time period in metamorphosis.
tadpole	(tad pole)	A very young frog that still lives in water.

Ask your teacher to say these words with you.



Teacher check _____

Initial

Date

INVERTEBRATES

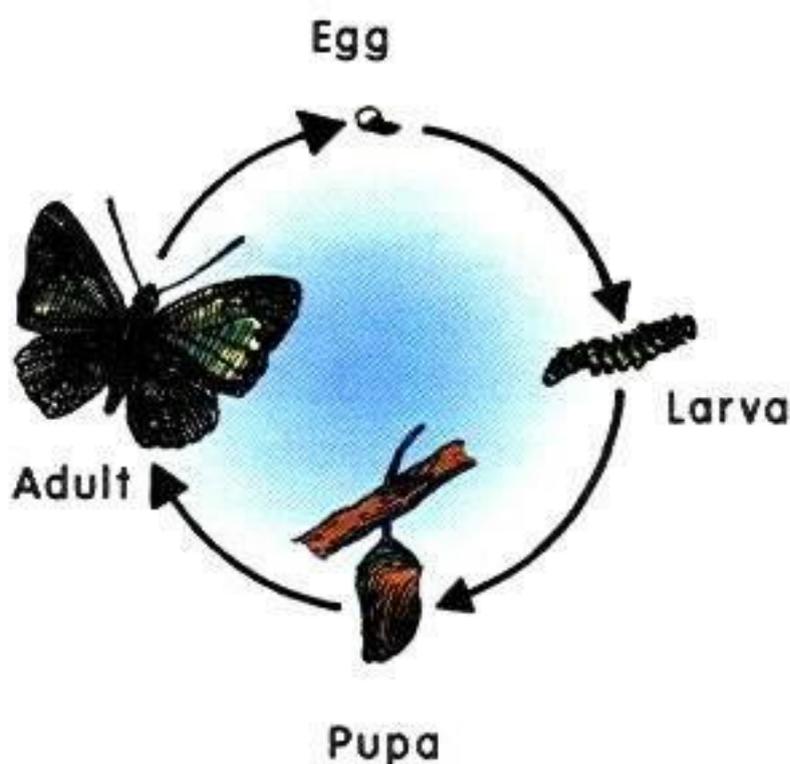
A butterfly is an invertebrate that goes through metamorphosis. There are four **stages** in the metamorphosis of a butterfly. The female **adult** lays an egg that hatches into a **larva**. A larva looks somewhat like a worm but it is not a worm. If you look at a larva carefully, you can find six tiny legs at the end nearest to its head. You will also find other things that look like legs at the back end of the larva. These things are not legs, but they do help to hold larva to surfaces.

When the animal is in the larva stage of its life, it must eat much food in order to be strong and to grow. Its skin will not grow like yours. Larva must **molt** when the skin becomes too tight. There is a soft skin underneath that will get hard. Then later, that skin will have to be shed. This happens many times before larva are ready to go into the next stage.

Later the larva will go into a resting stage called the **pupa**. It will no longer look like a worm-like animal. It will work hard to make a strong safe place for itself on a twig. There the animal will remain for some time not moving or eating. A different kind of covering will form on the outside.

The animal inside is changing. When everything is just right, an adult butterfly will come from the pupa skin.

An animal must be very strong to go through all four stages. Every time you see a butterfly, moth, or even a housefly, think about these stages of metamorphosis. The animal that you will be looking at had to survive these stages. God has a good plan for the animals of the earth to follow as they live, grow, and change.



**Diagram of Stages of Metamorphosis
of Butterflies**



Fill in the blanks.

- 3.1 The four stages of metamorphosis of a butterfly are

- 3.2 The skin of a larva cannot grow and must be

- 3.3 Arrange these words in proper order of growth.
adult larva egg pupa
(1)_____ (2)_____ (3)_____ (4)_____
-

Larva must have both a mother and a father as you have. The adult female is able to lay eggs that will hatch into larva. These larva will change to the pupa stage. The pupa will become adult males or females. The adults can become parents. The story goes over and over. This story is God's plan.



Try this study.

You will need these things:

- a gallon jar
- a lid with some small holes in it that will fit the jar
- moist soil
- potato
- three or four **sow bugs**



Follow these directions. Put a check in the box as you do each step.

1. Place moist soil in the jar to a depth of 10 centimeters (4 inches).
2. Put a small potato and the sow bugs in the jar.
3. Set the environment in a place where it will not fall.
4. Observe changes that take place. Keep a record of what you see happening.
5. Make your own special table that will show what you observe. If you need more space, you can add sheets of your own paper.

3.4 Record the facts in the chart you make.

Data Table: Observing a Sow bug's Environment



Teacher check _____

Initial

Date



Record your findings.

3.5 How many sow bugs did you place in the environment? _____.

3.6 Record the number of sow bugs you have after
1 week _____, 2 weeks _____,
3 weeks _____, 4 weeks _____,
5 weeks _____, 6 weeks _____.

If everything is just right for the sow bugs, they will live, grow, and multiply.



Try this!

You can make an environment for crickets in the same way that you did for sow bugs if you have time. Put some moist leaves into the jar with the crickets.

AMPHIBIANS

Frogs and toads go through metamorphosis, too. You may have found some **tadpoles** in a lake or stream. A tadpole does not look like its mother. It will look like the mother someday if everything in the environment is right.

The life story of an amphibian has only three parts to it.

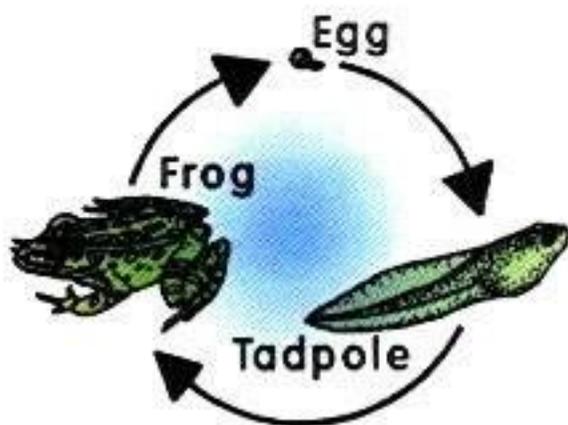


Diagram of
Metamorphosis of a Frog

If you ever decide to keep tadpoles, you must be very sure to keep the environment exactly like the environment where you find the tadpoles. The kind of water and the temperature of the water must not change. You must also remember that when the tadpole gets its legs and become a lung breather, it must be able to get its head out of the water. You must remember to put something in the jar so the frog can climb up on it for air. If you do not do this, the frog will drown just as you would if you were in the water and could not come up for oxygen from the air.



Try these reading activities.

- 3.7 Circle the words that have the same / ow / sound as you hear in drown.
brown know show owl town clown
- 3.8 Circle all the words that have the same / ou / sound as you hear in found.
soup round though thou pouch out enough
- 3.9 Fill in the missing letters.
The oi in oil sounds the same as the _____ in boy.
The oy in joy sounds the same as the _____ in foil.

What do you know about words? Learn to add endings. Make a new word for these science words that end in e. To add a suffix to most words that end in e, you must drop the e before adding the suffix. Try these. Add -ed and -ing to the root word.

	-ing	-ed
live	_____	_____
breathe	_____	_____
measure	_____	_____

MAMMALS

Most mammals look much like their parents when they are born. They have nearly the same shape but are not the same size. As mammals live and grow they change in size. Other body parts will also be changing as they become older. When they are adults they can become parents of babies who look much like themselves.

Some mammals like the opossum and the kangaroo give birth to their young when the babies are too small to live entirely away from the mother's body. These babies must live in a special pouch that the mother has. They will stay until they are strong enough to be out on their own.

Many baby mammals are quite helpless. They must be cared for by their mothers or someone else. The female mammal is able to make milk for her young.

If your dog or cat has had babies, you have been able to observe the mother feeding her young.

Whales are mammals. If you know that whales are mammals, then you also know some other things about baby whales. You know that they are born alive and that they must live off the milk of the mother. You know, too, that whales are lung-breathers and are not gill breathers as are fish.

Whales are among the first animals that you are told about in Genesis. Even though whales are the last animals you will study about in this LIFE PAC, you must remember how important they are to God's plan. They and all the other animals living, growing, and changing in their special environments were created by God.



Study these science words.

- 3.11 Circle the word in each line that has the right spelling.
- | | | | | |
|-------|-------|--------|--------|-------|
| mamal | mamle | mammal | mammel | mamml |
| adolt | adilt | adutl | addult | adult |
| puple | puppa | pupal | pupa | popa |
| larva | lurva | larrva | lorva | larve |
- 3.12 Underline the word in each line that does not belong.
- | | | | | |
|------------------|--------------|-----------|---------|----------|
| egg | larva | pupa | mammal | adult |
| egg | tadpole | adult | frog | insect |
| three body parts | two antennae | amphibian | | |
| six legs | butterfly | spider | cricket | moth fly |



Teacher check _____
Initial Date



Study what you have read and done for this last Self Test. This Self Test will check what you remember in your studies of all parts in this LIFEPAC. The last Self Test will tell you what parts of the LIFEPAC you need to study again.

SELF TEST 3

Fill in the circle before the answer.

- 3.01 Which of these animals is not warm-blooded?
 mammal reptile bird
- 3.02 Which of these animals uses gills to breathe?
 reptiles birds fish
- 3.03 Most of the animals on the earth belong to which group?
 reptiles invertebrates vertebrates
- 3.04 To molt is to
 shed grow multiply
- 3.05 Which word is not a stage in metamorphosis?
 amphibians larva egg
- 3.06 Which word is the resting stage of metamorphosis?
 pupa larva egg
- 3.07 The melting point of ice is
 212°F 32°C 32°F

Write the answers on these lines.

- 3.08 Butterflies are _____.
vertebrates/invertebrates
- 3.09 A thermometer is an instrument used for measuring _____.
temperature/height
- 3.010 A sow bug _____ an insect.
is/is not

- 3.011 The animals in the _____ group
amphibians/reptile
use both gills and lungs at different times during
their metamorphosis.
- 3.012 Name the stages in order of the metamorphosis of
a butterfly.
- a. _____
b. _____
c. _____
d. _____
- 3.013 Name four things that can change an environment.
- _____

- 3.014 List the five groups of vertebrates.
- _____



Teacher check _____
Initial _____ Date _____



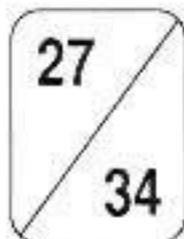
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24

NOTES

SCIENCE

3 0 3

LIFEPAC TEST



Name _____

Date _____

Score _____

Complete the following lists.

11. List the five groups of vertebrates.

12. List four things that can change environments.

13. The four stages in order in the metamorphosis of a butterfly are

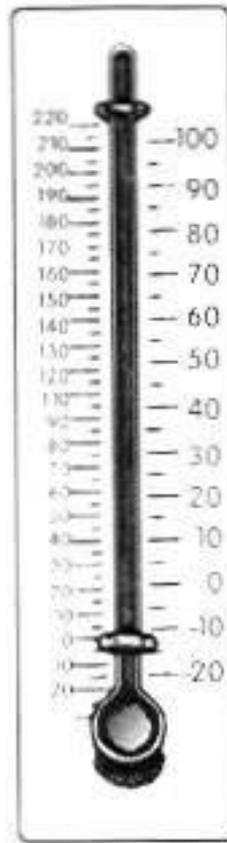
, and

Write the temperatures on the lines.

14.

Boiling Point
of Water. _____ a. _____

Freezing Point of
Water and
Melting Point of
Ice. _____ c. _____

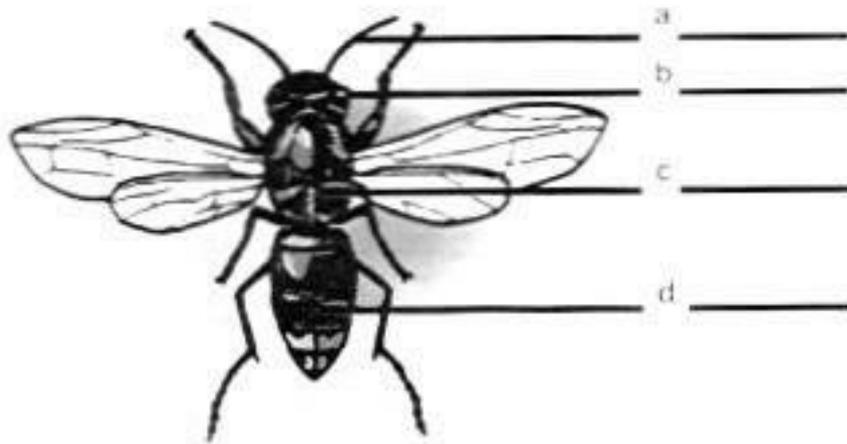


b. _____

d. _____

Write the right name for each part of an insect.

15. abdomen antenna head thorax



3 (three)

SCIENCE 303

ANIMALS: GROWTH AND CHANGE

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