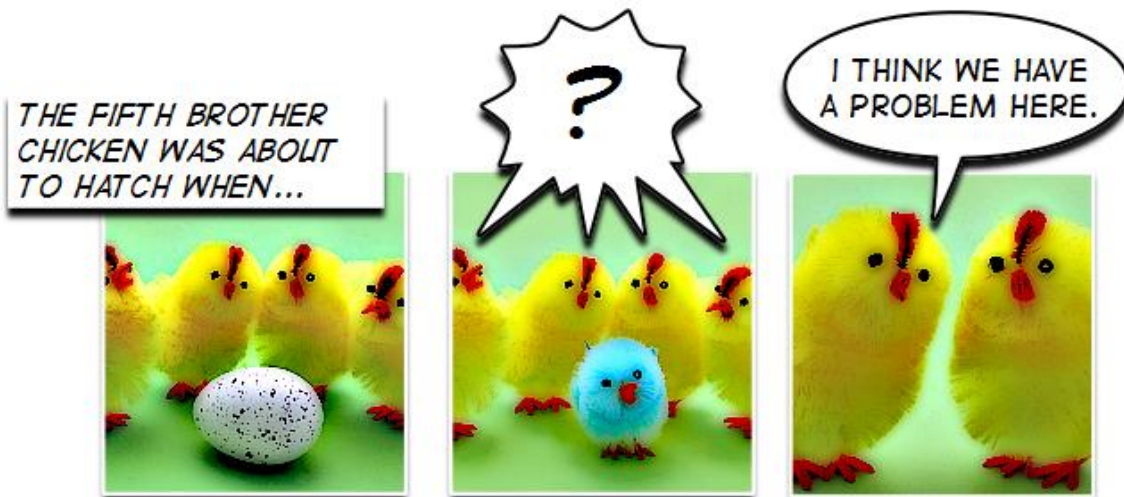


CHAPTER 9

In the last unit, we looked at the biomes that organisms live in. All organisms that live in each of these areas have features (for example, special body parts and abilities) that help them survive!



In this unit we are going to look at how and why these features are so important!

Have you ever noticed that brothers tend to look alike? Have you ever had trouble telling them apart? The things that make these people look alike are known as **inherited** ("in-hair-a-ted") **traits**. An inherited trait is something (like eye color, height, hair color...) that you get from your parents.

Notice I said **parents!** That's right! You get your inherited traits from both your mom and dad! And it is not just humans that get their traits from their parents...

Many living organisms inherit traits from their parents.

Scientists have a fancy word for all the babies in the world... **offspring.**

I'm sure you know other words for parents and offspring, how about...



Parents

Dog

Cat

Bird

and

and

and

Offspring

Puppy

Kitten

Chick

Most offspring get their traits from their parents. This is why most offspring look much like their parents.

For example, a flower grows seeds that can be planted in the ground. These seeds will grow into another flower, right? You would not expect a seed to grow into a dog, would you?

Of course you would not!

It is true that family members share many kinds of inherited traits...

Some of these inherited traits are:

- Eye color
- Hair color
- Height
- Color of skin
- Dimples or freckles
- Naturally curly or straight hair

**...there are even some inherited traits that
can not be seen very easily!**

Some of these "hidden" traits include:

- **The ability to roll your tongue**

Can you roll your tongue into a tube? Not everybody can!

- **Color blindness**

Not everyone can see the difference in colors! For example, some people cannot see the color green.

But not all traits are inherited...

...some traits can be learned!



None of you have seen a newborn baby pick up a book and start to read, have you? No way! The ability to read was learned through practice! This is called a "learned trait."

You learned to do a lot of stuff in your life:

- Ride a bike
- Draw pictures
- Brush your teeth

None of these abilities were inherited from your parents! You had to learn how to do them!

But our traits, if they are learned or inherited, allow us to be grouped together into one **species** ("spee-ces"). A species is a group of similar and related organisms.

How about a story to help you understand this topic...

Imagine an alien visiting your home and looking at all of your family.

The alien may think that all humans look alike, right? We all have two ears, a nose, a couple of eyes, two arms and legs...



You may say to the alien, "but not everyone looks alike..."

...and you are correct!

But humans are a lot more alike one another than we are with chickens...

Yes... chickens!

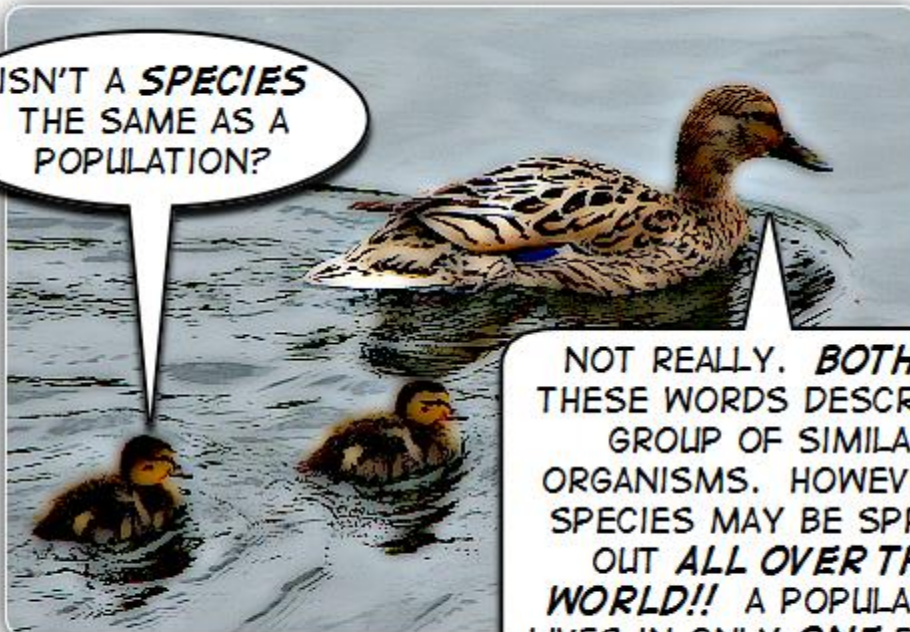
Humans have no feathers, no beaks, no claws and we do not crow during the day...



YOU THINK **WE** ARE LOUD, EH?

HAVE YOU LISTENED TO ANY OF **YOUR** MUSIC LATELY? **GEESH!**

ISN'T A **SPECIES** THE SAME AS A **POPULATION**?



NOT REALLY. **BOTH** OF THESE WORDS DESCRIBE A GROUP OF SIMILAR ORGANISMS. HOWEVER, A SPECIES MAY BE SPREAD OUT **ALL OVER THE WORLD!!** A POPULATION LIVES IN ONLY **ONE** PLACE.

So... we have a species of humans and species of chickens
and species of pond slime and species of zebras and species
of bananas and species of fish and species of apples
and species of dogs and species of pigs and
species of monkeys and species of
tomatoes and species of
butterflies and species
of lions and species
of elephants and
so on...

*FOR EXAMPLE, I GO FISHING FOR A SPECIES OF FISH
KNOWN AS RAINBOW TROUT. THIS POPULATION OF
RAINBOW TROUT LIVES IN SOUTHERN MISSOURI. THIS
SAME SPECIES OF TROUT (RAINBOW TROUT) CAN BE
FOUND IN OTHER POPULATIONS AROUND THE WORLD.*



*PHOTO OF THE AUTHOR CATCHING HIS DINNER. SHORTLY AFTER CATCHING
HIS MEAL, THE AUTHOR SLIPPED ON A ROCK AND LET GO OF HIS CATCH.
THE FISH WAS LAST SEEN LAUGHING AS HE SWAM DOWNSTREAM...*

In the
next
chapter,
you are
going to
explore
how
different
plant
species
grow!

Fill in the "code" to answer the following question:

What is the difference between a "species" and a "population"?

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
15	1	26	8	3	12	24	2	9	10	11	4	23	22	5	17	7	20	18	14	16	6	21	25	13	19

_____ _____ _____ _____
 15 4 4 5 20 24 15 22 9 18 23 18 5 12 14 2 3 18 15 23 3

_____ _____ _____ _____ _____
 18 17 3 26 9 3 18 23 15 13 5 20 23 15 13 22 5 14

_____ _____ _____ _____ _____ _____
 4 9 6 3 9 22 14 2 3 18 15 23 3 15 20 3 15 9 12

_____ _____ _____ _____ _____ _____
 14 2 3 13 8 5 14 2 3 13 15 20 3 11 22 5 21 22 15 18

_____ _____ _____ _____ _____ _____
 15 17 5 17 16 4 15 14 9 5 22

Match the words in the first column to the best available answer in the second column.

- | | |
|--------------------|--|
| — Inherited traits | 1) a group of similar and related organisms that may or may not be living in the same area |
| — Offspring | 2) a feature (like eye color, height, hair color...) that you get from your parents |
| — Species | 3) a parent's baby |

Which one is right? Circle the correct answer.

1. You inherited your traits from your _____.

- a. mother
- b. both your mother and father
- c. father

2. Which of these pairs of animals do not match?

- a. deer and cub
- b. dog and puppy
- c. cat and kitten

3. Which of the following is not an inherited trait?

- a. hair color
- b. rolling your tongue
- c. painting a picture

4. A species is a _____.

- a. a group of similar organisms living in the same place
- b. a group of similar organisms
- c. a group of organisms living in the same habitat

5. A population is a _____.

- a. a group of similar organisms living in the same habitat
- b. a group of similar organisms
- c. an organism that is living in a habitat

6. The offspring of a plant would be a _____.

- a. fruit
- b. another plant
- c. flower

CHAPTER 10

Last week, you looked at how offspring can inherit traits from their parents. In addition, organisms can learn traits like how to read a book or ride a bike...

This week, you are going to look at some of the inherited traits of our little green friends...

Plants

There are a lot of different plants in the environment! Trees, grasses, bushes and vegetables (yum!) are all different kinds of plants!

Have you ever taken a good look at a salad before?



**There are plants all over
the place in there!**

In a salad you may find lettuce,
carrots, broccoli, cauliflower and
radishes...

...these are all plants!

Everything in a salad may look different...

...but because they are all parts of plants,
they share similar traits!

Almost all plants have these similar traits:



*Many plants also have flowers too! You are going to learn
about how flowers are very important to fruit later on...*

Keep reading!

Roots are the parts of the plant under the ground! Have you ever tried to pull a plant out of the ground before? It may have been pretty hard to do, right? That is because the roots support the rest of the plant. They do this by attaching the plant to the ground!

The roots also soak up all of the water and nutrients from the ground!

Leaves are the workshops of the plant. They use the water and nutrients from the roots and sunlight to make food for the plant! This process is called **photosynthesis** ("foe-toe-sin-thu-sis"). Each leaf must collect as much sunlight as possible! The more light that is collected, the more food the leaves can make. That is why many leaves are so big!

**No
sunlight...
no food...
no plant!**



WHAT
VEGETABLE
CAN TIE
YOUR
STOMACH IN
KNOTS?

STRING BEANS!



I AM SO SORRY.
THAT WAS WORSE
THAN THE FIRST
JOKE.

But how does the water and nutrients from the roots get to the leaves?

From the stems!

Stems carry all of the water and nutrients from the roots to the leaves. The stems also carry the food that the leaves make to the rest of the plant. Stems are normally very stiff. This is important so that the plant can stand upright for the leaves to collect as much sunlight as possible!

Remember, no sunlight... no food... no plant!

Fruits are the parts of the plant that hold the seeds! The fruit is made to surround and protect the seed! Some of these fruits are fleshy, like an apple or an orange.

Many of the vegetables we eat are really the fruits of a plant (like beans, tomatoes, cucumbers...)

Flowers may look and smell pretty, but they are very important for the plant! Flowers are the parts of the plant that make all of the seeds and fruits!



Each seed has all of the inheritable traits to create a new plant of the same species! You wouldn't plant an apple seed and grow a carrot, would you? Of course not!

Now that you have a good idea about the parts of a plant, let's see how they all work together!

Plants (and all other organisms) go through a **life cycle**. A life cycle is a way that an organism makes more of its own kind. Plants, like many other organisms, have the same parts in their life cycles that include:

- being born
- growing into adults
- reproducing
- and eventually dying

Here is a simple life cycle for a plant:

1. Seeds are grown by the flower of a plant.
2. The seeds fall to the ground or are carried to the ground by the wind or by animals.
3. With the correct abiotic resources (Remember! Abiotic means "non-living resources") of water, soil and temperature, the seed can **germinate** ("jer-me-nate"; which means "a plant that begins to grow.")
4. Once the seed germinates, it begins to grow into a small plant, called a **seedling**.
5. Seedlings grow roots, which hold onto the soil and soaks up water and nutrients. Leaves begin to make food for the plant. The stems send all of these resources all over the plant!
6. Flowers develop on the plant. The flowers grow new seeds. The flowers grow fruit around the seeds.



... and the cycle starts all over again as the seeds fall to the ground or are carried to the ground by wind or animals.

The table below contains words and phrases that have been chopped in half. Find the pieces that fit together and write them in the answer area below.

seed	germ	Ro	St
cycles	Flo	wers	inate
photosy	lea	ves	ots
its	life	nthesis	Fru
ling	ems		

Answers:

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

Match the words in the first column to the best available answer in the second column.

- | | |
|----------------------|---|
| _____ Roots | 1) a pattern for all organisms that includes being born then growing into adults and reproducing then dying |
| _____ Leaves | 2) to begin plant growth |
| _____ Photosynthesis | 3) this part of a plant use the nutrients from the roots and sunlight to make food for the plant |
| _____ Stems | 4) the parts of the plant that hold the seeds |
| _____ Flowers | 5) the parts of a plant under the ground that support the plant and soak up its water and nutrients from the soil |
| _____ Fruits | 6) parts of the plant that make all of the seeds |
| _____ Life cycles | 7) a young and small plant |
| _____ Germinate | 8) a way for plants to use sunlight and nutrients and water to make their own food |
| _____ Seedling | 9) parts of a plant that carry all of the water and nutrients from the roots to the leaves |

Draw a picture of a plant. Label the following parts on your picture:

Roots
Leaves
Stem

Flower
Fruits

CHAPTER 11

In the last chapter, you learned how plants go through a natural cycle of life. It is not just plants that go through a life cycle! Animals do too!

Remember the definition of species? A species is a group of similar and related organisms. There are so many different species in the world that scientists have grouped them together by their similar traits. Most of the animal species can be placed into one of six different groups:

Reptiles

Amphibians ("am-fib-ee-anz")

Fish

Birds

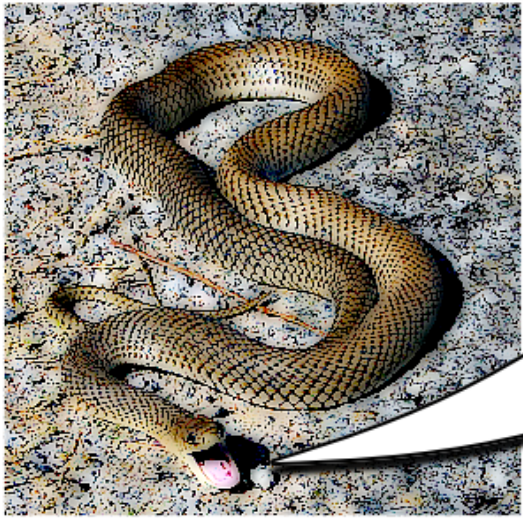
Mammals

and **Insects**



This week, you will be exploring three different kinds of animals:

Our first stop.....**Reptiles!**



A **REPTILE** IS AN ANIMAL THAT HAS ROUGH DRY SKIN AND IS COVERED IN SCALES (SCALES ARE THIN, FLAT AND HARD PLATES). ALL REPTILES ARE COLD-BLOODED.

BEING **COLD-BLOODED** MEANS THAT THEIR BODY STAYS ABOUT THE SAME TEMPERATURE AS THEIR HABITAT. SO, REPTILES NEED A **WARM** HABITAT IN ORDER TO SURVIVE.

There are thousands of different species of reptiles. Turtles, snakes and alligators are all different kinds of reptiles. Some reptiles live in habitats that have cold winters, but the rest of the year is warm. These species of reptiles would need to hibernate during the cold winter months.

Reptiles spend most of their time on land, but they can be found in the water. Think of an alligator...these organisms spend a lot of time in the water, but they can't breathe underwater! They breathe air like you and me, through lungs. Animals with lungs cannot breathe underwater.

Also...all reptiles are **vertebrates** ("vur-tee-bretts")

Being a vertebrate means that you have a backbone!

Most animals, like reptiles, come from eggs which are made by the adult female. Inside each egg there is everything needed to form a new animal. Many eggs have a shell which keeps it from drying out. The shell also protects the new animal growing inside. Most young reptiles hatch from eggs, like turtles.



Each species of reptile has a different life cycle. Let's look at the life cycle of one kind of reptile... the turtle!

Turtles lay eggs like most other reptiles. These are not the same kind of eggs you are used to seeing from the grocery store. These eggs have a softer shell. They feel almost like leather!

The baby turtle grows inside this egg until it hatches. The hatched turtle looks very much like its parents! This is an example of an inherited trait. The young turtle grows into an adult. An adult female turtle lays more eggs. This takes many years to complete! These new eggs will hatch into baby turtles that will start the cycle over again.

Our next stop.....**amphibians!** ("am-fib-ee-anz")



There are thousands of different species of amphibians.
Frogs and toads are different kinds of amphibians.

An amphibian is an animal that has smooth, wet skin. These animals can also live in water and on land. Amphibians are all vertebrates and are cold-blooded. They are different from reptiles because of their wet skin.

Another difference between amphibians and reptiles can be found in their life cycles. Let's look at the life cycle of a well-known amphibian... the frog!

A frog lays its eggs in the water. These eggs are covered in a clear jelly. The young frogs hatch from these eggs into the water.

Now is where it gets a little different from a reptile's life cycle...

Unlike reptiles, amphibians do not always look like their parents right after they are born. It takes time for them to develop into the same likeness of their parents!

The young frog looks and acts like a baby fish! The young frog is known as a **tadpole**. Tadpoles are baby frogs that have a tail for swimming and no legs. They also breathe air from the water where they live, just like fish!



IT CAN GET CONFUSING AT THE TADPOLE PLAYGROUND...

As tadpoles get older, they lose their tail and begin to grow legs...just like an adult frog! They also lose the ability to breathe air from the water. They grow lungs which allow them to breathe air from the sky! The adult female frogs can then lay more eggs and the cycle continues again!

Tadpoles share a very important trait with our next animals you will be studying...

Our last stop for this week..... **Fish!**

There are thousands of kinds of fish that exist in the ocean and in fresh water! A few different kinds of fish are trout, bass and sharks!

Fish (like reptiles and amphibians) are vertebrates and are cold-blooded. Fish live in aquatic biomes all over the world. Most of them have scales and a slimy skin. They also breathe air from the water, like tadpoles, their entire lives!



Like tadpoles, fish breathe air from the water with special body parts known as **gills**. Think of the gills as the "nose of the fish".

The life cycle of a fish has a similar trait with reptiles! Let's take a look...

Most fish hatch from eggs. The species of fish that lay eggs tend to make a huge amount of eggs. Most of the time, the female fish cannot protect all of her eggs. So, many of the eggs are eaten by other organisms in the water! But because she makes so many eggs, many of them are not eaten. These eggs hatch into baby fish which look very much like the adults (just like baby reptiles!) These baby fish grow into adults and start the cycle over again.

Fill in the blanks with the correct letters. The words in the list on the right provide a clue to the answer.

1) S _ a _ es	flat and hard plates on the skin of a reptile
2) Re _ ti _ _ s	cold-blooded animals with rough and dry skin that is covered in scales
3) Ta _ _ ol _	a young frog
4) F _ sh	cold-blooded vertebrates that live inside the aquatic biome
5) G _ ll _	special body parts on fish that allow them to breathe air from the water
6) Co _ d- _ _ o _ ded	an animal whose body stays about the same temperature as their habitat
7) V _ _ t _ br _ tes	an animal which has a backbone
8) _ _ phib _ ans	cold-blooded vertebrates with smooth wet skin

Match the words in the first column to the best available answer in the second column.

- | | |
|--------------------|---|
| _____ Reptiles | 1) cold-blooded vertebrates that live inside the aquatic biome |
| _____ Amphibians | 2) an animal which has a backbone |
| _____ Fish | 3) flat and hard plates on the skin of a reptile |
| _____ Scales | 4) special body parts on fish that allow them to breathe air from the water |
| _____ Cold-blooded | 5) a cold-blooded animal with rough and dry skin that is covered in scales |
| _____ Vertebrates | 6) a young frog |
| _____ Tadpole | 7) an animal whose body stays about the same temperature as their habitat |
| _____ Gills | 8) cold-blooded vertebrates with smooth wet skin |

Compare and Contrast

the

Reptiles and Amphibians

Compare (things that are the same between the two animals)	Contrast (things that are different between the two animals)

CHAPTER 12

Last week you explored the world of reptiles, amphibians and fish! Remember, every species in the world has their own special cycles, traits and abilities! If all of these facts were written down in this book, it would be the...

Largest book in the world!

It would take you your entire life to read all of the pages! So what does that mean to you? It means there are a lot of different species out there! And each of them is different! Pretty cool, huh?



This week, you are going to look at three more kinds of animals:

Birds, Insects and Mammals

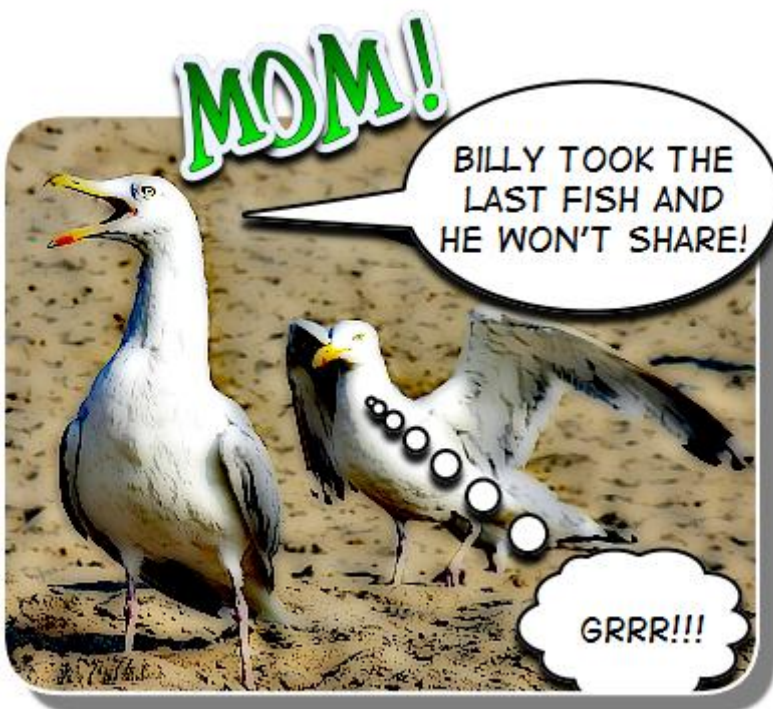
Our first stop for this week..... **Birds!**

There are all kinds of birds that exist in the world! A few different kinds of birds are hawks, eagles and chickens!

Birds (like reptiles, amphibians and fish) are vertebrates. However, birds are different from these animals because they are **warm-blooded**.

Being warm-blooded means that the organisms body temperature stays the same, even if its habitat is very cold! In order to keep your body temperature the same, a warm-blooded animal uses some of its food to make energy to keep it warm.

The body temperature of a bird is helped by another trait... feathers! Birds are covered in feathers. This helps to keep them warm and, for some birds, to help them fly!



Another trait that birds have is their beaks. Beaks are used for protection from other organisms and to get food. Every species of bird have their own size, shape and color of beak.

The life cycle of a bird is similar to many other animals you have studied.

Birds lay eggs into a nest. These eggs have a hard shell. Most eggs are protected by at least one of the parents before they hatch. When the baby bird hatches, it looks very similar to its parents. The parents also bring food and protect the babies until they grow into an adult. The new adult female bird lays more eggs (just like reptiles, amphibians and fish!) Once the eggs hatch into baby birds, the cycle begins again!

Our next stop for this week...

**Bears, dogs,
horses and
people are
all
mammals!**



Mammals (like birds) are warm-blooded vertebrates. We breathe air through our lungs. Mammals also have fur or hair to protect us and keep us warm.

Unlike the other species you have explored so far, female mammals make milk to feed their babies. Think of a cow... A cow makes milk to feed her babies.

Mothers play a stronger role in the life cycle of a mammal. Let's take a look...

Most mammals do not hatch from eggs. The animal is "born live. If an animal is "born live", it grows inside the mother's body until it is born. The baby looks similar to the parent. The mother produces milk to feed the baby and usually protects and trains the baby until it is an adult.

As an adult, the female can have babies once again. And the cycle continues...

You are so used to seeing mammals you may think that most animals are mammals.

But that is not true!

Our last stop for this week takes us to a group of animals that has the most kinds of species...

Insects!

There are so many different kinds of insects even scientists have not found them all! You can see many insects every day! Butterflies, ants and grasshoppers are just a few examples of insects.

POOR CHOICES:



Until now, all of the animals you have been reading about have been vertebrates. This means that they have a backbone. The backbone, which is part of the animal's skeleton, is found inside their bodies. When the skeleton is found inside the body, it is known as an **endoskeleton** ("en-do-skell-uh-ton").

An insect does not have its skeleton inside its body...
...it is on the **outside** of its body!

Having your skeleton on the outside of your body is known as an **exoskeleton**.

An insect has three different body parts:

Head – I think you know what this is for!

Thorax ("thor-axe") – This is where you will find the legs and wings

Abdomen – This is the last part of the insect.

If you think about the body parts of an insect like a train: The head would be the engine, the thorax would be the freight cars and the abdomen would be the caboose!



An insect also has **six** legs. That's right, six!

Every species of insect has its own life cycle! However, many of these insects have the same kind of cycle...

Most insects go through three (sometimes four) stages of growth in their life cycle. Nearly all of them begin as an egg.

We will be looking at the life cycle of a moth as an example today!

Insect eggs can be found anywhere: under the water, in the ground, on your food (yuck!!). But... moth eggs are usually found on leaves and branches of trees. This is the **first** stage of growth for most insects.



LARRY WAS GOOD AT "HIDE AND GO SEEK" EVER SINCE HE BECAME A LARVA.

The **second** stage of growth begins when the egg hatches. The young insect is called a **larva** ("lar-vah") and it spends much of its time searching for food! The larva of a moth is known as a caterpillar.

The **third** stage of an insect's life cycle is known as the **pupa** ("pew-paH"). At this time, the larva has stopped eating and forms a protective covering around itself. An example of a pupa would be a **cocoon** ("cuh-coon"). A cocoon is the pupa for a moth! If you were in a cocoon, it would feel like being wrapped up in a thick blanket.

Inside the cocoon, the pupa slowly changes from a caterpillar into a moth. When the insect has completely changed, it comes out of its cocoon. At this time, the **fourth** stage of the moth's life cycle begins. This is the **adult** stage.

In time, the adult female can lay more eggs to repeat the cycle all over again.



There are so many different species of animals and plants and life cycles that it is not possible to list them all here!

Also, each of these species has their own life cycle. Just remember that each species' life cycle is a little bit different from each other.

Unscramble the words below:

1. olrbwdodmea _____

2. uapp _____

3. avral _____

4. ssitnec _____

5. sdbri _____

6. noococ _____

7. mamsaml _____

Write the definitions for each word:

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

Match the words in the first column to the best available answer in the second column.

- | | |
|--------------------|---|
| _____ Birds | 1) warm-blooded vertebrate animals which are covered in feathers |
| _____ Insects | 2) warm-blooded vertebrates with fur or hair; a female mammal makes milk to feed her young |
| _____ Mammals | 3) the second stage of growth in an insect's life cycle; for a moth this would be the caterpillar |
| _____ Warm-blooded | 4) small organisms with six-legs and an exoskeleton |
| _____ Larva | 5) the third stage of growth in an insect's life cycle |
| _____ Pupa | 6) the name for the pupa of a moth |
| _____ Cocoon | 7) an organism whose body temperature stays the same even if its habitat is very cold |

Unit Three review

Label the numbers with the correct parts of the plant.



1. _____

2. _____

3. _____

4. _____

Match the words in the first column to the best available answer in the second column.

- | | | |
|-------|------------|--|
| _____ | Birds | 1) warm-blooded vertebrates with fur or hair |
| _____ | Fish | 2) warm-blooded vertebrate animals which are covered in feathers |
| _____ | Mammals | 3) cold-blooded vertebrates that have rough, dry skin |
| _____ | Reptiles | 4) cold-blooded vertebrates that live inside the aquatic biome |
| _____ | Insects | 5) cold-blooded vertebrates that have smooth, wet skin |
| _____ | Amphibians | 6) this group has the most species and has an exoskeleton |

Be certain to go over your definitions for the test!