FOCUS ON SCIENCE

Life Science

Plant and Animal Adaptation

Basic Level

Life Cycles of Animals

LOOK INSIDE FOR:

- Core Curriculum Covered
- Student Book
- Assessments and Reading Activities

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Life Cycles of Animals

How are animals well-suited to live in their environments?

CORE CURRICULUM STATEMENTS

Organisms inherit genetic information in a variety of ways that result in continuity of structure and function between parents and offspring.

Some traits of living things have been inherited (e.g., color of flowers and number of limbs of animals).

Some characteristics result from an individual's interactions with the environment and cannot be inherited by the next generation (e.g., having scars; riding a bicycle).

Organisms maintain a dynamic equilibrium that sustains life.

All living things grow, take in nutrients, breathe, reproduce, and eliminate waste. LE 5.1b An organism's external physical features can enable it to carry out life functions in its particular environment.

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BL

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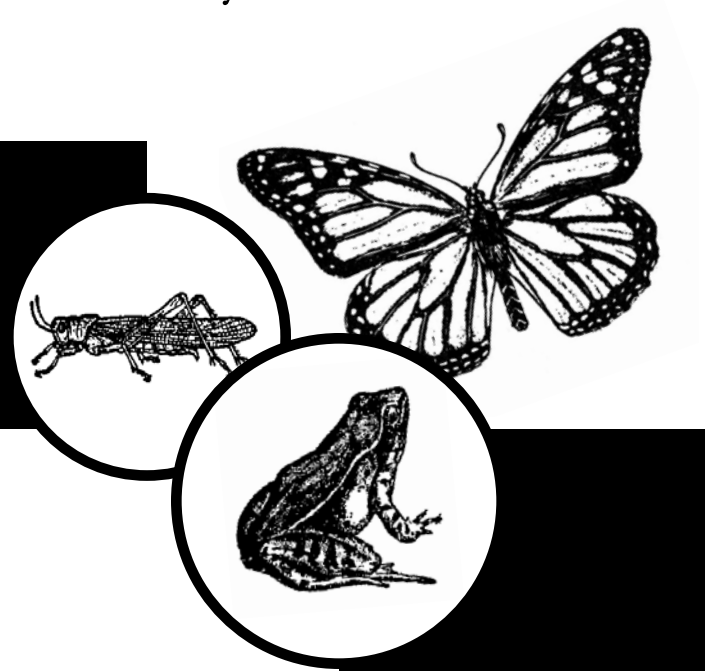
Life Cycles of Animals

by Linda Barr



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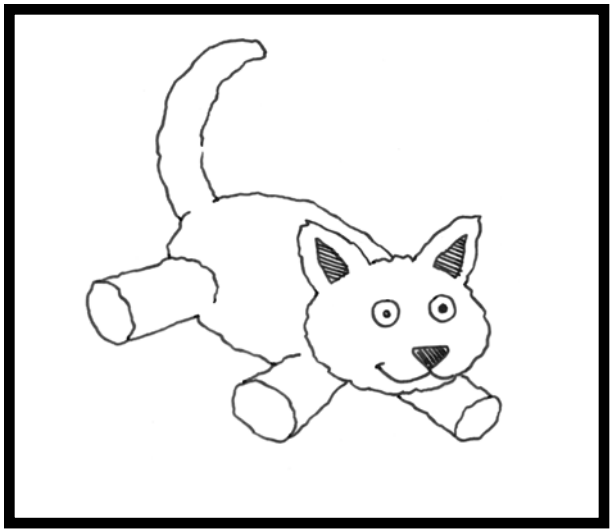
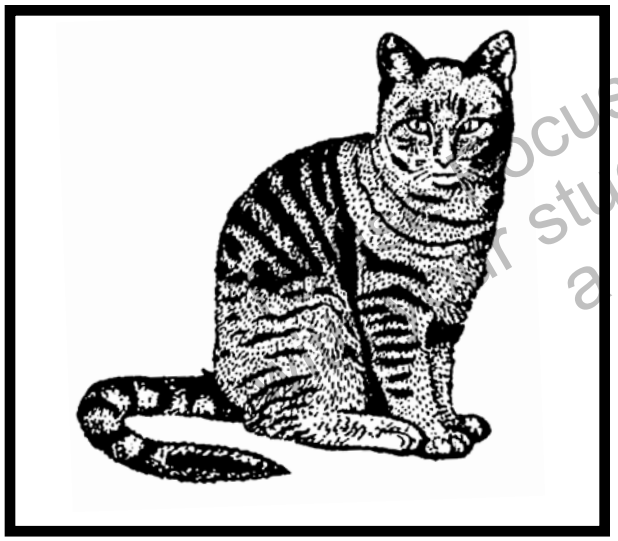
Curriculum materials for **your** content standards

Table of Contents

–Predict–
What do you think you will learn from reading this book?





Only one of these drawings is of a living cat. It needs food for energy and air to breathe. If it sees a mouse, this cat will chase it. It can reproduce and have kittens. The other cat is a stuffed animal so it is not alive. It will never grow, change, or move on its own.

Is It Alive?

You find a round, hard thing in the soil. Is it alive? You touch it with a stick. It moves, so it's alive. Plants and animals are alive. They respond to changes around them.

A living thing is called an **organism**. What is true of organisms?

- They reproduce, They create new plants or animals.
- They need food to stay alive.
- They take in **gases** from the air.
- They are made of **cells**.
- They grow and change.

organism: a living thing
gases: matter that has no shape; the air we breathe contains several kinds of gases
cells: tiny units of living matter of which plants and animals are made

CHAPTER 1

What Do Living Things Need?

You, a polar bear, and a corn plant are all living things. You all have the same needs. What are they?

Energy

You and the polar bear eat food. Your bodies turn food into energy. Cornstalks use sunlight to make their own food for energy. All living things need energy to live and grow.

Animals have different ways of getting food. Polar bears have sharp claws to hunt seals. Flamingos have long legs so they can find food in deep water. Elephants have trunks to grab food.

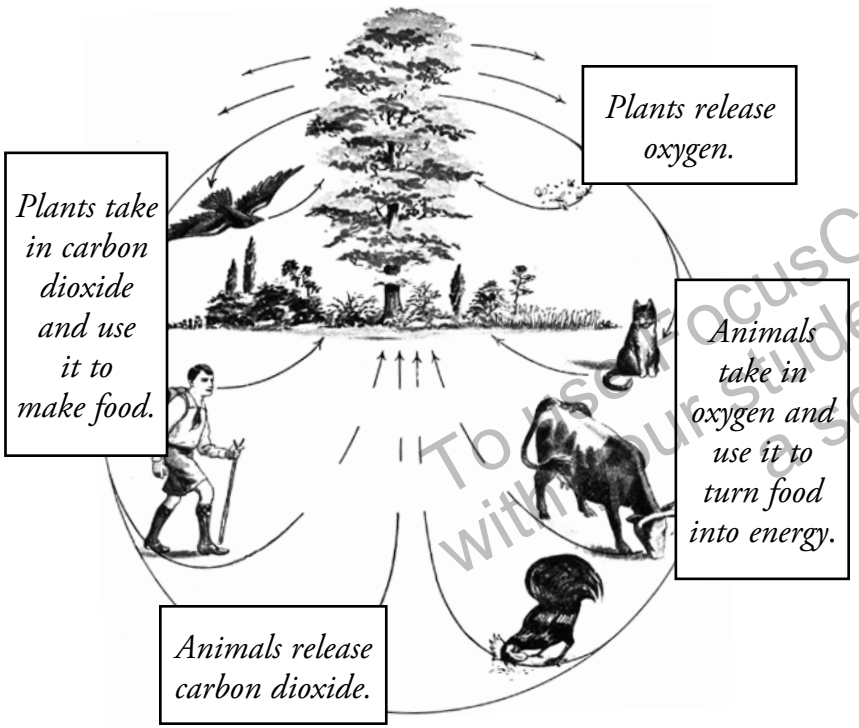
Water

You and all animals need to drink water almost everyday. Plants are the same. They cannot make their own food without water. All organisms must have water to stay alive.

Gases From the Air

Oxygen and carbon dioxide are gases in the air. Animals breathe in oxygen. Animals breathe out carbon dioxide. Plants take in carbon dioxide. Plants release oxygen.

Look at this diagram. Can you see how plants and animals help each other meet their needs?



Space

Like you, other animals and plants need space to spread out. Otherwise, they get sick more often. They struggle to get enough food, water, and sunlight.

Some animals need more space than others. For example, cheetahs have their own territories. But honeybees can live in colonies with thousands of bees!

Shelter

Shelter protects animals from bad weather. It gives them a safe place for their babies. A shelter might be a nest in a tree. It could be a hole in the ground. It could be an apartment.

–Conclude–
Which need can you do without for a short time?
Which need must be met all of the time?

CHAPTER 2

The Cycle of Life

All animals pass through four stages.

Fertilization/Reproduction

A new animal begins life when a cell from the female is combined with a cell from a male. Some females carry these new cells inside their bodies. For example, human babies grow inside their mother's body.

However, many females lay eggs outside their bodies. This includes all birds, **reptiles**, insects, and some **amphibians**.

reptile: a type of animal that lives on land and has a dry, scaly skin such as snakes, alligators, lizards, and turtles
amphibian: a type of animal that begins its life in water and may later live on land

Birth

In time, the babies are born, or the eggs hatch. Many new animals look like their parents. They are just smaller. Others look nothing like their parents.

Adulthood

Babies grow into adults. This may take a few days or many years.

Death

By the time many animals die, they have reproduced. They have babies.

Some animals pass through these four stages in a few days. Others take many years. All animals grow and change. Yet they grow and change in different ways.

–Recall–
Explain the four stages animals pass through during their lives.

Metamorphosis

A kitten looks much the same as it will when it is a cat. It will be the same color. It will have four legs, two ears, and a tail.

Some young animals look nothing like their adult forms. Think about tadpoles and caterpillars. They change form as they become adults. A tadpole becomes a frog. A caterpillar becomes a butterfly. This is called a metamorphosis. This word means "a change in form."

metamorphosis: a change in form

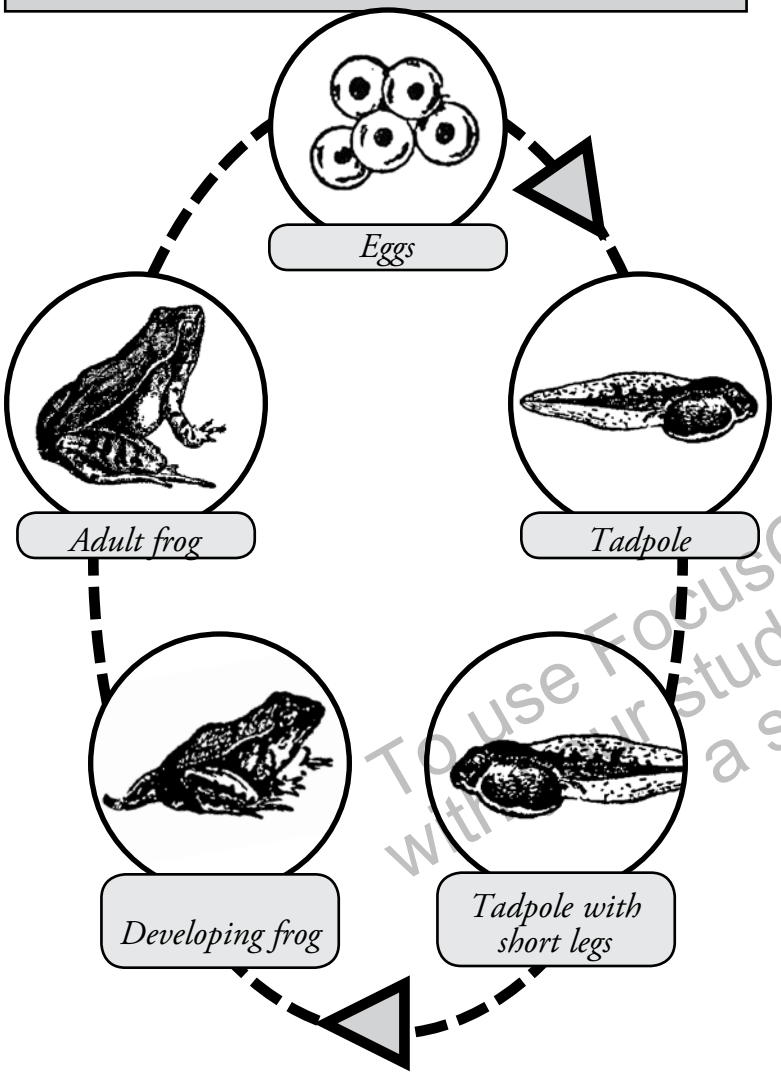
Frogs and Toads

Frog and toad eggs hatch into tadpoles. Tadpoles breathe through **gills** and have no legs. They look like fish.

The diagram on the next page shows how a tadpole changes into a frog. This is a metamorphosis. As it grows legs, its tail begins to disappear. It also develops lungs. Lungs let it breathe air and live on land. The **cycle** of life begins again.

gills: slits behind the eyes of fish and tadpoles
cycle: a period of time in which a series of events happens

Life Cycle of a Frog



–Hypothesize–
How do you think scientists learned about the life cycle of a frog?

Three-Stage or Incomplete Metamorphosis

Some insects have a three-stage metamorphosis. Other insects have a four-stage metamorphosis.

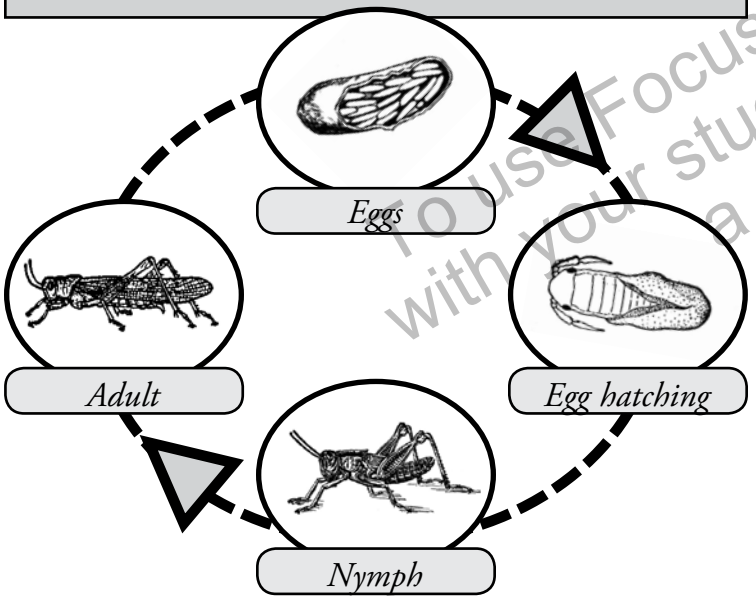
Grasshoppers, crickets, dragonflies, mayflies, cockroaches, and termites all have a three-stage metamorphosis. What happens?

First, the egg hatches into a small insect. It looks much like its parents. This young insect is called a **nymph**. Most nymphs have no wings. They cannot lay eggs.

nymph: a young insect that looks like its parent

A nymph does not just grow larger, like a kitten. Instead, the nymph **molts**. It sheds its hard outer skin. A new, larger skin grows in its place. After molting four to eight times, the insect has grown wings. It can lay eggs to begin the cycle again.

Life Cycle of a Grasshopper
(Incomplete Metamorphosis)



molt: to shed and replace an outer skin

Four-Stage or Complete Metamorphosis

Most insects go through a four-stage metamorphosis. That includes butterflies and moths. They change from an egg, to a **larva**, to a **pupa**, to an adult. Each stage looks different.

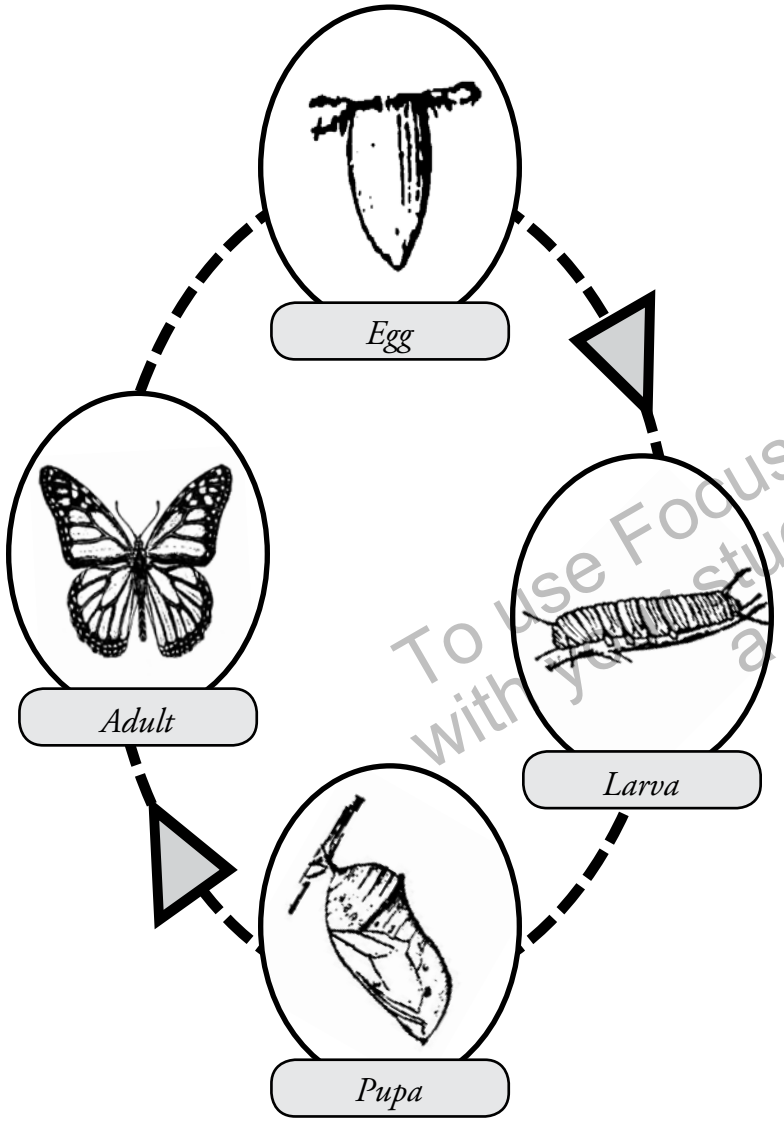
An insect spends most of its time as larva. The larva of a butterfly is a caterpillar.

Like nymphs, larva molt several times. Each time, it gets bigger. The larva and nymph stages are the only time when an insect grows.

A larva eats for days or weeks. Next, it attaches itself to a twig or leaf. Then it covers itself with a hard cocoon. The insect is now a pupa. It does not eat or move. Yet the insect is changing.

larva: a worm-like stage in metamorphosis
pupa: the stage in metamorphosis when the larva turns into an adult insect

Life Cycle of a Butterfly
(Complete Metamorphosis)



In days, weeks, or months, the pupa becomes an adult insect. It grows wings, legs, and eyes, and other parts.

In time, the cocoon opens. The insect crawls out. It looks for a mate. The cycle of life begins again.

Sum It Up

You have learned that all animals grow and change. Some young animals look like adult animals. They just get bigger. Other young animals look very different from adults.

Yet, all animals need the same things to survive, including:

- food for energy
- water
- gases from air
- space to grow
- shelter

–Summarize–
Compare the life cycles of a frog, a grasshopper, and a butterfly.

CHAPTER 3

Traits of Animals

All animals have **traits**. Some they **inherit**, or get from their parents. Others they acquire, or get later on.

Eye color is an inherited trait. So is height. Shape of ears and number of legs are inherited traits, too.

As animals live, they acquire new traits. For example, a lizard may lose part of its tail. This is an acquired trait. The lizard's babies will have tails of normal length.

Think about it this way. An inherited trait is something an animal is born with. An acquired trait is something an animal learns or receives later.

trait: a quality that distinguishes one living thing from another
inherit: to receive a trait from a parent

Inherited or Acquired?

Look at this list of traits. Which are inherited? Which are acquired?

- Knowing how to play the guitar
- Color of fur
- A loose tooth
- Having whiskers
- Patterns on a butterfly's wings
- A broken arm
- Number of toes

Study these two photos. Which traits did each girl inherit? Which traits did each girl acquire?

Glossary

amphibian—a type of animal that begins its life in water, breathing with gills and later may live on land, breathing with lungs

cells—tiny units of living matter of which plants and animals are made

cycle—a period of time in which a series of events happens

gases—matter that has no shape; the air we breathe contains several kinds of gases

gills—slits behind the eyes of fish and tadpoles

inherit—to receive a trait from a parent

larva—a worm-like stage in metamorphosis

metamorphosis—a change in form

molt—to shed and replace an outer skin

nymph—a young insect that looks like its parent

organism—a living thing

pupa—the stage in metamorphosis when the larva turns into an adult insect

reptile—a type of animal that lives on land and has a dry, scaly skin such as snakes, alligators, lizards, and turtles

trait—a quality that distinguishes one living thing from another

To Find Out More . . .

Want to learn more about life cycles of animals?

Try these books about life cycles by Bobbie Kalman

The Life Cycle of a Bird. Crabtree, 1997.
The Life Cycle of a Butterfly. Crabtree, 1997.
The Life Cycle of a Frog. Crabtree, 2006.
The Life Cycle of a Honeybee. Crabtree, 2006.
The Life Cycle of a Spider. Crabtree, 2002.
What Is a Life Cycle? Crabtree, 1998.

Access these Web sites

Fun information about butterflies
www.billybear4kids.com/butterfly/flutter-fun.html

The Amazing Adaptable Frog
www.exploratorium.edu/frogs/mainstory/index.html

Learn more about all kinds of insects
www.insecta-inspecta.com/bees/honey/index.html

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FOCUS ON SCIENCE

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Assessments

Life Cycles of Animals

Print pages 20–22 of this PDF for the assessments.

Life Cycles of Animals

Check Understanding

Shade the circle next to the correct answer or write your answer on the lines provided.

1. Some young animals look much like their parents. Others look very different. Which young animal looks nothing like its adult form?

Ⓐ dog

Ⓑ moth

Ⓒ human

Ⓓ grasshopper

2. A prairie dog lives in a tunnel underground. This is an example of

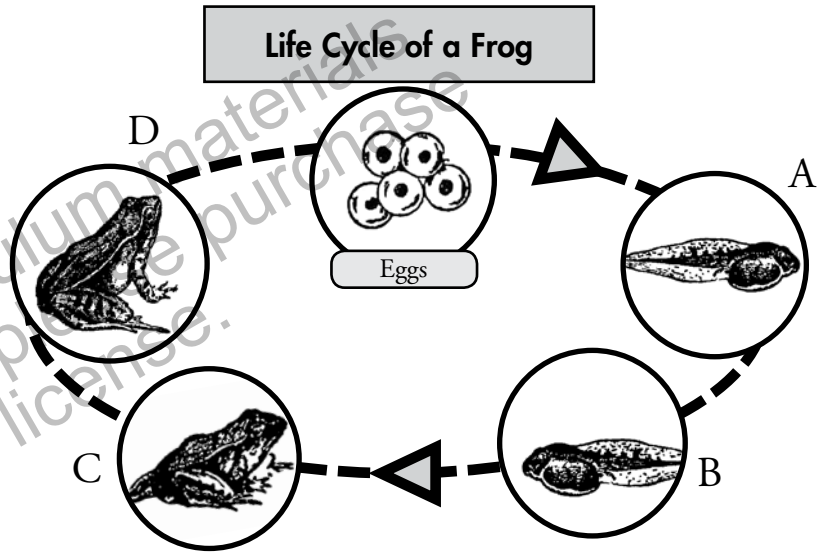
Ⓐ shelter

Ⓑ space

Ⓒ energy

Ⓓ gases from the air

3. The diagram below shows the life cycle of a frog. Four stages are labeled A, B, C, and D.



In the chart below, write the letter that represents each stage of the life cycle shown.

Stage	Letter
Developing frog	
Tadpole	
Tadpole with short legs	
Adult frog	

Check Understanding

4. Identify the **two** kinds of traits animals have.

(1) _____

(2) _____

5. Fish breathe with gills, but people breathe with lungs. This statement suggests that

Ⓐ fish will develop lungs one day

Ⓑ fish do not have the same basic needs as people

Ⓒ fish and people are not both animals

Ⓓ fish and people get oxygen in different ways

Note that question 6 has only three choices.

6. Which statement is an example of metamorphosis?

Ⓐ A caterpillar changes into a butterfly.

Ⓑ A dog gives birth to puppies.

Ⓒ A camel goes months without drinking water.

Life Cycles of Animals

Assessment Scoring Guidelines

1. Answer B is correct.

2. Answer A is correct.

3.

Stage	Letter
Developing frog	C
Tadpole	A
Tadpole with short legs	B
Adult frog	D

4. Inherited traits and acquired traits

5. Answer D is correct.

6. Answer A is correct.

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English Language Arts Activities

Life Cycles of Animals

Print pages 24–28 of this PDF for the reading activities.

Prefixes

A prefix is a group of letters added to the beginning of a word. Here are two common prefixes and their meanings:

un- meaning "not"

re- meaning "again"

Look at how prefixes change the meanings of these words:

happy: "cheerful"

unhappy: "sad"

produce: "make"

reproduce: "make again"

TRY THE SKILL

Read each sentence. Find the word with a line in front of it. Shade the letter next to the prefix that should be added to that word. One sentence does not need a prefix.

1. When animals have babies, they ___place themselves.

Ⓐ un-

Ⓑ re-

Ⓒ no prefix needed

2. I will relax in this ___comfortable chair.

Ⓐ un-

Ⓑ re-

Ⓒ no prefix needed

3. Inside the pupa, the larva ___forms itself. It becomes an insect.

Ⓐ un-

Ⓑ re-

Ⓒ no prefix needed

4. A nymph is ___able to fly.

Ⓐ un-

Ⓑ re-

Ⓒ no prefix needed

Summarize

Summarizing means telling the main ideas of something you have read. You use as few words as you can. Summarizing helps you understand what you read.

To practice, read this paragraph:

Some young animals look nothing like their adult forms. Think about tadpoles and caterpillars. They change form as they become adults. A tadpole becomes a frog. A caterpillar becomes a butterfly. This is called a metamorphosis. This word means "a change in form."

Is this sentence a good summary of this paragraph?

A caterpillar becomes a butterfly.

No! This is not the main idea of the paragraph. It is a detail that helps to explain the main idea. Is the sentence below a good summary?

Some young animals look nothing like their adult forms.

Yes! This is the main idea of the paragraph. The main idea is often—but not always—in the first sentence.

TRY THE SKILL

Read each paragraph. Shade the letter of the best summary.

1. A nymph does not just grow larger, like a kitten. Instead, the nymph molts. It sheds its hard outer skin. A new, larger skin grows in its place.

Ⓐ A nymph does not just grow larger, like a kitten.
Ⓑ A nymph grows larger by molting.
Ⓒ A nymph sheds its hard outer skin.
Ⓓ A new, larger skin grows in its place.

2. All animals use eggs to reproduce. Human mothers and many other animals carry these eggs inside their bodies. Some mother fish and reptiles also carry their eggs inside. There, the eggs grow and become baby animals.

Ⓐ All animals use eggs to reproduce.
Ⓑ All animals use eggs to reproduce, but some carry the eggs inside their bodies.
Ⓒ Humans and other animals carry eggs inside their bodies.
Ⓓ Some fish and reptiles carry their eggs inside.

Make Inferences

When you make an inference, you think about what you read. You also think about what you know. Then you reach a decision.

Read this paragraph.

A larva eats for days or weeks. Next, it attaches itself to a twig or leaf. Then it covers itself with a hard cocoon. The insect is now a pupa. It does not eat or move. Yet the insect is changing.

Make an inference about the purpose of a pupa.

First, think about what you have read and what you know. You have read that the larva eats and grows. A pupa does not do that. You probably have seen some cocoons. How would a cocoon help an insect?

You infer that the pupa protects the larva so it can change into an insect. You are correct!

TRY THE SKILL

Read the question. Then think about what you know and have read. Shade in the correct answer.

1. You found a nymph. Which inference is correct?

Ⓐ The adult insect will look different from this nymph.

Ⓑ The adult insect will look much the same as this nymph.

Ⓒ This nymph came from a cocoon.

Ⓓ This nymph will lay eggs, beginning the cycle of life again.

2. A larva cannot find enough food to eat. What is likely to happen?

Ⓐ It will quickly turn into an insect.

Ⓑ It will turn into a nymph.

Ⓒ It will stay a larva for a very long time.

Ⓓ It will not have enough energy to make a cocoon.

3. A butterfly dies before it can find a mate. What is likely to happen?

Ⓐ A cocoon will form around the dead butterfly.

Ⓑ The butterfly will lay eggs.

Ⓒ That butterfly's life cycle will stop.

Ⓓ The butterfly will become a caterpillar.

Identify Main Ideas and Details

A paragraph may have one or two important ideas. It may also have details that tell about each main idea.

Read this paragraph.

Oxygen and carbon dioxide are two of the gases in the air. Animals, including you, breathe in oxygen, which their bodies need. Animals breathe out carbon dioxide, which their bodies do not need. Through their leaves, plants take in carbon dioxide, which they need. Plants also release oxygen.

What is the main idea of this paragraph?

This paragraph has two closely related main ideas: Animals need oxygen, and plants need carbon dioxide. The paragraph also includes details about these main ideas. It names gases that animals and plants release into the air.

TRY THE SKILL

Read this paragraph. Then answer questions.

Have you ever seen an aquarium that had way too many goldfish in it? Fish can't survive long under those conditions. Both plants and animals do not live well when they are crowded together. Just like you, other organisms need space to spread out. Otherwise, they get sick more often. They have to struggle to get enough food, water, and sunlight.

1. What is the main idea in this paragraph?

   Ⓐ An aquarium shouldn't have too many fish in it.
   Ⓑ Crowded organisms get sick more often.
   Ⓒ Plants and animals need space to spread out.
   Ⓓ Crowded organisms struggle to get enough food.

2. Write two details from this paragraph.

   a. _____

   _____

   b. _____

   _____

Answer Key

Prefixes

1. B
2. C
3. B
4. A

Summarize

1. B
2. B

Make Inferences

1. B
2. D
3. C

Identify Main Ideas and Details

1. C

2. Possible details: Fish can't survive long when they are crowded. When plants and animals are crowded, they get sick more often. They have to struggle to get enough food, water, and sunlight.