



Life Science

Plant and Animal Adaptation

On Level

Life Cycles of Animals

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FOR:

Core Curriculum
Covered
•
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•
Assessments and
Reading Activities

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

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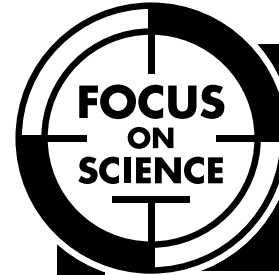
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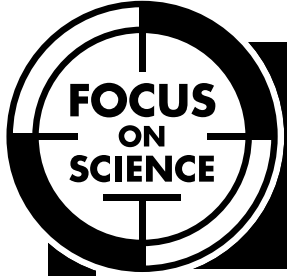
Life Science

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Life Cycles of Animals

by Linda Barr





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Curriculum materials for **your** content standards

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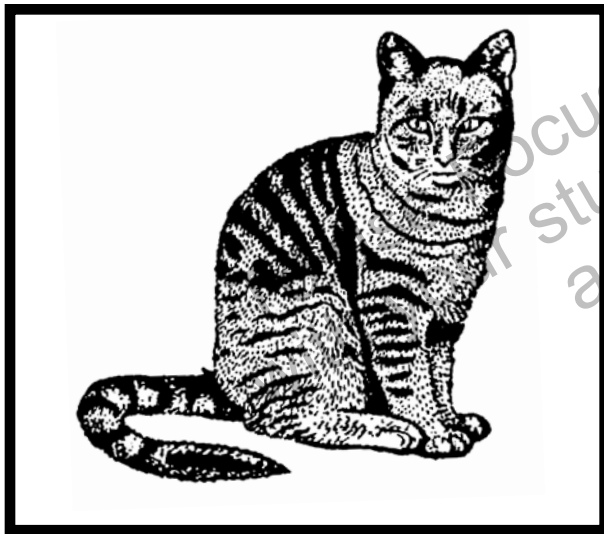
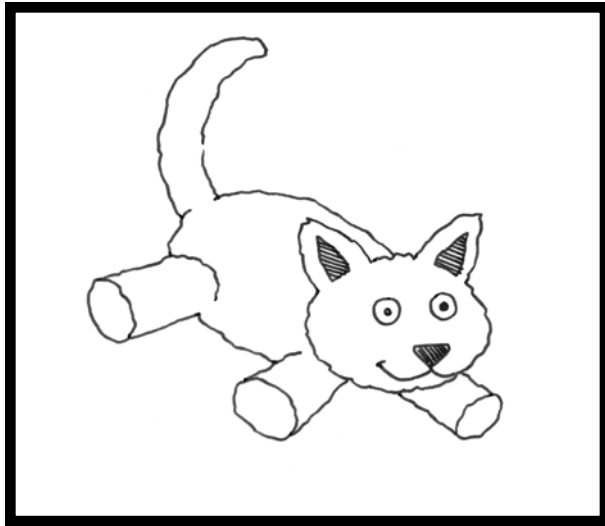
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–Predict–

*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.

INTRODUCTION

Is It Alive?

You find a round, hard thing in the dirt and wonder if it is alive. You poke it with a stick to see if it moves. It does. Animals react to changes around them, including a poke from a stick. Plants react to changes, too. For example, many flowers bloom when the sun shines on them. What else do living things do?

- They reproduce, creating new plants or animals.
- They need energy such as food and sunlight to stay alive.
- They take in certain **gases** from the air.
- They are made of **cells**.

A living thing is called an **organism**. There is one more very important thing that all organisms do—they grow and change.

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

organism: a living thing

What Do Living Things Need?

How are you, a polar bear, and a corn plant the same? You are all living things, and you all have the same needs. But, you meet your needs in different ways.

Energy

Your body, like a polar bear's body, turns the food you eat into energy. Cornstalks and other plants use sunlight to make their own food for energy. 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 use their trunks to grab food.

Water

You know how you feel when you are thirsty. Polar bears and all other animals get thirsty, too. All organisms must have water to stay alive.

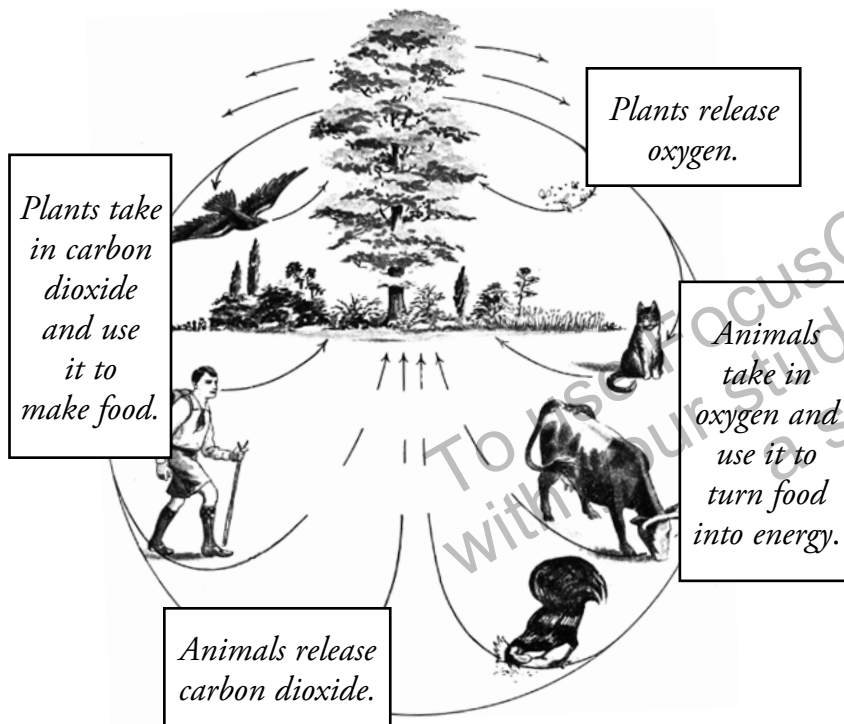
Camels that live in the desert can drink up to 50 gallons of water in a few hours! Camels may go up to seven months without drinking water. People cannot survive without water after five days.

Gases From the Air

Oxygen and carbon dioxide are two gases in the air. Animals breathe in oxygen, which their bodies need. Animals breathe out carbon dioxide, which they do not need. Plants take in carbon dioxide, which they need. Plants release oxygen.

Frogs get most of their oxygen through their skin. Birds breathe through nostrils in their beaks. Fish breathe through **gills**.

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



gills: slits behind the eyes of fish and tadpoles; water moves in and out through these slits and the animal removes oxygen from the water

Space

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 struggle to get enough food, water, and sunlight.

Some animals need more space than others. For example, male cheetahs have their own territories. A territory can be 30 square miles. But honeybees can live in colonies with thousands of bees!

Shelter

Shelter protects animals from bad weather and larger animals. It gives them a safe place to have their babies and take care of them. A shelter might be a nest in a tree. It could be a hole in the ground. It could be an apartment in a tall building.

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

The Cycle of Life

An animal can be as small as an ant or as huge as a whale. Still, every animal passes 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 begin life and grow inside their mother's body.

However, many females lay eggs outside their bodies. This includes all birds, **reptiles**, insects, and some **amphibians**. Some animals, such as birds, take care of their eggs until they hatch. Other animals, such as snakes, leave their eggs on their own.

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, breathing with gills and later may live on land, breathing with lungs

Birth

In time, the babies are born, or the eggs hatch. Many of the new animals look much like their parents, only they are smaller. Others look nothing like their parents.

Adulthood

The babies develop into adults. Adulthood can last a few hours or many years.

Death

The last stage of life for all animals is death. By then, many animals have reproduced. That is, they have replaced themselves by having babies.

Some animals pass through these four stages in a few days. Others take many years. All animals grow and change. Yet animals 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 after it becomes a cat. It will be the same color. It will have the same cute spot on its nose. It will have four legs, two ears, a tail, and so on.

However, some young animals look nothing like their adult forms. The next pages tell how a tadpole changes into a frog. You will also read how a caterpillar changes into a butterfly.

Frogs and butterflies change form as they develop into adults. This kind of change is called a metamorphosis. This word means “a change in form.”

metamorphosis: a change in form

Frogs and Toads

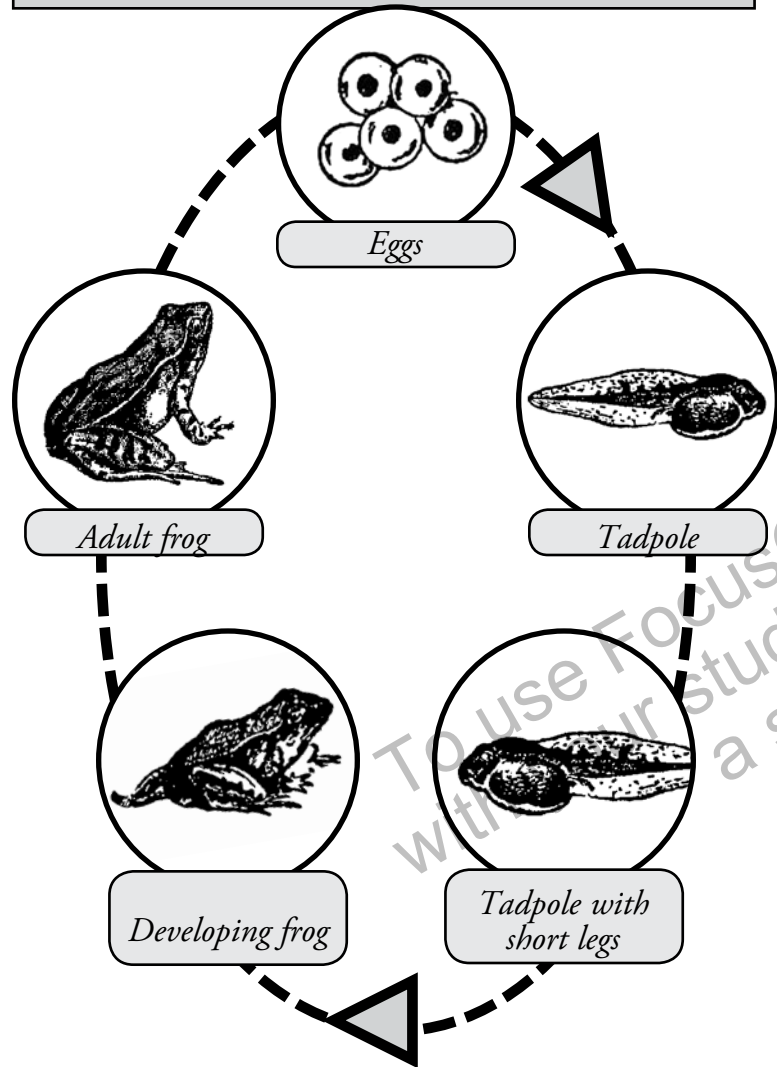
Frog and toad eggs do not hatch into tiny frogs or toads. Instead, they hatch into tadpoles. Frogs and toads undergo metamorphosis as the tadpoles change into adults.

You might have seen tadpoles in a pond or stream. Tadpoles breathe through gills and have no legs. They look more like fish than frogs or toads.

Look at the diagram on the next page. You can see how a tadpole develops into a frog. As it grows legs, its tail begins to disappear. It also develops lungs so it can breathe air and live on land. Then the female lays eggs, and the male fertilizes the eggs. The **cycle** begins again.

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

Insects also go through metamorphosis. Some insects have a three-stage metamorphosis. Others have a four-stage metamorphosis.

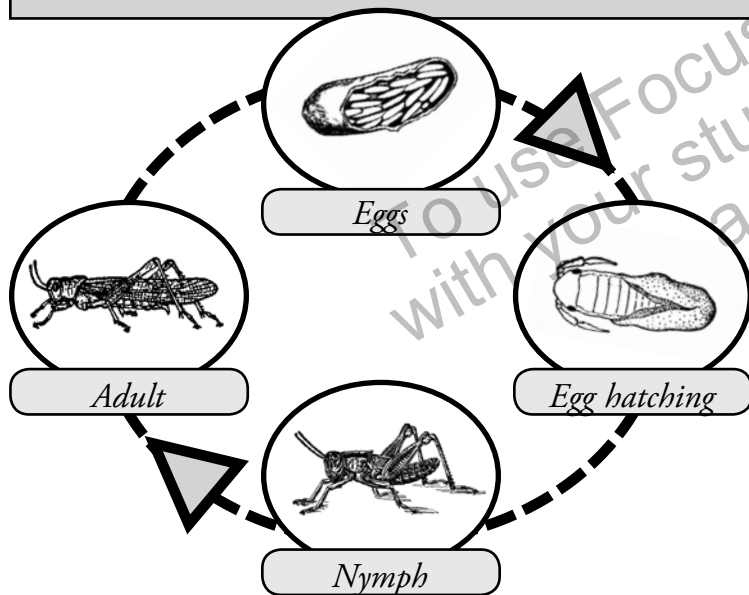
Grasshoppers, crickets, dragonflies, mayflies, cockroaches, cicadas, and termites all go through three-stage metamorphosis. What happens?

First, the egg hatches into a small insect. This young insect looks much like its parents. The young insect is called a nymph. A **nymph** usually does not have wings. It is not able to lay eggs or reproduce.

nymph: a young insect that looks like its parent

A nymph does not just grow larger, like a kitten. Instead, the nymph **molts**, or sheds its hard outer skin, and then a new, larger skin grows in its place. A nymph molts four to eight times, until it reaches its adult size. With each molt, its wings grow bigger. By its last molt, the insect can fly. After the adult insects mate, the female lays 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. This includes butterflies and moths. They change from an egg, to a **larva**, to a **pupa**, to an adult. These insects look different at each stage.

These insects spend most of their time as larvae. (*Larvae* is the plural of *larva*.) The larvae of many butterflies are caterpillars.

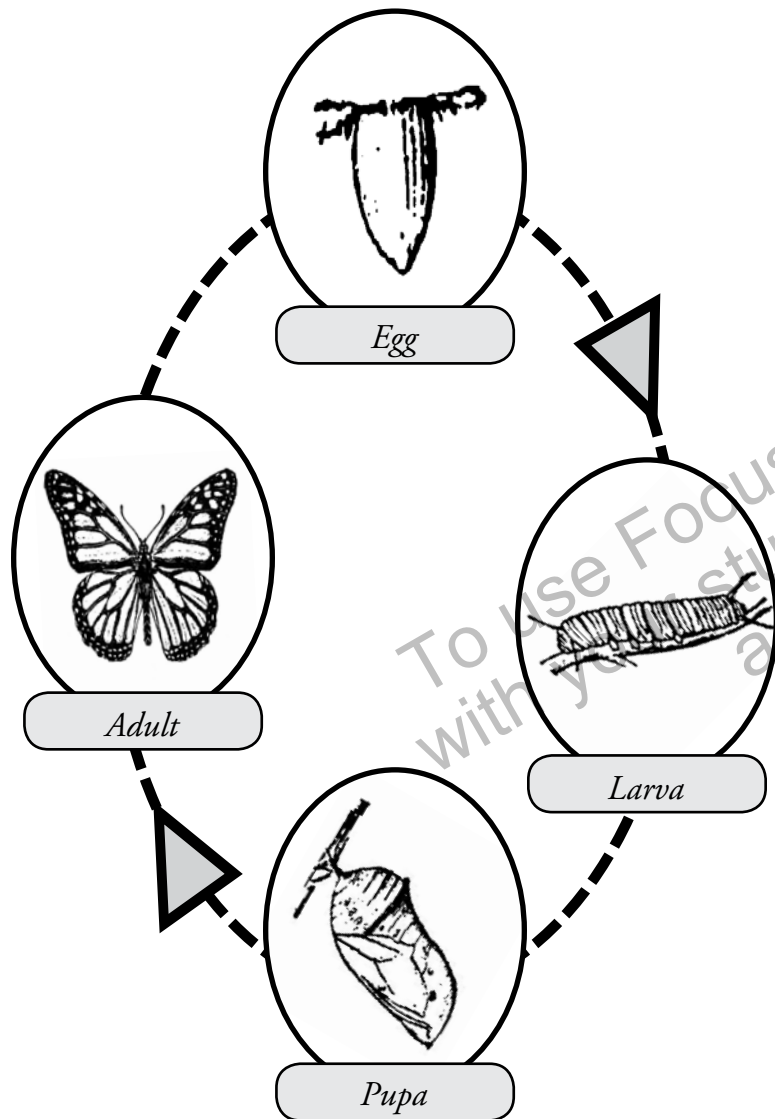
Like nymphs, larvae molt several times. Molting allows the larva to grow larger. The larva and nymph stages are the only time when an insect grows.

A larva eats for several days or weeks. Next, it attaches itself to a twig or leaf. Then it creates a covering around itself called a cocoon. It has reached the pupa stage. It does not eat or move. Yet inside the cocoon 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)



For the next several days, weeks, or months, the pupa develops into an adult insect. It grows wings, legs, eyes, and other parts. A monarch butterfly makes this change in only two weeks!

After the adult insect is formed, the cocoon cracks open. The insect crawls out. If it is a butterfly, it spreads its wings. That helps them dry and stiffen. Next, the insect looks for a mate. After two butterflies mate and lay eggs, the cycle of life begins again.

These insects go through complete, four-stage metamorphosis: butterflies, moths, flies, fleas, beetles, ants, mosquitoes, wasps, bees.

All animals grow and change. Some young animals just get bigger as they become adults. Many insects take on entirely new forms.

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

Traits of Animals

When animals are born or hatch, they have traits that they **inherited** from their parents.

Eye color is an inherited **trait**. So are height, shape of ears, and number of arms and legs. Inherited traits are passed from parents to their babies.

As animals pass through their life stages, 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.

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

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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Assessments

Life Cycles of Animals

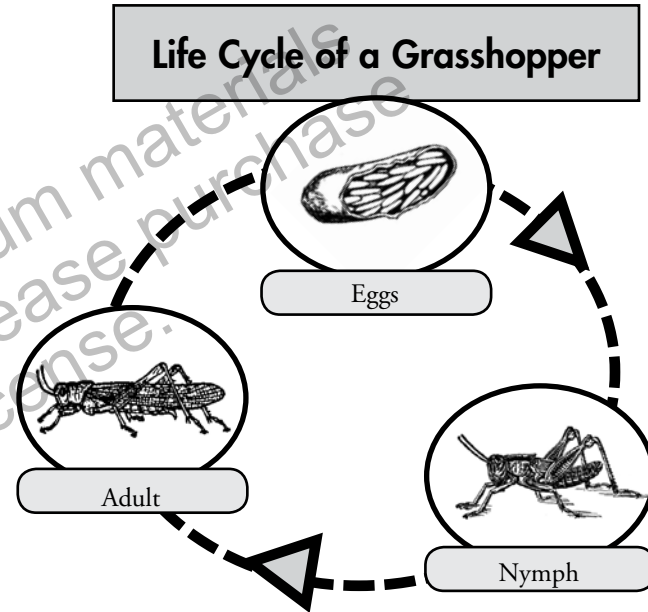
Print pages 20–22 of this PDF for the assessments.

Check Understanding

Shade the circle next to the correct answer.

1. Cheetahs need lots of space, but honeybees can live with thousands of other bees. This statement suggests that
 - Ⓐ honeybees are not animals
 - Ⓑ some animals need more space than others
 - Ⓒ all animals need space
 - Ⓓ cheetahs are more important than honeybees
2. An moose has a scar from a fight. The scar is
 - Ⓐ a trait that will help the moose survive
 - Ⓑ a trait that will disappear
 - Ⓒ an acquired trait
 - Ⓓ an inherited trait

3. The diagram below shows the life cycle of a grasshopper.



What happens during the second stage of incomplete metamorphosis?

- Ⓐ The insect is a pupa.
- Ⓑ The insect is an egg.
- Ⓒ The insect is an larva.
- Ⓓ The insect is a nymph.

Check Understanding

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

Note that question 4 has only three choices.

4. The four stages that all animals pass through are

- Ⓐ fertilization, birth, adulthood, death
- Ⓑ egg, larva, pupa, adulthood
- Ⓒ egg, nymph, molting, adulthood

5. Some young animals do not look like their adult forms. Identify **two** animals that change forms as they develop into adults.

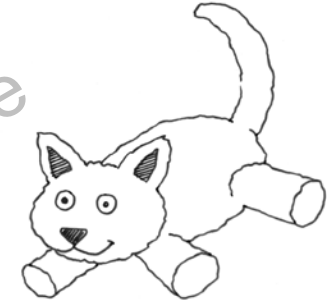
(1) _____

(2) _____

6. The diagrams below show two cats.



Cat B



Cat A

Identify **two** needs that Cat A has and Cat B does not have.

(1) _____

(2) _____

Assessment Scoring Guidelines

1. Answer B is correct.
2. Answer C is correct.
3. Answer D is correct.
4. Answer A is correct.
5. Frog or toad; butterfly or moth
6. Cat A needs energy, water, space, shelter, and oxygen.

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English Language Arts Activities

Life Cycles of Animals

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

Ask and Answer Questions

TRY THE SKILL

Often we can figure out the answer to a question by asking ourselves other questions.

For example, let's say you find a group of insects that are all the same kind but different sizes. You wonder if they undergo a three-stage or four-stage metamorphosis.

You might ask yourself, "Do the smaller insects look much like the larger ones?" If so, this kind of insect probably undergoes a three-stage metamorphosis. This nymph looks much like the adult. It will keep shedding its outer covering, growing larger each time, until it reaches its adult size.

When you ask yourself questions, you are identifying what you need to know so that you can answer another question.

Read each question below. Then shade the circle next to the question that would help you figure out the answer.

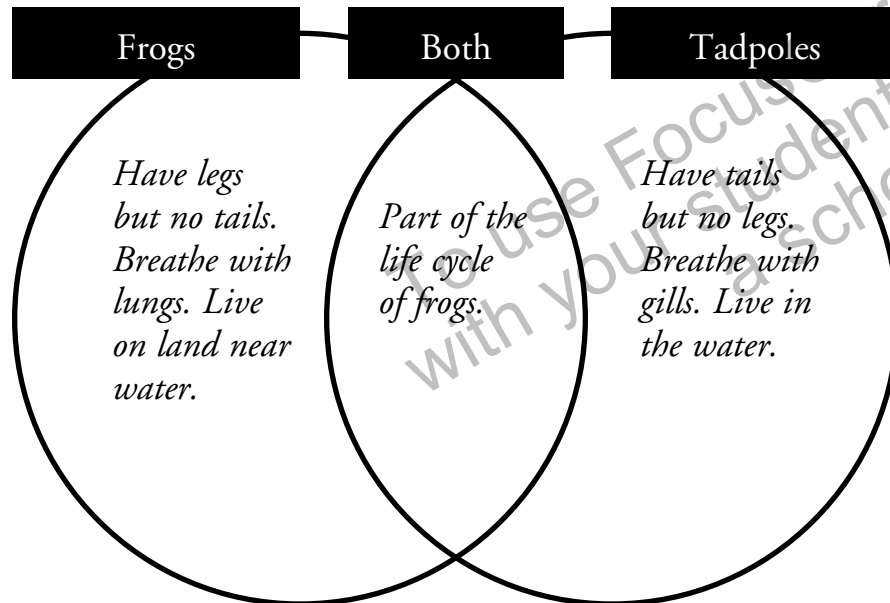
1. Does this insect have a three-stage or four-stage metamorphosis?
 - (A) What food does it eat?
 - (B) How many legs does it have?
 - (C) Can it fly?
 - (D) Does it make a pupa?
2. Is this insect an adult?
 - (A) Does it have a shell?
 - (B) Can it reproduce?
 - (C) Does it have wings?
 - (D) Can it move?
3. How can you tell if something is alive?
 - (A) Does it give off energy?
 - (B) Does it move?
 - (C) Is it made of cells?
 - (D) Does it get bigger?

Compare and Contrast

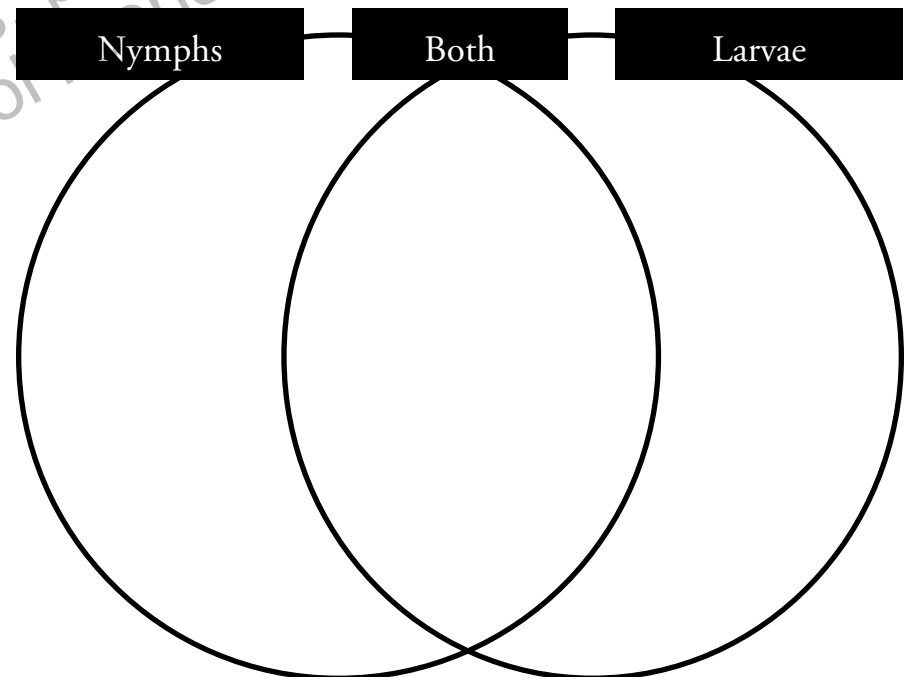
TRY THE SKILL

When you compare two things, you tell how they are alike. When you contrast them, you tell how they are different. A Venn diagram is made of overlapping circles. It can help you compare and contrast. This Venn diagram compares and contrasts frogs and tadpoles.

Use this Venn diagram to compare and contrast nymphs and larvae. Use the phrases in the box.



- Young form of an insect
- Look like their parents
- Goal is eating
- Look nothing like their parents
- Grow larger by molting
- Turn into a pupa
- A stage in three-stage metamorphosis
- A stage in four-stage metamorphosis



Use Context Clues

TRY THE SKILL

Read the words in the box. Then use context clues in each sentence below to figure out which word should complete it. Then write the correct word on the line.

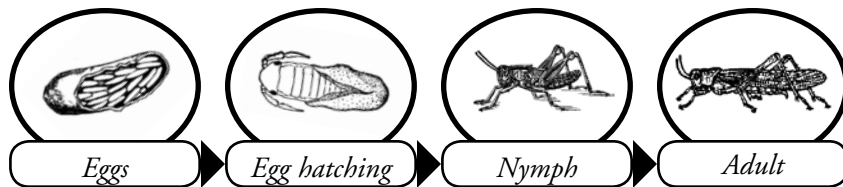
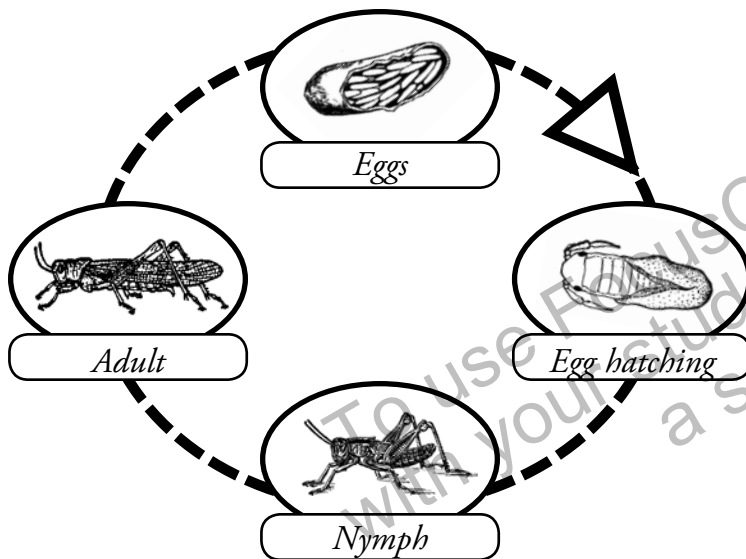
pupa nymph metamorphosis oxygen reptile
amphibian molt gills larva cocoon

1. A worm-like _____ hatches out of a tiny egg.
2. A new moth slips out of a _____.
3. When it hatches, the _____ already looks like its parent.
4. The beetle larva has to _____ to grow larger.
5. Tadpoles, unlike frogs, breathe with _____.
6. As the tadpole changes into a frog, it undergoes _____.
7. No animals can survive for long without _____.
8. During the _____ stage, the insect gains its adult form.
9. An animal that lives on land and has dry, scaly skin is called a _____.
10. An animal that begins life in water and later lives on land is an _____.

Use Graphic Organizers

TRY THE SKILL

A diagram can show the steps or stages in a process. Often a diagram is easier to understand than several paragraphs that explain the same thing. This diagram shows the life cycle of a grasshopper. It can be changed into a time line.



Study the small pictures. Then look at the circle diagram. One picture has been placed on the diagram. Cut and paste the remaining pictures (with numbers and names) to show their correct places in this diagram. Next, place numbers 1, 2, 3, and 4 in their correct places on the time line. On the time line, start with the number of the picture that shows reproduction.



3. Adult



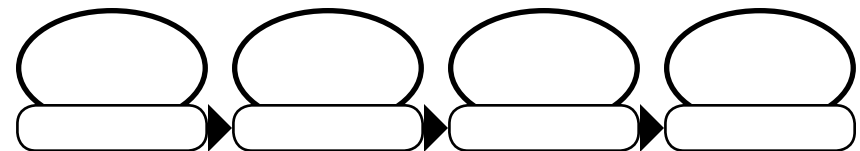
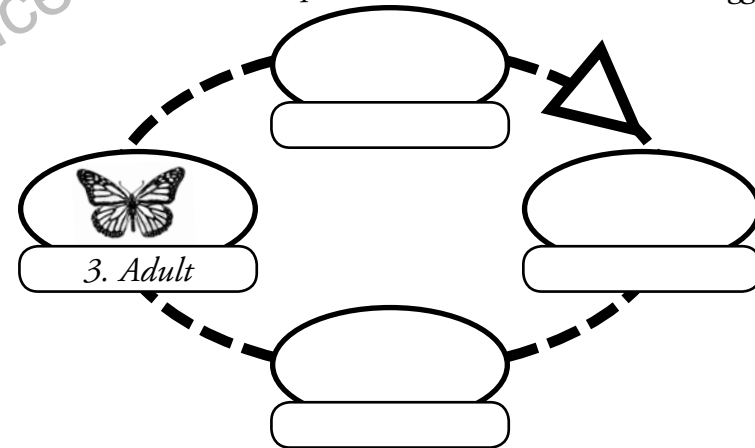
1. Pupa



4. Larva



2. Egg

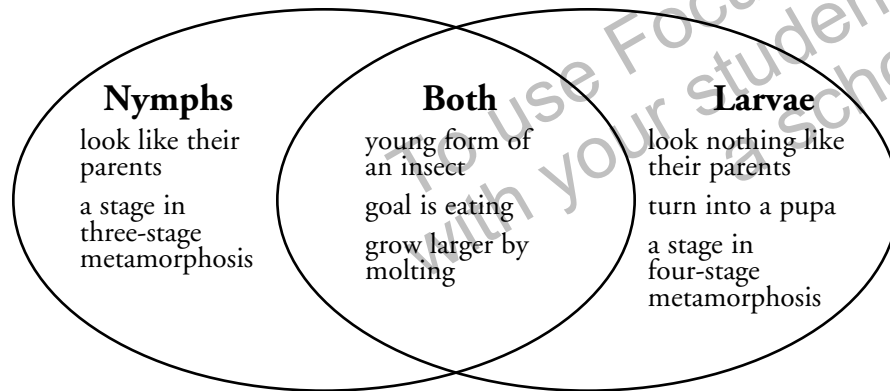


Answer Key

Ask and Answer Questions

1. D
2. B
3. C

Compare and Contrast



Use Context Clues

1. larva
2. cocoon
3. nymph
4. molt
5. gills
6. metamorphosis
7. oxygen
8. pupa
9. reptile
10. amphibian

Use Graphic Organizers

Life Cycle: pictures should be in this order, clockwise: 2 (egg), 4 (larva), 1 (pupa), 3 (adult).

Time Line: numbers should be in this order: 2 (egg), 4 (larva), 1 (pupa), 3 (adult).