

Be an Engineer!

Design an arboreal robot! Make a robot that can cling, climb, or hang in trees. How would you design its body and limbs to move among branches? How would it collect food from trees? What special features would your robot need? Draw a diagram of your robot and label its features. Then build a model of it using recycled materials. Finally, write about your model in a science journal and explain why you designed it the way you did.

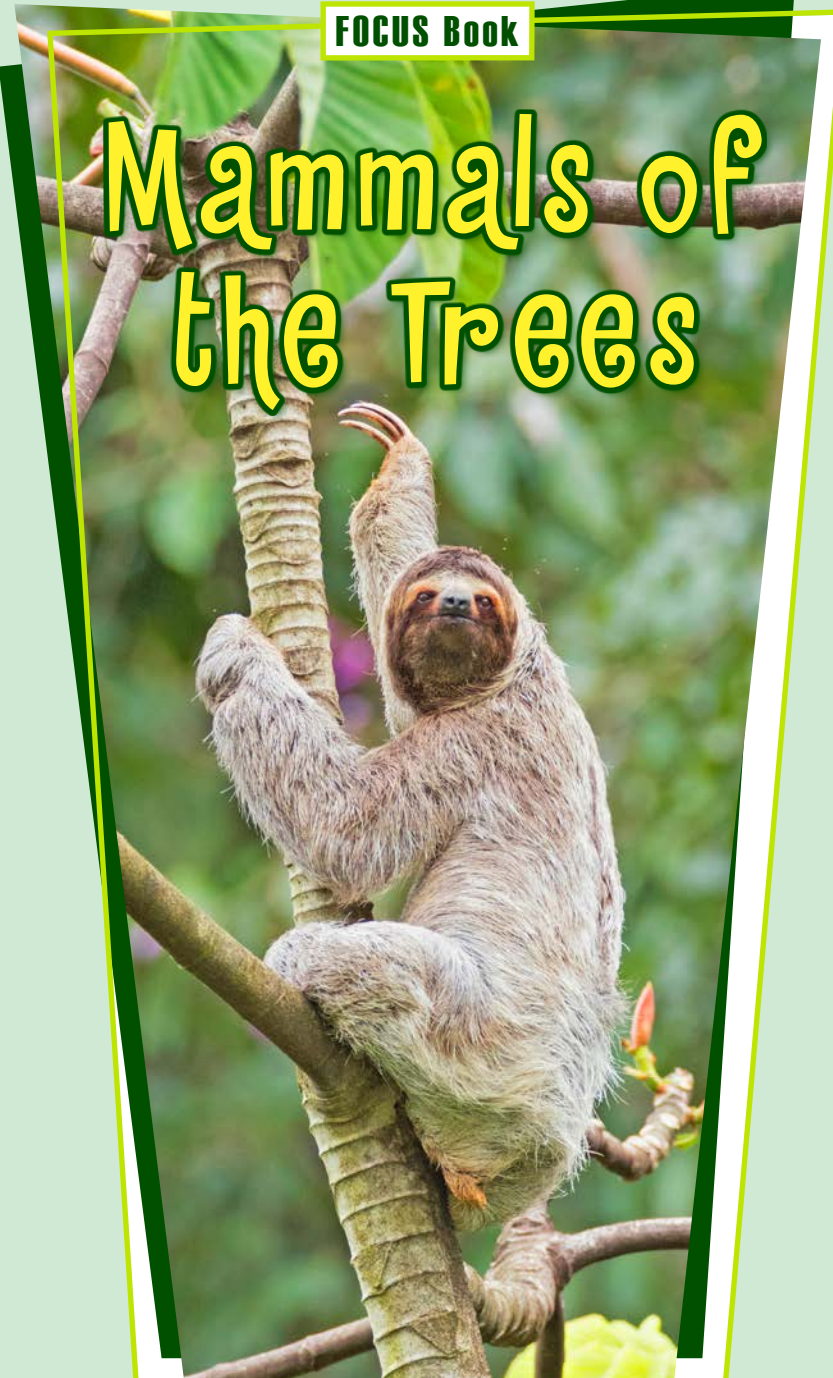


Beyond the Book

Use the library or the Internet to find out about other kinds of arboreal vertebrates.

FOCUS Book

Mammals of the Trees



: Science A-Z 🐞

Mammals of the Trees



FOCUS Question

What do mammals that live in trees have in common?

Structure and Function

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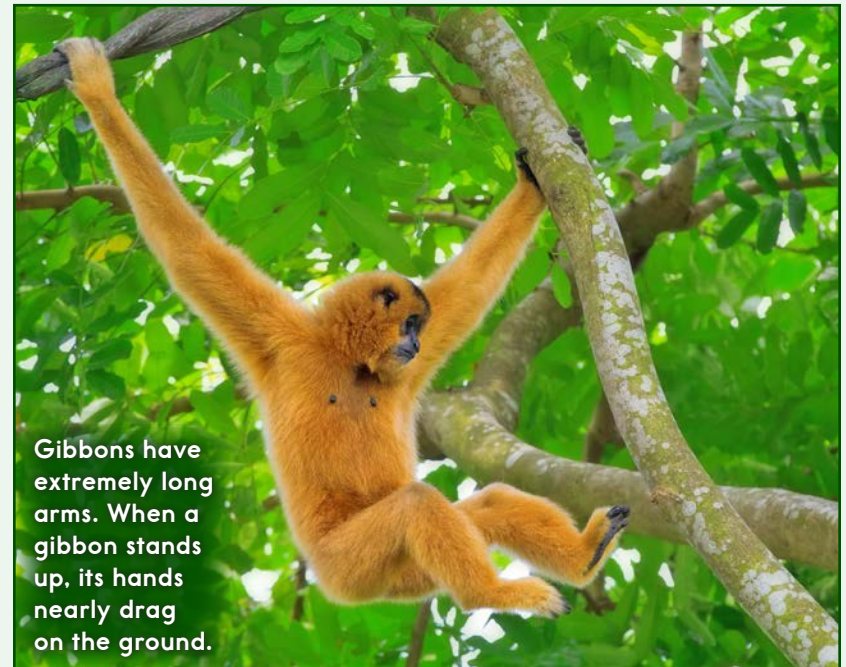
Reading Levels	
Learning A-Z	Q
Lexile	610L
Correlations	
Fountas and Pinnell*	N

*Correlated independent reading level

Look Up!

You step across the shadowy jungle floor. A whistling call rings from the branches above. You look for the bird that made the sound. Instead, you spot a large, furry mammal swinging from branch to branch.

You just saw a gibbon—a type of ape. A gibbon is an *arboreal* (ar-BOR-e-ul), or tree-dwelling, mammal. Many different kinds of mammals make their homes in trees. Living in high habitats has made these animals similar in many ways.

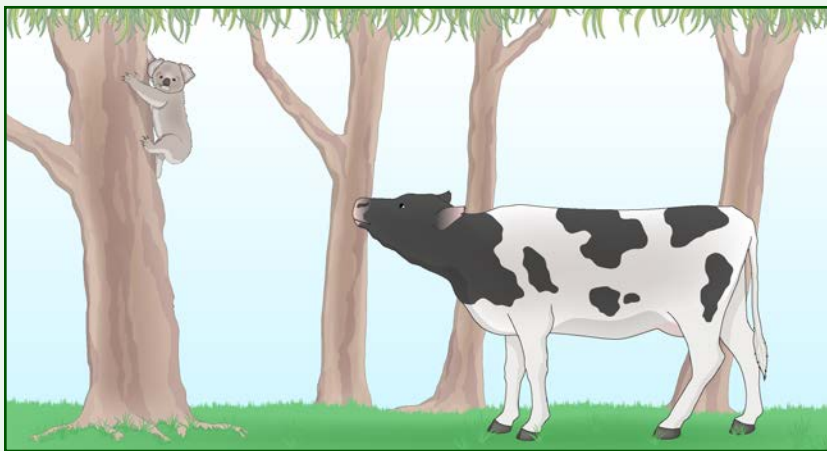


Gibbons have extremely long arms. When a gibbon stands up, its hands nearly drag on the ground.

Life in the Trees

Living in trees has advantages. The biggest benefit is food. Monkeys eat a lot of fruit. Koalas eat leaves. These foods, along with insects and flower nectar, are plentiful in treetops. In trees, animals can avoid predators that only live on the ground. Many predators can't reach the treetops. Trees also have many nooks and crannies for hiding.

Living in trees has its challenges, too. The biggest problem is moving from place to place without going down to the ground. Tree-dwelling mammals have to climb, swing, or leap from branch to branch. Luckily, their bodies have features to help them get around.



Both of these animals might enjoy eating the tender leaves at the top of this tree. Only one can get them. How are their bodies different?

Primates

A group of mammals called *primates* includes monkeys, lemurs, and apes. These animals eat insects, nuts, leaves, and a lot of fruit. How do arboreal primates get to these treetop treats?

Most monkeys are small, so they can travel on the thinnest branches. They have strong, flexible arms that allow them to reach and swing. Thumbs on their hands and feet help them grab and hang on. Most monkeys have long tails to help them balance. Some even have *prehensile* tails, which can bend and grip like an extra hand.

Think About It

Humans are also primates. Do people have features that would allow us to live in trees?



This spider monkey uses its tail to hang on to a tree branch.

Lemurs also have thumbs that can grip. Many lemurs have strong legs and feet that they use to “bounce” from trunk to trunk.



sifaka lemur

Apes tend to be larger than monkeys and lemurs. Even with their large bodies, orangutans are arboreal. These great apes have long, flexible arms and four thumbs used for climbing.

All primates have eyes that face straight forward. This gives them *binocular*, or 3-D, vision, which helps them judge distances. It makes leaping from branch to branch much easier!



This baby orangutan uses its tight grip to hang on to its mother.

Squirrels

Squirrels are another group that takes to the trees. These small mammals eat only nuts and seeds.



Squirrels can climb trees either upside down or right side up.

Most squirrels are small and light. Their long tails help them balance, even on the thinnest twigs. Strong legs let them leap from tree to tree. Tough claws grab tree bark and hold on. Squirrels can turn their ankles all the way around in order to hang on with their back feet while climbing down headfirst.

Do You Know?

Flying squirrels have flaps of skin between their legs called *patagia*. They use these skin flaps to glide from tree to tree.



Sloths and Anteaters

Monkeys, lemurs, and squirrels are quick and active. But sloths are slow and sleepy. Sloths are also at home living in trees. There, they eat a steady diet of tender leaves.

Sloths have very long arms. Rather than leaping from branch to branch, they reach and cling. They also have long, curved claws that loop around branches. Sloths can hang from trees for hours with little effort.

Silky anteaters also have long, curved claws.

These arboreal animals live their entire lives in trees, slurping ants and termites from hollow trunks.



Sloths have strong bodies that help them cling to trees for hours.



Silky anteaters have prehensile tails.

Marsupials

Marsupials are mammals with pouches for raising young. Koalas are an arboreal kind of marsupial. Like sloths, koalas are slow-moving animals that eat nothing but leaves. They have a pair of thumbs on each front paw that help them cling tightly to branches. Their soft, rounded rump allows them to sit in the fork of a tree trunk.

Opossums are also marsupials. Animals in this group eat fruit, insects, leaves, or flower nectar. They have small, light bodies and sharp claws. Opossums also have long prehensile tails.



koala



koala paw



brush-tailed
opossum

Arboreal marsupials have a special pouch that closes tight to keep the joey from falling out. When the baby leaves the pouch, it clings to its mother's back.

Cats

Even some predatory mammals spend time in trees. Leopards can hunt in trees and can drop down on prey from above.

Arboreal cats tend to be smaller and weigh less than cats that are ground dwellers. They have strong, flexible front legs for climbing and long, heavy tails for balancing.

Arboreal mammals have to climb, grip, swing, hang, and balance. Special features help these tree dwellers live high in the treetops.



African leopards use their large, thick tail for balance.

Read-Think-Write

Write your answers on separate paper. Use details from the text as evidence.

- 1 What is one way that living in trees benefits animals?
- 2 How do thumbs help primates live in trees?
- 3 Many arboreal animals have *prehensile* tails. What does this term mean?
- 4 Which arboreal animals have sharp claws, and how do claws help them live in trees?
- 5 How do long, heavy tails help cats that live in trees?

FOCUS Question

What do mammals that live in trees have in common? Write about three body features shared by arboreal mammals that help them live in trees.



Be an Engineer!

A marsupial's pouch has everything a joey needs. It has food, shelter, and warmth. It can open and close for the joey to get in and out.

Design and build a pouch that can hold a bottle of warm water. The pouch should keep the water warm. It should also be able to open and close. Lastly, you must be able to move around while wearing it.

Decide which materials to use. Plan the size and shape of the pouch. Figure out whether it needs moving parts. Then build your pouch and try it on. Does it meet all the requirements? What would you need to do to make it better?



Beyond the Book

Use the library or Internet to find stories or myths about marsupials from the native Aboriginal people of Australia.

FOCUS Book

Life in the Pouch



: Science A-Z 🐛

Life in the Pouch



FOCUS Question

How are marsupials different from other mammals?

Structure and Function

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Reading Levels	
Learning A-Z	P
Lexile	570L
Correlations	
Fountas and Pinnell*	M

*Correlated independent reading level

A Joey's Life

It's a warm, sunny day in Australia. A group of kangaroos rests at the edge of a forest.

A young kangaroo, called a *joey*, hops around and nibbles on some grass. But then the joey gets tired. It hops over to its mother and climbs inside a pouch on the front of her body. Inside the pouch, the joey is warm and safe. It can drink its mother's milk and enjoy a nap.

Only a few kinds of animals have this special pouch. These animals are called *marsupials* (mar-SOO-pee-ulz).

Wowser!

Kangaroos are amazing jumpers. They can hop 13 meters (43 ft.) in one leap! But they can't hop backward!



Joey's climb inside the pouch when they are hungry, tired, or scared.



Marsupials Are Mammals

Mammals are animals that feed their young with milk from the mother's body. They have hair or fur. The babies are born looking much like their parents, only smaller.

Marsupials are a kind of mammal. They have fur, and their babies drink milk. But marsupials have a special life cycle. After a baby is born, it lives inside a pouch on its mother's body.

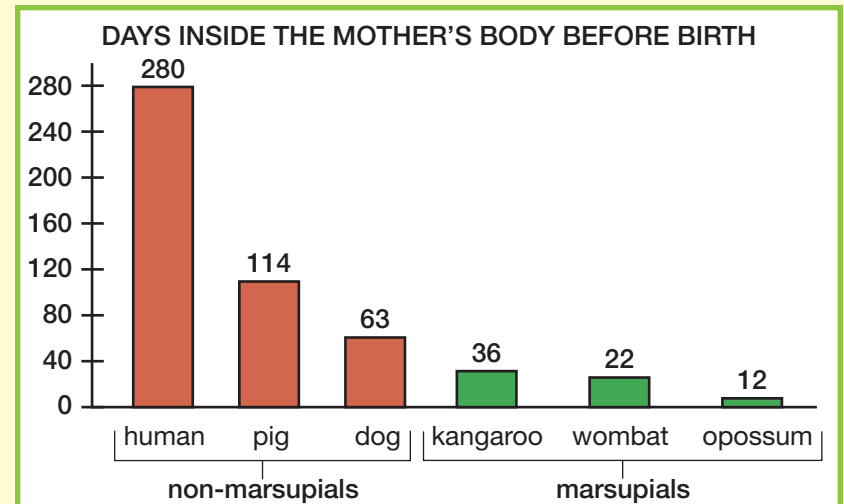


Virginia opossums are marsupials. They are found in North and Central America.

Being Born

Before they are born, baby mammals grow inside their mother's body. Most mammals have a *placenta* (pluh-SEN-tuh). This organ attaches the baby to the mother. It carries nutrients from the mother to the growing baby. The baby grows for weeks or months. Once it can survive outside its mother, it is born.

Marsupials don't have a placenta. The baby grows inside its mother for only a short time. The baby is born very small. It is not yet ready to survive in the outside world. How does the baby marsupial stay safe? How does it get the nutrients it needs to grow?



All mammal babies develop inside their mothers. But marsupials are born after fewer days. They need a safe place to keep developing after birth.



Getting to the Pouch

Female marsupials have a flap or pocket of skin on their belly. This is the pouch. It is a safe place where a baby marsupial can keep growing.

A baby marsupial is called a *joey*. It starts out the size of a jellybean! It has no fur, and its eyes are closed. As soon as it is born, the fragile little joey must climb all the way up to its mother's pouch.

The mother licks her fur to make a path for her baby. The joey's front legs are strong for its size. It climbs up the wet fur and into the pouch. Once inside, it drinks milk and rests from its journey.



This newborn marsupial is crawling up its mother's fur to find the pouch.

In the Pouch

The mother's pouch has muscles around the opening that keep it tightly closed. The pouch is lined with fur. Inside, it is soft and warm.

The joey stays attached to its mother and drinks her milk nonstop while it grows. It may stay in the pouch for up to a year!



This joey is *suckling* (drinking milk) inside its mother's pouch.



Leaving the Pouch

As the joey develops, it grows fur and its eyes open. The mother relaxes the muscles of her pouch, and the joey finally climbs out. It is not very strong yet. It still needs to drink its mother's milk.

At first, the joey only goes outside for short periods of time. It climbs back inside the pouch whenever it needs to drink milk or sleep. It also rides inside the pouch when its mother moves around.

The baby marsupial keeps growing. It gets stronger and starts to eat solid food. Eventually, it leaves the mother's pouch for good.

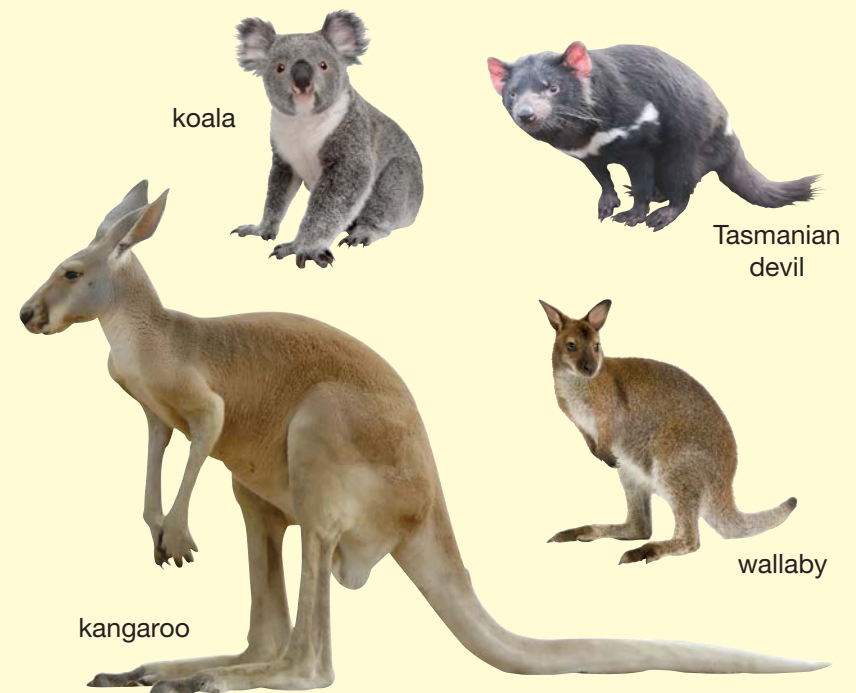


Young marsupials explore the outside world. But they stay close to their mother.

Kangaroos, Koalas, and More

Kangaroos and *wallabies* belong to one family of marsupials. They move by hopping on their strong back legs. Their pouches close tightly. As a result, the joey stays safe as the mother hops up and down.

Koalas and *Tasmanian devils* are also marsupials. When a koala or devil joey leaves its pouch, it often rides on its mother's back as she moves about.



All these marsupials live in Australia.

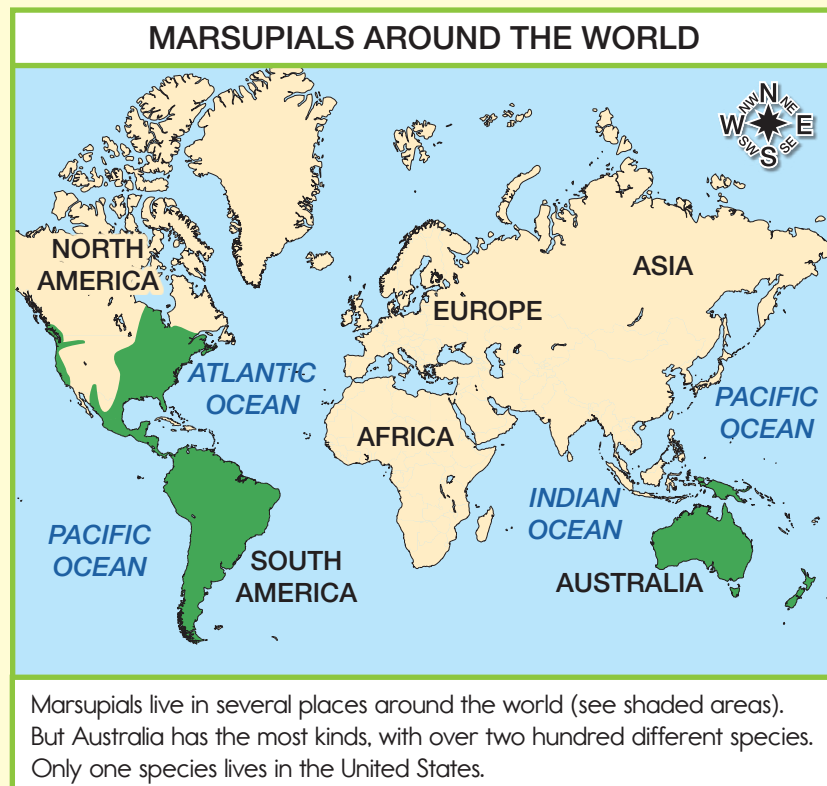


Where Marsupials Live

The world has many kinds of marsupials.
Most of them live in Australia.

Opossums are the only kinds of marsupials
that live outside of Australia. They live in
North, Central, and South America.

Use the map to find out if any animals with
pouches live near you!



Read-Think-Write

Write your answers on separate paper. Use details from
the text as evidence.

- 1 What are two things that marsupials have
in common with all other mammals?
- 2 What is the term for a baby koala? How do you know?
- 3 Why can't a baby marsupial stay inside
its mother's body for very long?
- 4 How does a marsupial mother help a joey find the
pouch, and how does she help it stay inside?
- 5 What is the purpose of the map on page 9?
 - A to explain that marsupials are only
found in Australia
 - B to show which parts of Australia have
the most marsupials
 - C to show where different kinds of marsupials
live around the world

FOCUS Question

How are marsupials different from other
mammals? Identify several ways a marsupial's
body is different. Also explain how they
behave differently from other mammals.





Be a Scientist!

Use arts and crafts materials to build a 3-D model of the layers of the human skin. Choose materials that will represent the properties of each layer on the basis of what you learned in this book. Label special features found in each layer and the functions of each.

Now add two examples of skin damage to your model and label them. Use your model to teach others about the layers of their skin and how they can keep their skin healthy.



Beyond the Book

Use the library or the Internet to research ways to protect your skin from the Sun's ultraviolet rays.

FOCUS Book

Skin

It Has You Covered



: Science A-Z 🦠

Skin

It Has You Covered



FOCUS Question

What are the functions of your skin?

Systems and System Models

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Skin: It Has You Covered

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Reading Levels	
Learning A-Z	S
Lexile	880L
Correlations	
Fountas and Pinnell*	O

*Correlated independent reading level

Your Amazing Skin

Skin! Your body is covered in it. But what is skin, and why do you need it?

Skin is the body's largest *organ*. An organ is a part of the body that has a specific and important function, such as your heart or lungs. Skin is a part of the *excretory system*, the system that rids the body of waste. But it does much more than that.

Skin covers and protects your muscles, bones, blood vessels, and other parts of the body. It protects your body from the outside world. It keeps most fluids inside the body and germs out. It's a waterproof coat, and it keeps the body from getting too hot or too cold. Skin also allows us to sense the outside world.

Math Moment

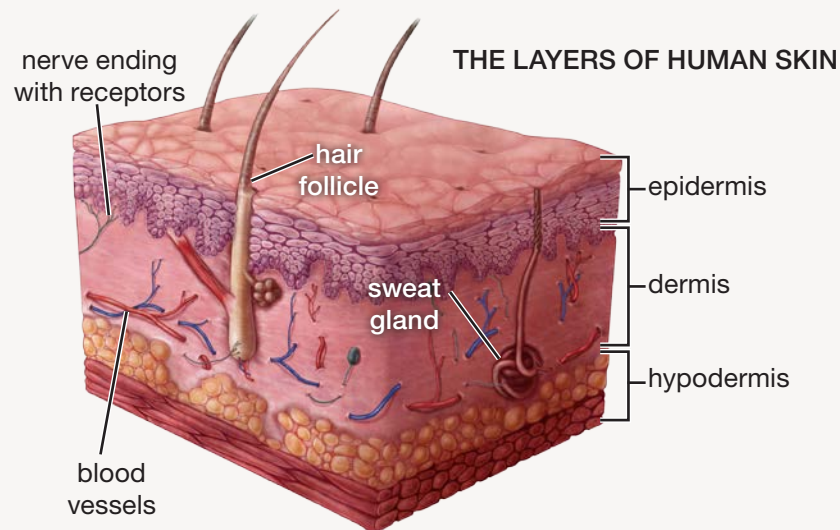
Skin makes up about 15% of a person's body weight. If a person weighs 160 pounds, about how much does their skin weigh? (Hint: Multiply by 0.15 to solve the problem.)

From birth, people use their skin to sense things around them and respond to touch.



On the Surface

Skin covers your whole body, but it is thicker in some places and thinner in others. The area around your eyes and eyelids has the thinnest skin. The bottom of your feet and palms of your hands have the thickest skin.



All skin is divided into three layers: the *epidermis*, the *dermis*, and the *hypodermis*. The epidermis is the thin outer layer. It is composed of dead, flattened cells at the surface of the body. Epidermis cells are constantly dying, flaking off, and being replaced by cells from below. Washing your skin helps remove the dead cells. We replace our epidermis about every thirty-five days.

Did you know that your nails and hair are part of your skin? Like all skin, they contain *keratin*, a type of protein produced in the epidermis.

Keratin gives your body a strong, flexible covering. It helps make skin waterproof and keeps out germs and chemicals from the environment.

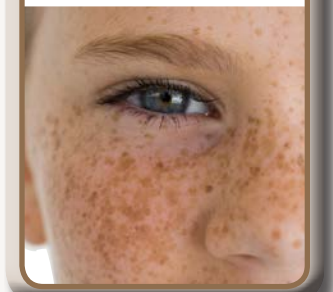


People's skin color can vary significantly, from very light to very dark.

The epidermis also produces a substance called *melanin*. Melanin protects skin from the harmful ultraviolet rays of the Sun. It also gives skin color. People born with darker skin produce more melanin than people with lighter skin. When exposed to sunlight, your skin produces more melanin and becomes a darker color.

Do You Know?

Freckles are small groups of cells that contain more melanin. People with lighter skin are more likely to form freckles.



Below the Surface

The dermis is the middle layer of your skin (see diagram on page 3). It contains *collagen*, a type of tissue that connects the body together. Collagen makes skin firm but allows it to stretch and return to its shape like a rubber band.

Tiny holes in the dermis, called *pores*, extend up into the epidermis. Some pores contain hair *follicles*—small tubes in the skin that hold each hair's root. *Sebum* is a kind of oil that moves up through the pores. Sebum keeps the skin moist, helps make it waterproof, and helps protect it from germs.



Do You Know?

Too much sebum can block pores with oil, dirt, and dead epidermis cells, and then become infected. The results are pimples! Washing your skin to remove extra sebum can help keep pimples from forming.



Blood vessels in the dermis provide nutrients to the skin. These blood vessels, along with sweat glands, help control your body's temperature. When your body is too warm, the blood vessels expand to release heat at your body's surface. The sweat glands release water through pores. Water evaporating from your skin's surface cools the body. The dermis also has *receptors* and nerve endings that sense pressure, touch, pain, and temperature.

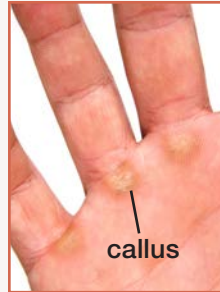
The hypodermis (see diagram on page 3) is the deepest layer of skin. It attaches the dermis to muscles and bones. The hypodermis stores fat for quick energy. Fat also provides padding and insulates the body from temperature changes.



Sweating helps keep the body cool during and after exercise.

Skin Damage

While interacting with the world, skin sometimes gets damaged. Lucky for you, skin can change to protect itself. In areas that get a lot of friction, like where hands grip tools, a *callus* may form. A callus is a thick, hard area on the skin that gives extra protection to the area.



Too much friction can cause a *blister* to form. A blister is a fluid-filled sac beneath the epidermis. Blisters can also form due to sunburn, irritants like poison ivy, or extreme hot or cold temperatures. A blister hurts, but it cushions the dermis from further injury.



The repeated rubbing of fingers against the strings of an instrument can cause calluses.

Skin's Healing Power

When your skin is injured, other parts of your body go to work. If your skin is cut, the circulatory system first slows blood flow to the damaged area to reduce bleeding. Then *scabs* form to protect the wound from germs until new skin grows. Scabs usually heal fairly quickly and leave little or no sign of injury.

If the wound is deep, your body creates *scar tissue* from collagen. Scar tissue has no hair follicles or sweat glands. It also has less protection from ultraviolet rays so it must be protected from sunlight even more than normal skin. Unlike scabs, scars are often permanent.



Scar tissue and scabs are both ways that skin protects and heals itself.



Skin Changes Over Time

Even without an injury, skin changes as we age. Babies have thin skin that becomes thicker and less sensitive as they grow to be children, teens, then adults. As adults get older, the skin thins again and produces less collagen. Less collagen means the skin becomes wrinkled and less stretchy.

The skin bruises more easily and may show signs of long-term sun damage. Some aging of the skin is natural. But too much exposure to sunlight and chemicals, such as cigarette smoke, can produce more wrinkles and age spots at a younger age.

Your skin will stay healthy if you keep it clean, drink plenty of water, and get enough sleep. Protect your skin so your skin can protect you!



Skin changes over the course of a lifetime.

Read-Think-Write

Write your answers on separate paper. Use details from the text as evidence.

- 1 What kind of body part is skin, and which body system is skin a part of?
- 2 From outside to inside, what are the three layers of the skin?
- 3 According to the book, what are two important functions of pores?
- 4 What are two processes that help skin heal from a cut?
- 5 How does keeping skin clean help it stay healthy?



FOCUS Question

What are the functions of your skin? Describe the three layers of your skin and explain the function of each. Include in your description the components of each layer.



Be an Engineer!

Create a diagram, digital model, or 3-D model of the human heart. To make a 3-D model, use common materials such as straws, recycled water bottles, yarn, cardboard, construction paper, clay, and food containers.

Label the parts of the heart that you read about in the book. Also label where the blood is going each time it exits the heart and where it is coming from each time it returns. Share your diagram or model with the class by tracing the path of blood as it flows through and beyond the heart and back again.



Beyond the Book

Conduct research to learn about an animal whose circulatory system is different from a human's.

FOCUS Book

Your Hardworking Heart



: Science A-Z 

Your Hardworking Heart



FOCUS Question

How does the human heart work?

Structure and Function

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Your Hardworking Heart
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Reading Levels	
Learning A-Z	R
Lexile	800L
Correlations	
Fountas and Pinnell*	N

*Correlated independent reading level

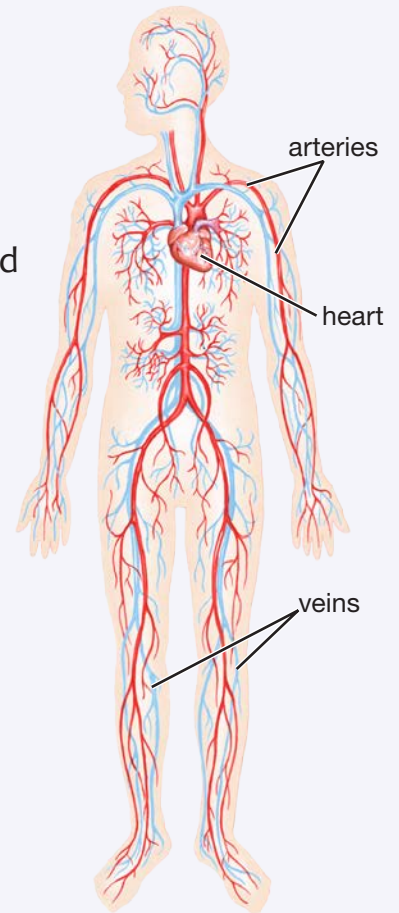
A Mighty Muscle

What's the most important muscle in your body?
It's your heart!

That's right—your heart is a muscle, and it has a very important job. It pumps blood throughout your body. Most other muscles in your body get to rest now and then, but your heart never stops. It started working long before you were born. It will keep working nonstop for your whole life, without you even thinking about it. Amazing!

The heart, blood, and blood vessels together make up the *circulatory system*. That's because the heart causes blood to travel, or circulate, throughout the body.

THE CIRCULATORY SYSTEM



wowser!

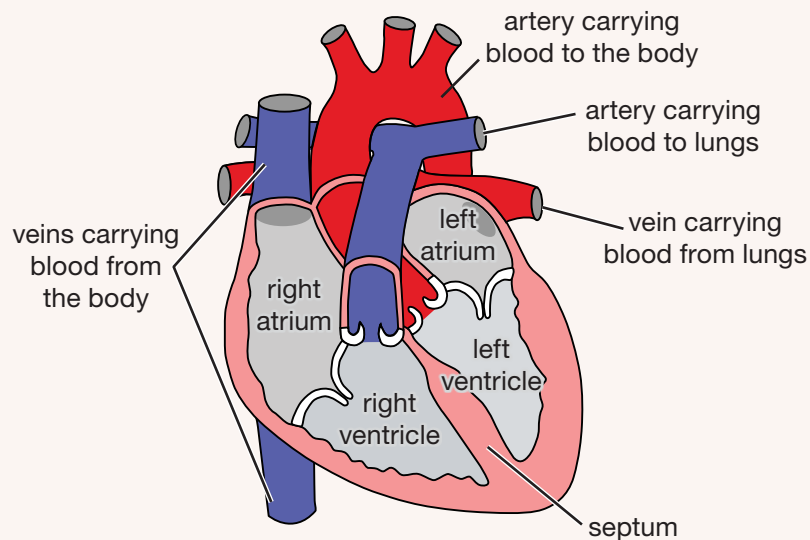
Your heart beats about 100,000 times each day, including while you sleep.

In and Around the Heart

Blood enters and leaves the heart through blood vessels. *Arteries* carry blood away from the heart, and tiny capillaries take it to individual cells. *Veins* bring blood back to the heart.

The heart has four sections, or *chambers*, that fill with blood at different times. The top two chambers, called *atria*s, receive blood coming back from the body and lungs. The bottom two chambers, called *ventricles*, pump the blood out to the body and lungs. The *septum* is a thick wall of muscle. It separates the left and right sides of the heart.

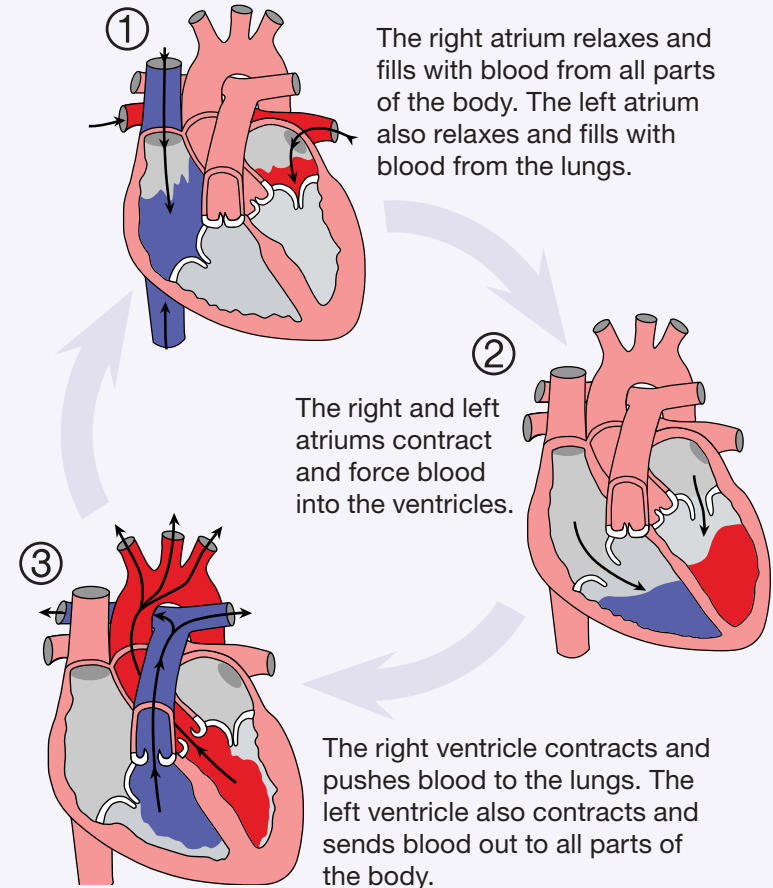
PARTS OF THE HUMAN HEART



One Heartbeat

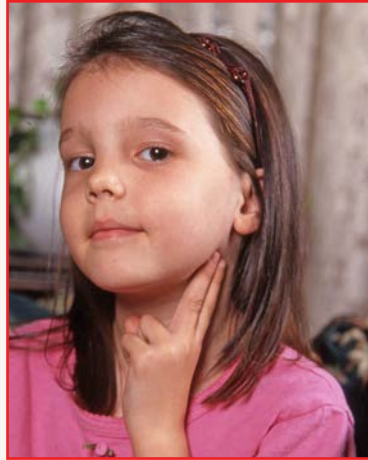
Like other muscles, your heart produces force and motion. It does this by *contracting* (tightening) and relaxing over and over. When a chamber of the heart relaxes, it fills with blood. When it contracts, it squeezes and pushes the blood out.

A SINGLE HEARTBEAT



The four heart chambers work together to keep blood moving through your body all the time. Blood rushes into the atriums and is immediately sent to the ventricles. As the ventricles pump blood out, other blood flows into the atriums. This cycle continues, causing heartbeat after heartbeat.

You can actually feel your heartbeat in certain places where blood flows close to the skin. This is called checking your *pulse*. An average pulse for humans is about 70 beats per minute.



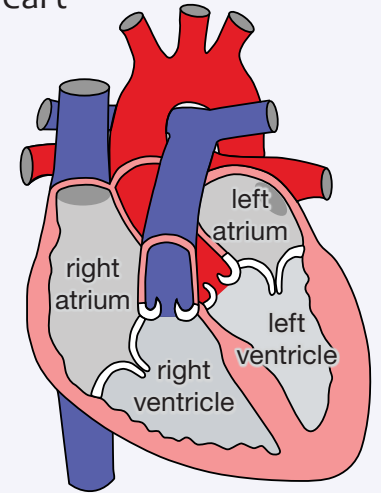
Two easy places to check your pulse are the side of your neck and the inside of your wrist.

Math Moment

People often check their pulse for only 15 seconds, then multiply by 4 to figure the beats per minute. Jane counted 16 beats in 15 seconds, and Doug counted 18 beats. What is the difference between their total beats in one minute?

Which Way?

Your heart is a busy place, like a big city where many freeways meet. How does the blood know which way to go? Four *valves* inside the heart act like security gates. They keep blood moving in the right direction. Two valves direct blood from the atriums to the ventricles. Two other valves direct blood as it leaves the ventricles. All the valves close after blood moves through them to prevent backward flow.



The four heart valves (in white) open and close to control blood flow through the heart.

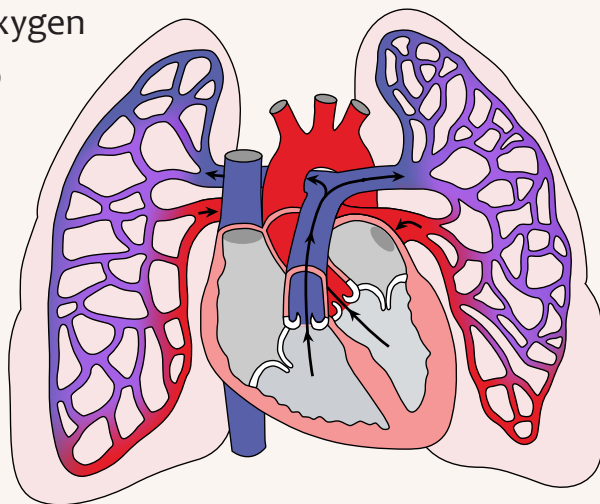


A doctor uses a *stethoscope* to listen to your heartbeat. The valves closing create the sound that the doctor hears.

Pick Up and Delivery

The heart works so hard because blood carries nutrients and an important gas called oxygen to all the cells in your body. Blood also removes waste from your cells so they can stay healthy. It's like a food delivery service and a trash collector in one!

When blood returns to the right atrium, it contains very little oxygen. That's because the cells have used it up to keep the body alive. The right ventricle pushes this blood to the lungs. The lungs take in oxygen each time a person breathes in. The blood picks up the oxygen and gets rid of waste (carbon dioxide). The blood filled with oxygen then returns to the heart. The left ventricle pumps it out to the body. Fresh oxygen is delivered to the cells!

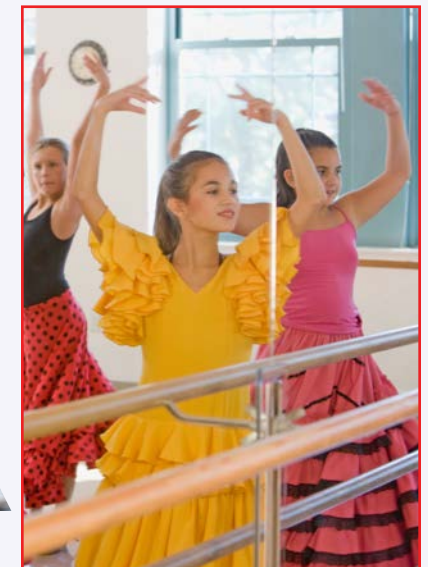


The heart and lungs work together to deliver oxygen to the body.

Healthy Heart

Your cells need a steady supply of oxygen and nutrients to stay healthy. That's why your heart must stay strong—so it can pump blood day and night without stopping. Keeping your heart in good shape will help you live a long, active life. What helps your heart stay healthy?

Move enough to huff and puff for thirty minutes to an hour every day. When you keep moving for that long, your heart beats faster to get more oxygen to your cells. Like your arm and leg muscles, your heart gets stronger and healthier when you exercise.



Riding your bike, dancing, and playing sports are all good for your heart.

Eating healthy foods helps keep your heart healthy, too. Eat lots of colorful fruits and vegetables every day. Limit foods such as fatty cheeseburgers, greasy fries, salty chips, and sugary soft drinks. Good eating habits will help keep your weight within a healthy range. Moving extra weight makes the heart work harder.



Do you know what else keeps your heart strong? Laughter! When you laugh, more blood flows to every part of your body.

Take good care of your heart for a long, healthy life!



Eating right, staying active, and laughing are a winning combination for a healthy heart!

Read-Think-Write

Write your answers on separate paper. Use details from the text as evidence.

- 1 How is your heart similar to the muscles in your arms and legs? How it is different?
- 2 What actions make up the cycle of one heartbeat?
- 3 What is the correct sequence for the blood's path, starting with the heart pumping blood to the body's cells? Rewrite this list in the correct order: left atrium, right atrium, left ventricle, right ventricle, lungs, cells
- 4 Why are the lungs important to the circulatory system, even though they are not part of it?
- 5 According to the book, what are four things you can do to help keep your heart healthy?



FOCUS Question

How does the human heart work? Describe in your own words the main parts of the heart. Then describe how those parts work together to pump blood throughout the circulatory system.



Claim, Evidence, and Reasoning

Name _____ Date _____

Directions: Ask a question that you can investigate. Once you complete the investigation, fill in each column of the chart.

Question: _____

Claim a statement that answers your question	Evidence data and observations that support your claim	Reasoning how or why the evidence supports your claim
<i>I claim that . . .</i>	<i>The evidence I used to make the claim is . . .</i>	<i>The evidence helped me make the claim because . . .</i>

Name _____ Date _____

Part 1: Identify Parts of a System

Read the paragraph and look at the pictures. Then complete the tasks.

A hawk is hunting. It uses its large, broad wings to fly down to the water and then catches a fish in its sharp, curved talons. The hawk flies back to its nest. There, it uses its hard, pointed beak to eat the fish. The hawk also tears off pieces of fish to feed its babies.



1. In the table, list three structures of a hawk's body. Then describe features of each structure and explain its function.

Structure	Features	Function

2. How do these external structures work together as a *system* to help the hawk survive? _____

Name _____ Date _____

Part 2: Make an Argument

Write a claim that answers the question below. Support your claim with evidence from Part 1. Then provide a reason that the evidence supports the claim.

Imagine the hawk from Part 1 loses its talons in an accident.
How will this affect its babies?

Claim: _____

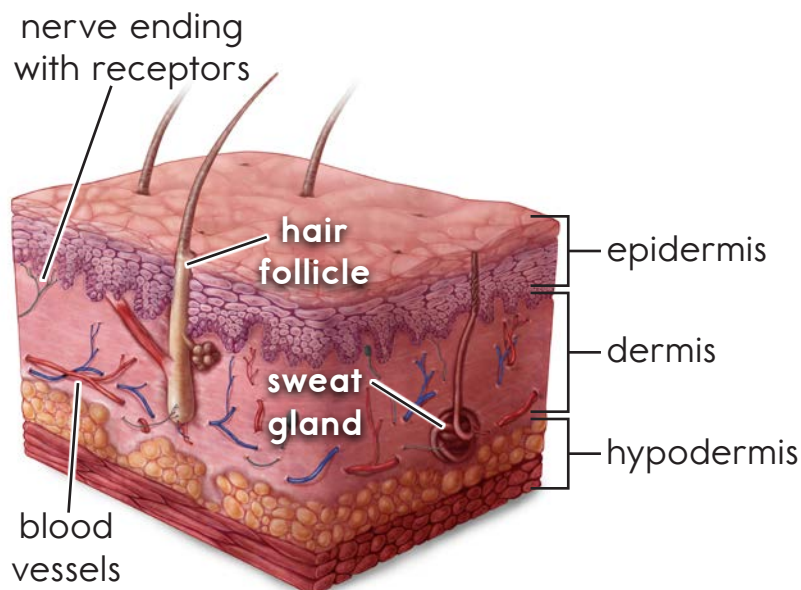
Evidence: _____

Reasoning: _____

Part 3: Support a Claim with Evidence

Look at the diagram and read the claims. Then answer the question on the next page.

THE LAYERS OF HUMAN SKIN



Claim 1. The skin is a system that covers the body of many animals.

Claim 2. The skin is a system made up of layers that contain hair follicles, nerves, blood vessels, and sweat glands.

Claim 3. The skin is a system that does not interact with other body systems, such as the nervous system.

Name _____ Date _____

Which claim is accurate and best supported by the evidence in the diagram? Explain your answer.

ANSWER KEY AND TEACHING TIPS

Connections to the Next Generation Science Standards*

Target Science and Engineering Practice: *Engaging in Argument from Evidence*

- Construct an argument with evidence, data, and/or a model.

Associated Performance Expectation: *4-LS1-1. Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.*

All questions in this assessment relate to the Disciplinary Core Ideas **DCI** of this Performance Expectation. Look for the **SEP** and **CCC** symbols for questions that specifically address Science and Engineering Practices and Crosscutting Concepts.

Summary

Students identify and describe the structures of an animal and determine the function of those structures. Then they use evidence about external and internal structures to make arguments and support claims.

CCC Part 1: Identify Parts of a System

1.

Structure	Features	Function
wings	large and broad	used to fly
talons	sharp and curved	used to catch and carry fish
beak	hard and pointed	used for tearing pieces of fish to eat and to feed to its babies

2. *These structures are parts of a system because the wings, talons, and beak work together to help the hawk survive. Each structure is needed to help the hawk get food for itself and its babies. The wings help the hawk fly to catch the fish and fly back to its nest. The hawk uses its talons to catch the fish and carry it back to its nest. The hawk uses its beak to eat and to feed the baby hawks.*

SEP Part 2: Make an Argument

Claim: *If the adult hawk loses its talons, the baby hawks will not survive.*

Evidence: *The photo and the text show the hawk using its talons to catch a fish. The hawk then uses its talons to carry the fish back to its nest. Then it feeds the fish to its babies. The babies need food to survive.*

Reasoning: *If the adult hawk didn't have talons, it couldn't catch fish. It also couldn't bring fish to its babies. The hawk would not be able to feed the babies. Without food to eat, they would not survive.*

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SEP Part 3: Support a Claim with Evidence

Claim 2 is accurate and is best supported by the evidence in the diagram. Reasoning may vary but should evaluate whether each claim is accurate and also supported by evidence. The diagram shows that skin is made up of layers. It also shows hair follicles, a nerve ending, blood vessels, and a sweat gland contained within the layers of skin. Claim 1 is not the best choice because, while true, the information about other animals is not shown in the diagram. Claim 3 is not the best choice because it is not accurate. The diagram shows nerve endings in the skin layers, and nerves are part of the nervous system, so the picture shows Claim 3 to be untrue.

Teaching Tips

If students have trouble performing the tasks on this assessment, ask them to look back at the observations they recorded in their table while analyzing the video and the books during Lesson 2. As a class, discuss the structures of the various animals included in their table. Help students understand how these external and internal structures work together to form systems that help animals survive. Discuss how the shape of a structure can help determine its function. For example, long, prehensile tails help monkeys grab onto trees and swing from branch to branch. Then work with students to identify the structures and functions of the hawk system in Part 1. Also, ask students to review the *Claim, Evidence, and Reasoning Graphic Organizer* they completed during the lesson, and discuss how students might use a similar strategy to complete the tasks in Parts 2 and 3 of this assessment.

Extensions

For students who complete their work early or are ready for an extra challenge, assign additional resources related to this topic found on the [Grade 4 Structure, Function, and Information Processing NGSS page](#) on Science A–Z.