



Level 4

Science

Help Pages

Help Pages

Glossary

(The lesson number included in the definition refers to when a teaching on this topic appears in the book.)

A

- air mass** a large body of air (L #25)
- amphibian** a vertebrate that lives part of its life in the water and part on land (L #14)
- anemometer** an instrument that measures wind speed (L #5)
- asteroid** an object in space that is made up of rock and metal; orbits the sun in a belt between Jupiter and Mars (L #105)
- attract** to pull toward (L #92)

B

- balance** a tool that is used to measure the mass of objects (L #8)
- barometer** a tool that measures air pressure (L #6)
- bedrock** the bottom layer of soil; it lies below the subsoil (L #39)
- bird** a vertebrate that has feathers, wings, and two legs (L #15)

C

- carnivore** an animal that only eats other animals (L #22)
- chemical change** a change in which the make-up of a substance is changed into one or more new substances (L #69)
- chlorophyll** the green substance inside leaves (L #13)
- circuit** the path that electricity follows (L #95)
- cirrus** the highest clouds in the sky; they look like wisps of hair (L #30)
- clay** a very fine-grained soil (L #41)
- cold front** cold, dense air; appears on a weather map as a blue line with triangles on it (L #27)

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| | |
|----------------------------|---|
| cold-blooded | describes an animal whose body temperature changes with its surroundings; it cannot maintain its own stable temperature (L #15) |
| comet | an object in space made of ice, rock, and frozen gases; it has a very long tail (L #105) |
| community | all of the populations that live in an ecosystem at the same time (L #56) |
| condensation | the process in which water vapor (gas) turns into liquid water (L #50) |
| conductor | something that lets electricity pass through it easily (L #94) |
| conifer | plant that has needle-like leaves and makes seeds inside cones (L #71) |
| consumer | an organism that eats other living things in order to get energy (L #20) |
| crust | the thin outer layer of the Earth (L #77) |
| cumulonimbus | describes clouds that look more like tall towers than regular cumulus clouds; associated with powerful thunderstorms (L #30) |
| cumulus | a name for clouds that look puffy and can bring storms (L #30) |
| current electricity | electricity that moves through wires (L #93) |
| D | |
| deciduous | describes a plant that sheds its leaves at the end of a growing season |
| desert | a very dry ecosystem that gets less than 10 inches of rain per year (L #56) |
| E | |
| earthquake | a tremor or shaking of the earth's surface usually caused by movement of rock in the crust (L #34) |
| ecosystem | all of the living and non-living things that interact with each other (L #54) |
| erosion | the process by which the surface of the Earth gets worn down (L #43) |
| evaporation | the process by which liquid water changes to water vapor or a gas (L #49) |
| experiment | a test that is done to see if the hypothesis is correct or not (L #2) |

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Glossary

F

| | |
|-------------------|---|
| fault | a break in Earth's crust, where rock moves (L #34) |
| fish | a vertebrate group that lives in the water and is covered with scales that protect it and help it to swim (L #15) |
| food chain | the path of food from one living thing to another (L #20) |
| force | any kind of push or pull (L #79) |
| forest | an ecosystem where many trees grow |
| fossil | the imprint or remains of something that lived long ago; a skeleton or leaf imprint (L #32) |
| friction | a type of force that stops things or slows them down (L #79) |
| front | the meeting of two different large air masses (L #27) |
| fulcrum | the fixed point on a lever (L #97) |
| fungi | organisms that cannot make their own food; absorb nutrients from other living things or from the remains of living things (L #10) |

G

| | |
|------------------|---|
| gas | a state of matter; a gas does not have a definite shape or take up a definite amount of space (L #66) |
| glacier | a large body of ice that moves slowly down a slope or valley (L #35) |
| grassland | an ecosystem that is usually dry and flat |
| gravity | a force that pulls objects toward each other (L #80) |

H

| | |
|------------------|--|
| hand lens | a tool that is used to magnify or make something look larger (L #12) |
| herbivore | an animal that eats only plants (L #22) |
| horizon | another word for soil layers (L #39) |

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Glossary

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|-----------------------|--|
| humus | the decayed remains of plants and animals (L #39) |
| hurricane | a large tropical storm with wind speeds of 74 mph or more; it forms over warm, tropical waters (L #52) |
| hypothesis | an educated guess, or a possible answer to a question (L #1) |
| I | |
| ice sheet | a type of glacier found in Greenland and Antarctica; covered much of the Earth long ago (L #35) |
| inclined plane | a simple machine that makes lifting and moving things a lot easier; a ramp is an example (L #99) |
| inner core | the center of the Earth; the inner core is solid because there is so much pressure on it; it is almost as hot as the sun (L #77) |
| insulator | something that does not let electricity flow through it easily (L #94) |
| invertebrate | an animal without a backbone (L #17) |
| investigation | a study a scientist conducts when there is a problem or a question to be answered (L #1) |
| L | |
| landslide | the sliding of a mass of loosened rock or earth down a hillside or slope (L #36) |
| larva | the second stage of metamorphosis (L #23) |
| leaf | the part where the plant makes its food (L #4) |
| lever | a bar that pivots, or turns, on a fixed point (L #97) |
| liquid | a state of matter that takes the shape of its container (L #66) |
| living | alive; living things need food, water, and air in order to live (L #1) |
| loam | a mixture of all of the types of soil: humus, clay, silt, and sand; great for growing crops (L #41) |

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Glossary

M

| | |
|----------------------|---|
| magnet | a piece of metal that attracts iron and steel (L #92) |
| mammal | a vertebrate that has hair or fur, is warm-blooded, and gives birth to live young (L #14) |
| mantle | the layer of the Earth below the crust; where magma is formed (L #77) |
| matter | anything that takes up space (L #65) |
| metamorphosis | the series of changes in appearance from birth to adulthood in some animals (L #23) |
| meteor | a shooting star; meteors are usually very tiny (L #105) |
| microscope | a tool scientists use to magnify an object; helps to view objects which cannot be seen with only the eyes |
| mimicry | imitating the look of another animal (L #46) |
| moon phases | different shapes of the moon seen at different times, having to do with the position of the moon and the sun (L #101) |

N

| | |
|--------------------|---|
| nonliving | not alive (L #1) |
| nonvascular | describes a plant that absorbs water through its surfaces like a sponge; there are no tubes to transport water and nutrients (L #8) |

O

| | |
|-------------------|---|
| omnivore | an animal that eats both plants and other animals (L #22) |
| opaque | materials that do not allow any light to pass through (L #86) |
| outer core | the layer of the Earth below the mantle; the outer core is liquid (L #77) |

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Glossary

P

| | |
|------------------------|--|
| permafrost | a layer of frozen subsoil found in the tundra (L #59) |
| photosynthesis | the process by which plants use energy from sunlight to turn water and carbon dioxide into sugar (L #13) |
| physical change | a change that does not create some new substance (cutting paper, ice-cube melting) (L #67) |
| pitch | the highness or lowness of a sound (L #91) |
| poles | the ends on a magnet (L #92) |
| population | a group of organisms of the same kind (L #55) |
| precipitation | any form of water that falls to the ground (rain, snow, sleet, or hail) (L #51) |
| predator | an animal that hunts another animal for food (L #19) |
| prey | an animal that is hunted by another animal for food (L #19) |
| producer | an organism that makes its own food (L #20) |
| pulley | a simple machine that is made up of a rope that is fitted around a fixed wheel (L #98) |
| pupa | a stage of metamorphosis in which the organism is wrapped in a cocoon (L #23) |

R

| | |
|-------------------|---|
| rainforest | dense forest located along the equator that gets up to 33 feet of rain per year; home to millions of plants and animals (L #58) |
| recycle | to conserve resources by reusing the same resource (L #61) |
| reflection | light bouncing off the surface of an object (L #85) |
| repel | to push away (L #92) |
| reptile | a vertebrate that has dry, scaly skin and lays eggs on land (L #15) |
| root | a part of a plant that takes in water and nutrients from the soil (L #4) |

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S

| | |
|---------------------------|---|
| sand | a type of soil that has tiny grains of rock that can easily be seen with the eyes (L #41) |
| scientific method | an organized plan that a scientist uses to conduct a study (L #1) |
| screw | a simple machine used to hold two or more objects together or to lift an object (L #101) |
| seed | the first stage of life for many plants; contains the food to help a new plant grow (L #4) |
| seismograph | an instrument that shows the movement of the Earth's surface during an earthquake (L #34) |
| silt | a type of soil made of tiny grains of rock (L #41) |
| simple machine | a tool with few or no moving parts that makes work easier (L #97) |
| soil | a mixture of many different things: sand, silt, clay, and humus (L #41) |
| solar system | a group of objects that revolve around the sun (L #105) |
| solid | matter that has a definite shape and takes up a definite amount of space (L #65) |
| sound | a form of energy that travels in waves (L #91) |
| static electricity | an electric charge that builds up on an object (L #93) |
| stationary front | a front that stays in one place for many days (L #27) |
| stem | the part of a plant that holds it upright; the stem carries water and nutrients from the roots to the leaves (L #4) |
| stratus | the lowest clouds in the sky; they look like a blanket of clouds (L #30) |
| subsoil | the middle layer of soil in which the soil particles are larger and not as dark as topsoil; contains small pieces of rock (L #39) |

Help Pages

Glossary

T

- taiga** a cold forest found south of the tundra and north of the deciduous forests; largest ecosystem in the world; means “forest” (L #60)
- topsoil** the top layer of soil; topsoil contains a lot of humus; plants grow best there (L #39)
- translucent** describes materials that let some light pass through (L #86)
- transparent** describes materials that let most of the light pass through (L #86)
- tundra** a cold and treeless ecosystem; found in Alaska, Greenland, Canada, Europe, and Russia (L #59)

V

- vascular** describes plants that have tube-like structures that transport water from the roots to the stem and leaves (L #7)
- vertebrate** an animal with a backbone (L #14)
- vibrate** to move back and forth (L #91)
- volcano** both the vent and the cone-like mountain left by the overflow of erupted lava, ash, and rock (L #33)

W

- warm front** a type of air mass that usually moves slowly and brings steady rain, rather than thunderstorms; appears on a weather map as a red line with half circles (L #27)
- warm-blooded** describes an animal whose body temperature remains constant regardless of the temperature surrounding it; the animal can maintain its internal body temperature (L #15)
- water cycle** the continuous movement and recycling of water throughout the environment (L #48)
- weather map** a map showing what the weather is like over a specific geographic area at a specific time (L #28)


Help Pages


Glossary

| | |
|-----------------------|--|
| weathering | the breakdown of rocks and minerals on the Earth's surface (L #42) |
| wedge | a simple machine made up of two inclined planes placed back to back (L #102) |
| wheel-and-axle | a simple machine made of a small cylinder or an axle attached to a larger wheel (L #100) |
| work | something that is done when a force is used to move an object (L #96) |

Help Pages


Invertebrate Fact Cards


| Cockroach | |
|-----------------|--|
| Facts: | Cockroaches are found everywhere in the world except in the polar regions. There are about 3,500 species of cockroach; most live in the tropics. The most likely place to see a cockroach is indoors. Cockroaches usually come out at night. |
| Diet: | Cockroaches will eat almost anything they come across, including dead animals and animal droppings. However, plant matter makes up most of their diet. Cockroaches will also eat paper, glue, and even wallpaper in a home. |
| Breeding | Cockroaches lay 5–50 eggs which are fully grown in 3–6 months.  |
| Group: | Insect |

| Cricket | |
|-----------------|--|
| Facts: | Even though crickets have wings, most do not fly. Most get around by jumping from place to place. A cricket usually lives less than 1 year. They make a song by rubbing their otherwise useless wings together. |
| Diet: | Crickets eat green leaves, fresh seedlings, garden fresh fruits, and tomatoes; they are also known to feed on smaller insects. |
| Breeding | One female cricket can lay as many as 2,000 eggs in the fall, and the eggs will hatch in the spring. The baby crickets are called nymphs.  |
| Group: | Insect |

Help Pages


Invertebrate Fact Cards

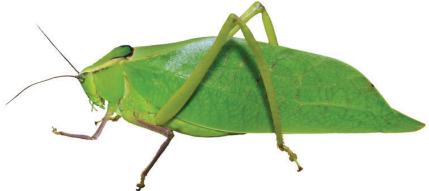
| Grasshopper | |
|-----------------|---|
| Facts: | Grasshoppers can be found in most places in the world where there are plants. Most species have wings; many have two sets of wings. They can hop 25 cm. Grasshoppers are good at camouflaging themselves for protection against predators. They make sounds by rubbing their back legs against their wings. |
| Diet: | Grasshoppers eat leaves, flowers of plants, and grass.  |
| Breeding | Grasshoppers lay between 3 and 100 eggs. When they first hatch, they look like tiny worms. They go through a process called molting or shedding their skin. Each time they shed their skin, they grow larger. |
| Group: | Insect |

| Honeybee | |
|-----------------|--|
| Facts: | Bees live in large colonies. They make honey, which is their source of food during the winter months. Life span: Queen bee: 7 years, drones: 4–5 weeks, and workers: 8 weeks |
| Diet: | Bees live on nectar and pollen.  |
| Breeding | In the 1–7 years of her life, the queen bee will lay up to 1,500 eggs. |
| Group: | Insect |

Help Pages

Invertebrate Fact Cards

| Housefly | |
|-----------------|--|
| Facts: | One housefly can carry over a million bacteria, which can spread disease. The housefly loves garbage dumps and sewers. It cannot chew or swallow solid food, so it must suck it up in liquid form. |
| Diet: | Houseflies consume mainly rotting flesh, fruit, and excrement.  |
| Breeding | The housefly can lay up to 900 eggs in batches of 120–150 at a time. It takes only about 1 week to develop from an egg to an adult. |
| Group: | Insect |

| Katydid | |
|-----------------|--|
| Facts: | Katydids are mainly nocturnal. Their green color and ability to remain still during the day helps them to avoid predators. Most katydids live in trees, but some live in tall grasses or weeds. Katydids make their songs by rubbing the base of their front wings together. |
| Diet: | Katydids eat mostly leaves, shrubs, weeds, and occasionally other insects.  |
| Breeding | Katydids lay up to 50 eggs. Their lifespan is about one year. |
| Group: | Insect |

Help Pages

Invertebrate Fact Cards

| Praying Mantis | |
|-------------------|--|
| Facts: | The praying mantis can be found in many habitats, including the desert, the forest, and the grasslands. There are over 2,000 different species of mantises found around the world. |
| Diet: | The praying mantis eats insects, spiders, and even other praying mantises. |
| Defense: | The praying mantis uses camouflage as one type of defense. Birds are a major enemy of the praying mantis. In an effort to discourage them, the mantis will strike out with its spiny forelegs. |
| Life Span: | about 10–12 months |
| Group: | Insect |



| Tarantula | |
|-------------------|---|
| Facts: | There are about 40 types of tarantulas found in the United States. Most of these are found in the deserts of the Southwest. |
| Diet: | Tarantulas eat beetles, spiders, grasshoppers, moths, and millipedes. Some larger species eat lizards, snakes, frogs, toads, and mice. |
| Defense: | The tarantula has several defenses. Some tarantulas lean back on their haunches and expose their long fangs. Other species squirt an unpleasant substance into their predator's face. A third defense comes from the hairs on its abdomen. These hairs have sharp points that can cause pain or blindness if they come into contact with the eyes or skin of an animal. |
| Life Span: | about 30 years or more |
| Group: | Spider |



Help Pages

Ecosystem Fact Cards

Deciduous Forest

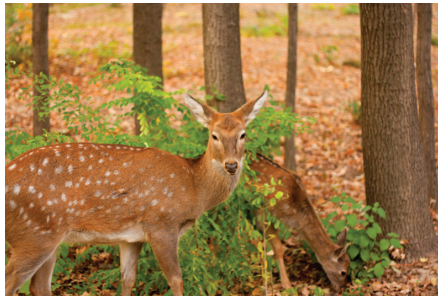
Forests occupy one-third of Earth's land area. The temperate deciduous forest can be found in most of the eastern United States and a small strip of southern Ontario, Canada. The dominant plant species of this biome is broad-leaved deciduous trees. Trees such as oak, hickory, beech, maple, and elm live here. Evergreens, like pine, may also be found.

The deciduous forest has four distinct seasons. The leaves of deciduous trees change color and fall off in the autumn and grow back in the spring. Temperate deciduous forests get between 30 and 60 inches of precipitation a year.

The animals that live in the forest are squirrels, deer, fox, rabbits, skunks, birds, raccoons, and black bears, to name a few.



deciduous forest



deer



fox

Grasslands

Grasslands are dry and usually flat areas of land that are hot in the summer and cold in the winter. They get more rain and snow than deserts, but less than some other ecosystems.

Food crops tend to grow well in the grasslands. Due to the hot, dry summers, a large number of fires can occur. These fires cause great changes to the grasslands.

The main plant of the grasslands is grass, but bushes and wildflowers also grow there. There are very few trees and shrubs in the grasslands.

Some animals of the grasslands include bison, coyotes, mice, rabbits, owls, hawks, and snakes. Many insects can be found in the grasslands as well.



bison



wildflowers



grasses

Help Pages

Ecosystem Fact Cards

Rainforest

Rainforests have tall trees, a warm climate, and lots of rain. Rainforests can be found in Australia, Africa, Asia, and Central and South America. The largest rainforest in the world is the Amazon rainforest in South America.

Rainforests cover less than 2% of the Earth's surface but are home to more than 50% of all of the plants and animals on Earth. Insects are the most numerous animal in the rainforest. Some other animals found in the rainforest include jaguar, ocelot, gorilla, lemur, orangutan, bat, leaf cutter ant, poison arrow frog, toucan, macaw, sloth, wild boar, chameleon, and boa constrictor.

Some foods that originally came from the rainforest include cashews, bananas, pineapple, coffee, tea, yams, cinnamon, cocoa, and peanuts. The rainforest gets 7 to 33 feet of rain each year. Some rainforests get an inch of rain per day.



macaw



ape



jaguar

Taiga

Taiga is the Russian word for "forest." It is the largest ecosystem in the world. The taiga is located south of the tundra. Winters in the taiga are very cold with lots of snow. The summers are warm, rainy, and humid. Many coniferous trees (evergreens) grow in the taiga. The taiga doesn't have as much plant and animal life as deciduous forests or the rainforest, but millions of insects live there in the summertime, and birds migrate there every year.

The main seasons are winter and summer. Spring and fall are so short, it's as if they are not seasons at all. Not many plants can survive the harsh weather conditions, but there are some lichens and mosses, as well as pine trees, white spruce, Douglas fir, and hemlock that can grow there. Some animals found in the taiga include lynx, wolverine, bobcat, mink, elk, red deer, moose, and snowshoe rabbit.



evergreen trees



moose



wolverine

Help Pages

Ecosystem Fact Cards

Tundra

The word *tundra* means “treeless plain.” The Arctic tundra is one of the Earth’s coldest, harshest, and windiest ecosystems. The Arctic tundra is located in northern Greenland, Alaska, Canada, Europe, and Russia.

Because of the frozen soil, called **permafrost**, it is impossible for trees to grow there. The tundra is snow-covered for much of the year. The growing season lasts for only 50–60 days out of the year. The plant life consists mainly of mosses, lichen, small shrubs, and grasses. Some animals found in the tundra include Arctic foxes, caribou, lemmings, polar bears, reindeer, wolves, weasels, snowy owls, and snow geese.



polar bear



Arctic fox



caribou

Help Pages

The Scientific Method

When scientists have a problem or a question, they use an organized plan, called the **scientific method**, to conduct a study, called an **investigation**. There are 5 steps for planning and conducting an investigation.

Step 1: Observing and Asking Questions

During this step, you use your senses to gather information. You may begin to think of some questions about what you are observing. You may also discover some things you don't know, but would like to find out more about.

Step 2: Forming a Hypothesis

A hypothesis is a possible answer to one of the questions about your observations. It is a logical guess. A hypothesis can be tested to see if it is correct and should be written in a complete sentence.

Step 3: Planning an Experiment

An experiment is a test that is done to see if your hypothesis is correct or not. When you plan an experiment, you need to describe the steps, list the materials you will need, identify the variables, and decide how you will gather and record your data.

Step 4: Conducting an Experiment

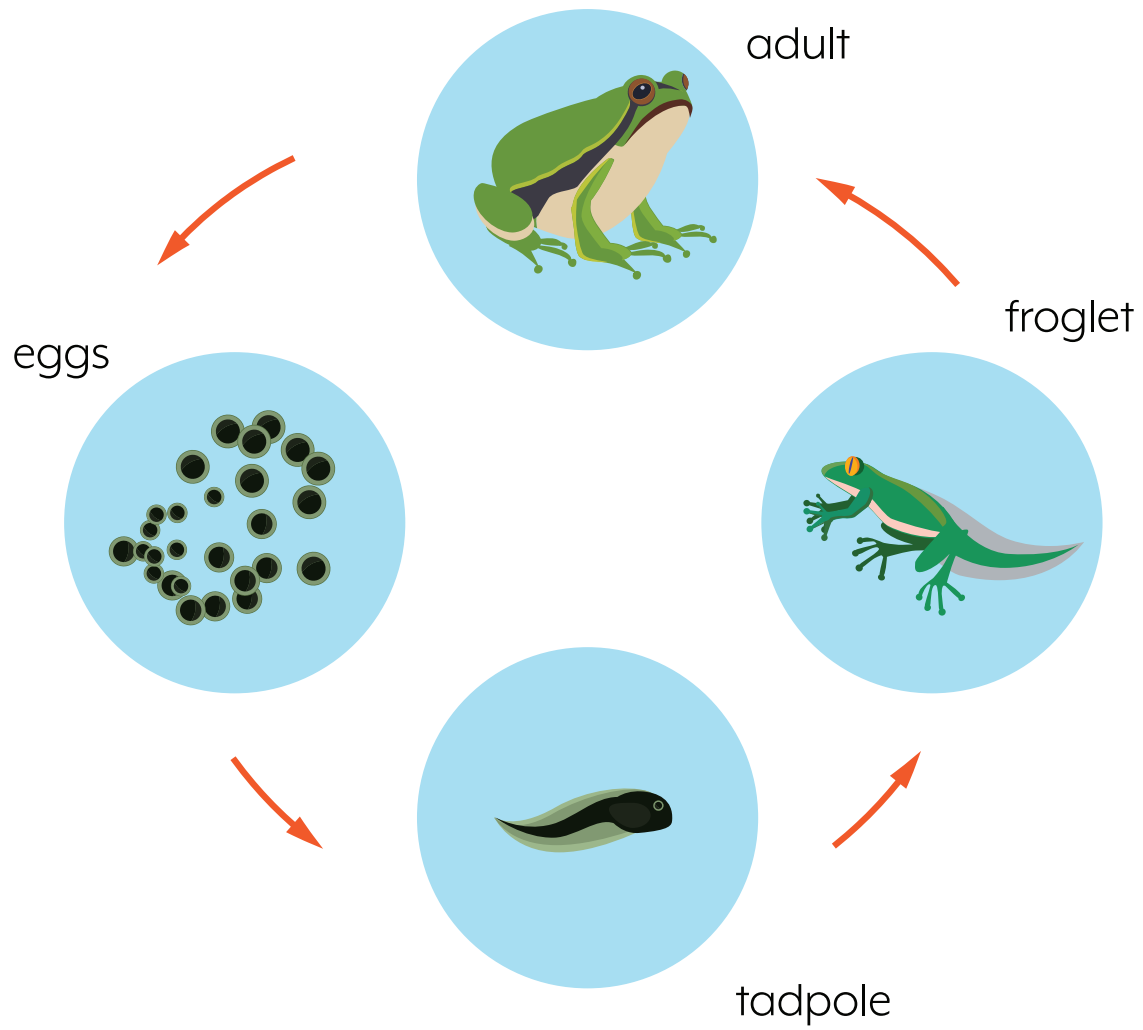
Follow the steps of the experiment you planned in step 3. Observe carefully, and record your information accurately.

Step 5: Drawing Conclusions

Look at all of the information you have collected. You can make graphs and charts to summarize the results. Write a conclusion and decide whether your hypothesis was correct. Share your results.

Help Pages




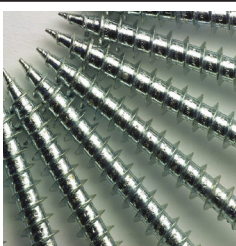
Frog Metamorphosis



Help Pages

Simple Machines






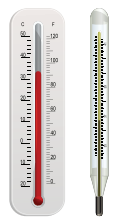

A **simple machine** is a tool with few or no moving parts. It makes work easier. There are six simple machines.

| | | |
|-----------------------|---|---|
| Lever | A lever is a bar that pivots or turns on a fixed point. The fixed point is called the fulcrum. A broom is an example of a lever. Some other examples of levers are a shovel , a broom , your arm , and a fishing pole . |  |
| Pulley | A pulley is made of a rope that is fitted around a fixed wheel. It changes the direction of a force. You pull one end of the rope one way, and the other end moves in the opposite direction. Pulleys are found on cranes , window blinds , sailboats , and flagpoles . |  |
| Wheel-and-Axle | A wheel-and-axle is made up of a small cylinder or an axle attached to the center of a larger wheel. The wheel and axle are connected so that they turn together. Examples of a wheel-and-axle are a screwdriver , a faucet , a doorknob , and a steering wheel . |  |
| Inclined Plane | An inclined plane makes lifting and moving things easier. A ramp is an example of an inclined plane. |  |
| Screw | A screw is a simple machine that you turn to hold two or more objects together or to lift an object. A screw looks like a nail with threads around it. |  |
| Wedge | A wedge is made up of two inclined planes placed back to back. You use a wedge to force two things apart or to split one thing into two things. Some examples of wedges are an axe , a chisel , and a knife . |  |

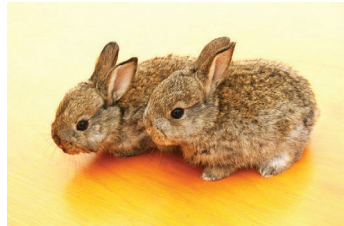





Help Pages

| Planets | |
|---------------------------|---|
| Mercury (inner) | closest planet to the sun; has craters |
| Venus (inner) | about the same size as Earth; covered with mountains, volcanoes |
| Earth (inner) | only planet to support life; most of the planet made up of water |
| Mars (inner) | known as the Red Planet; has huge dust storms |
| Jupiter (outer) | largest planet and is made up of gases; has a giant storm called the Great Red Spot |
| Saturn (outer) | known for its many beautiful rings; has 31 moons |
| Uranus (outer) | rotates on its side; has about 27 moons |
| Neptune (outer) | windiest planet in the solar system; blue in color |

Help Pages

| Science Tools | | |
|---|--|---|
| We use tools to help us observe, measure, or study objects. | | |
| Anemometer | An anemometer is an instrument that measures the speed of the wind |  |
| Weather Vane | A weather vane is an instrument that measures the direction of the wind. |  |
| Balance | A balance is a tool that is used to measure the mass of objects. When you place an object on one pan and another object on the other pan, you are able to compare the objects' masses. |  |
| Hand lens | This tool is used to magnify an object, or make it look larger. |  |
| Microscope | A microscope is a tool used to magnify objects. Microscopes are helpful to see objects that are too small to see with your eyes alone. |  |
| Thermometer | This tool is used to measure how hot or cold something is. |  |
| Barometer | A barometer is used to measure air pressure. |  |

Help Pages

| Vertebrate/Invertebrate Chart | | |
|-------------------------------|---|---|
| Animal Type | Description | |
| Mammal | has hair or fur; breathes with lungs; gives birth to live young; produces milk for young; warm-blooded |  |
| Reptile | has dry, scaly skin; lives near water; lays eggs; breathes with lungs; cold-blooded |  |
| Bird | has feathers, wings, and two feet; lays eggs; breathes with lungs; warm-blooded |  |
| Fish | has scales; breathes with gills; lays eggs; cold-blooded; lives whole life in water |  |
| Amphibian | lives part of its life in water and part on land; has moist skin; stays close to water; breathes with gills when born and lungs when an adult; cold-blooded |  |
| Invertebrate | has no backbone; some live on land and some in water; some crawl, some fly, and some swim |  |