Year 6 Knowledge Organisers

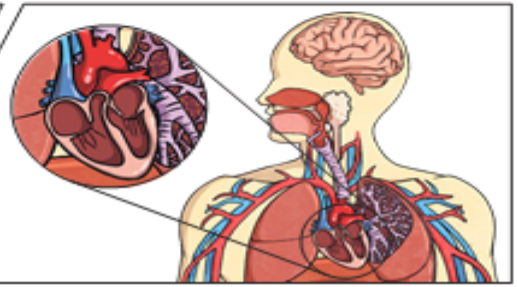
Science

Year 6 Animals including humans

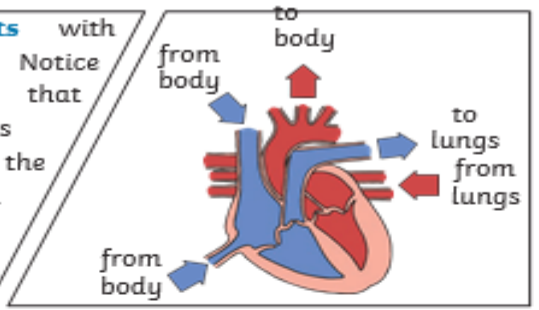
Key Vocabulary	
circulatory system	A system which includes the heart, veins, arteries and blood transporting substances around the body.
heart	An organ which constantly pumps blood around the **circulatory system**.
blood vessels	The tube-like structures that carry blood through the tissues and organs. Veins, arteries and capillaries are the three types of blood vessels.
oxygenated blood	**Oxygenated blood** has more oxygen. It is pumped from the **heart** to the rest of the body.
deoxygenated blood	**Deoxygenated blood** is blood where most of the oxygen has already been transferred to the rest of the body.

The **heart** pumps blood to the lungs to get oxygen.

It then pumps this **oxygenated blood** around the body.



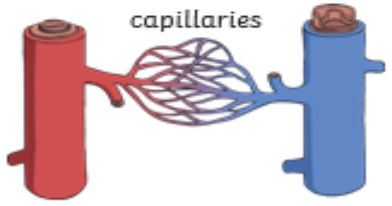
Mammals have **hearts** with four chambers. Notice how the blood that has come from the body is **deoxygenated**, and the blood that has come from the lungs is **oxygenated** again. The blood isn't actually red and blue: we just show it like that on a diagram.



deoxygenated blood ⟵ ⟶ oxygenated blood

Capillaries are the smallest **blood vessels** in the body and it is here that the exchange of water, nutrients, oxygen and carbon dioxide takes place.

Arteries carry **oxygenated blood** away from the **heart**.

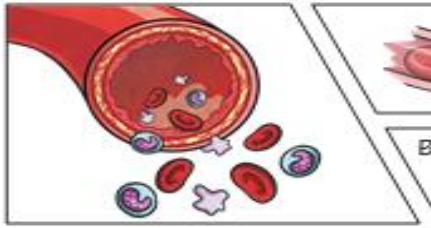


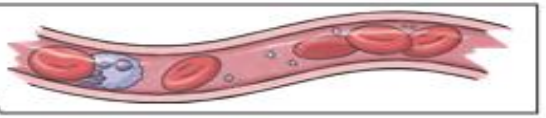
Veins carry **deoxygenated blood** toward the **heart**.

If you linked up all of the body's blood vessels, including arteries, capillaries, and veins, they would measure over 60,000 miles.

Year 6 Animals including humans

Key Vocabulary	
drug	A substance containing natural or man-made chemicals that has an effect on your body when it enters your system.
alcohol	A **drug** produced from grains, fruits or vegetables when they are put through a process called fermentation.
nutrients	Substances that animals need to stay alive and healthy.





Blood transports:

- gases (mostly oxygen and carbon dioxide);
- **nutrients** (including water);
- waste products.

The liquid part of blood contains water and protein. This is called plasma.

Plasma is liquid. The other parts of your blood are solid.

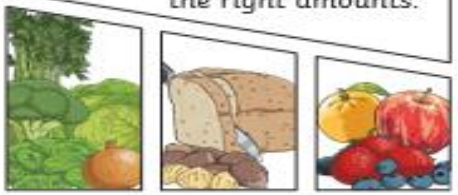
Red blood cells carry oxygen through your body.

Platelets help you stop bleeding when you get hurt.

White blood cells fight infection when you're sick.

Drugs, **alcohol** and smoking have negative effects on the body.

A healthy diet involves eating the right types of **nutrients** in the right amounts.



Regular exercise:

- strengthens muscles including the heart muscle;
- improves circulation;
- increases the amount of oxygen around the body;
- releases brain chemicals which help you feel calm and relaxed;
- helps you sleep more easily;
- strengthens bones.

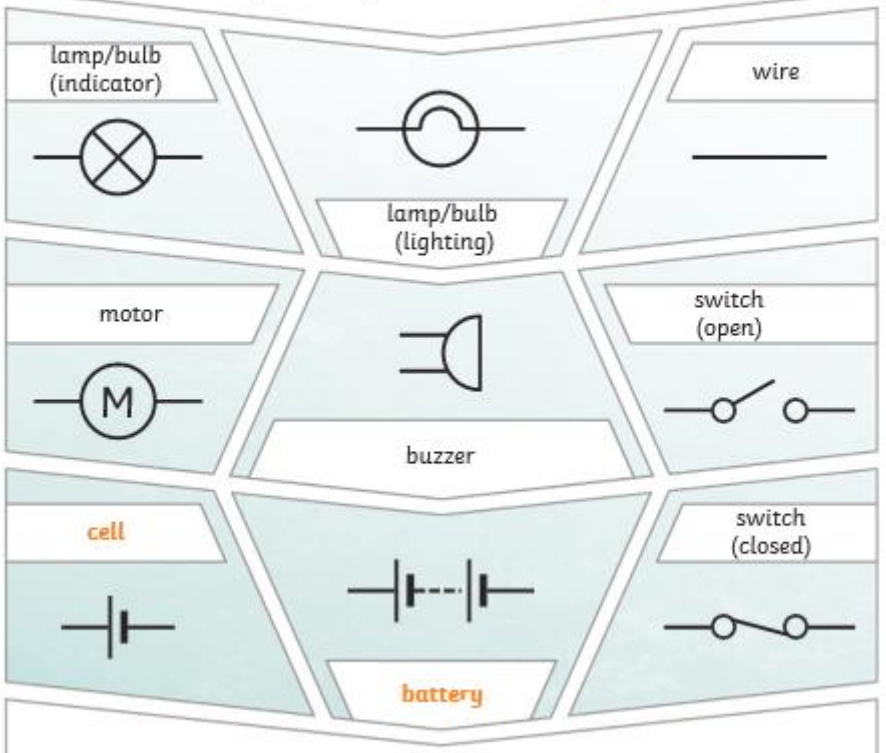
It can even help to stop us from getting ill.

Year 6 Electricity

Key Vocabulary	
circuit	A path that an electrical current can flow around.
symbol	A visual picture that stands for something else.
cell/battery	A device that stores energy as a chemical until it is needed. A cell is a single unit. A battery is a collection of cells.
current	The flow of electrons, measured in amps.
amps	How electric current is measured.
voltage	The force that makes the electric current move through the wires. The greater the voltage, the more current will flow.
resistance	The difficulty that the electric current has when flowing around a circuit.
electrons	Very small particles that travel around an electrical circuit.

Key Knowledge

Components of a Circuit and Their Symbols



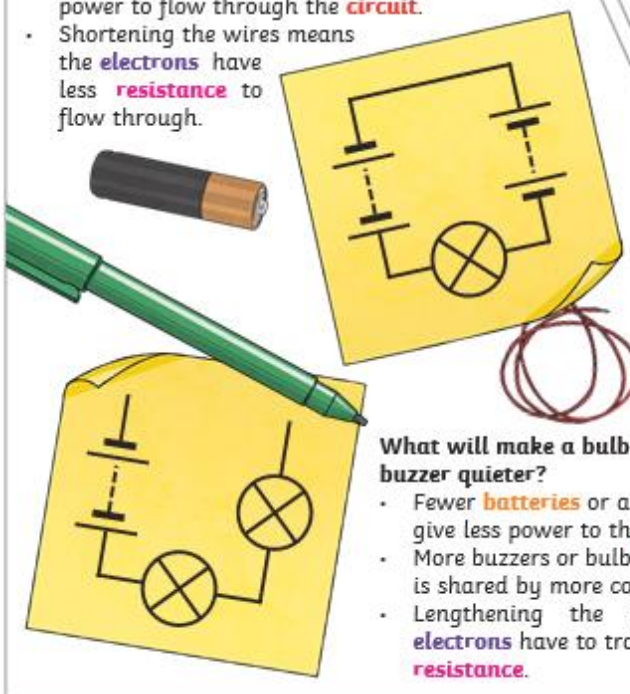
These symbols can be used to create electrical circuit diagrams.

Year 6 Electricity

Key Knowledge

What will make a bulb brighter or a buzzer louder?

- More **batteries** or a higher **voltage** create more power to flow through the **circuit**.
- Shortening the wires means the **electrons** have less **resistance** to flow through.

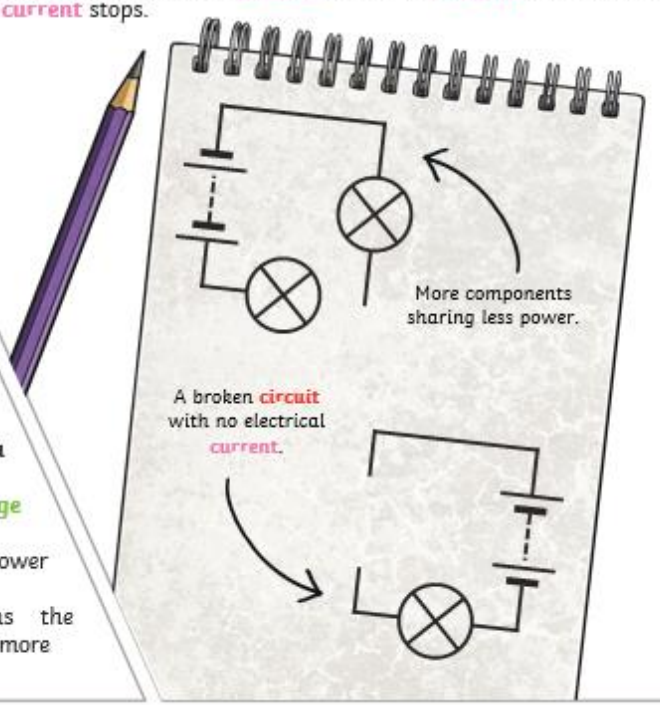


What will make a bulb dimmer or a buzzer quieter?

- Fewer **batteries** or a lower **voltage** give less power to the **circuit**.
- More buzzers or bulbs mean the power is shared by more components.
- Lengthening the wires means the **electrons** have to travel through more **resistance**.

Series Circuit

A **circuit** that has only one route for the **current** to take. If more bulbs or buzzers are added, the power has to be shared and so they will be dimmer or quieter. If just one part of this series **circuit** breaks, the **circuit** is broken and the flow of **current** stops.

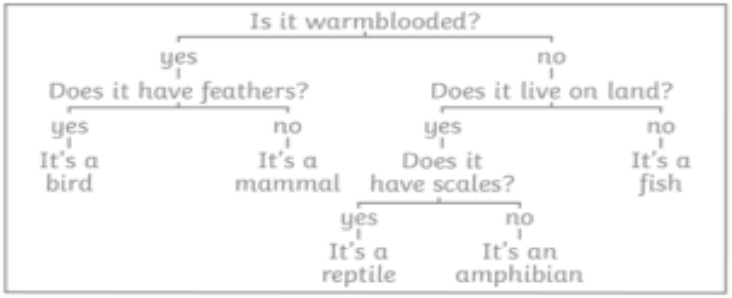


Year 6 Living things and their habitat

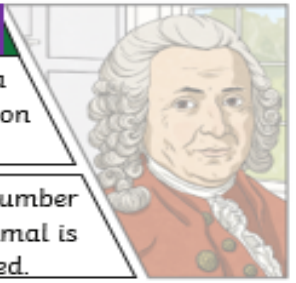
Key Vocabulary

characteristics	Special qualities or appearances that make an individual or group of things different to others.
classify	To sort things into different groups
taxonomist	A scientist who classifies different living things into categories.
key	A **key** is a series of questions about the **characteristics** of living things. A **key** is used to identify a living thing or decide which group it belongs to by answering 'yes' or 'no' questions.

Scientists, called Taxonomists, sort and group living things according to their similarities and differences.



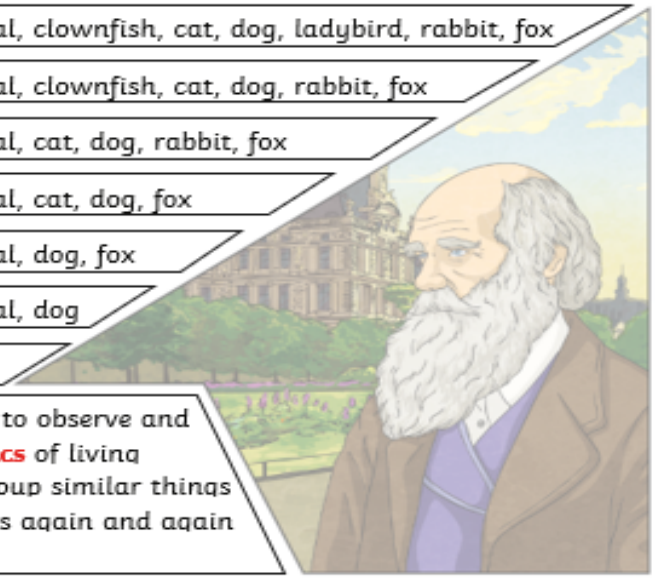
Classification



In 1735, Swedish Scientist Carl Linnaeus first published a system for **classifying** all living things. An adapted version of this system is still used today: The Linnaeus System.

Living things can be **classified** by these eight levels. The number of living things in each level gets smaller until the one animal is left in its species level. This is how a dog would be classified.

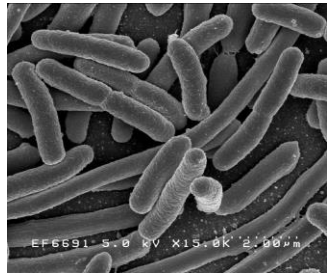
Domain: Eukarya	jackal, clownfish, cat, dog, ladybird, daisy, rabbit, fox
Kingdom: Animals	jackal, clownfish, cat, dog, ladybird, rabbit, fox
Phylum: Chordata	jackal, clownfish, cat, dog, rabbit, fox
Class: Mammals	jackal, cat, dog, rabbit, fox
Order: Carnivore	jackal, cat, dog, fox
Family: Canidae	jackal, dog, fox
Genus: Canis	jackal, dog
Species: Lupus	dog



Each group allows scientists to observe and understand the **characteristics** of living things more clearly. They group similar things together then split the groups again and again based on their differences.

Year 6 Living things and their habitat

Key Vocabulary	
Bacteria	A single-celled **microorganism**
Microorganism	An organism that can only be seen using a **microscope**, e.g. **bacteria**, mould and yeast
Microscope	A piece of equipment that is used to view very tiny (**microscopic**) things by magnifying their appearance.
Species	A group of animals that can reproduce to produce fertile offspring

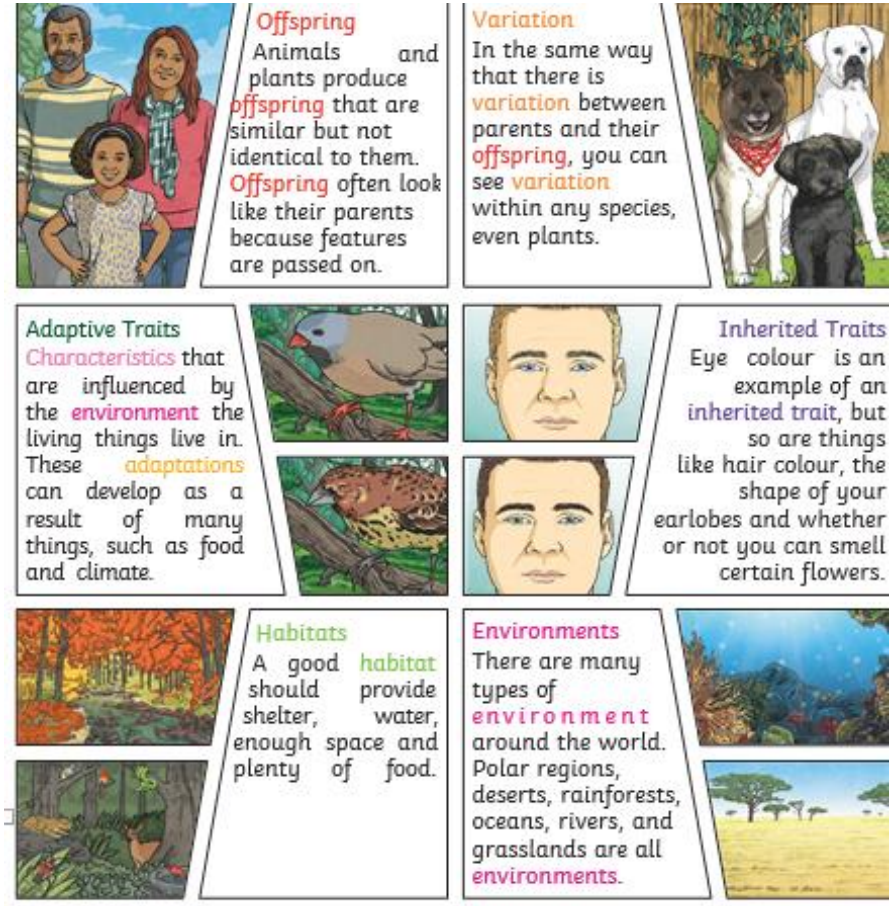


Microorganisms are viruses, **bacteria**, moulds and yeast. Some animals (dust mites) and plants (phytoplankton) are also **microorganisms**.
Microorganisms are very tiny living things that can only be seen using a **microscope**. They can be found in and on our bodies, in the air, in water and on objects around us.

Helpful microorganisms	Unhelpful Microorganisms
Bacteria – cheese	**Bacteria** – salmonella is a bacterium that can lead to food poisoning
Yeast- Wine	Virus – chicken pox and flu are examples of viral diseases
Bacteria- Yoghurt	Fungi – athlete's foot
Yeast – bread dough	**Bacteria** – plaque
Penicillium fungi - antibiotics	Fungi - mould

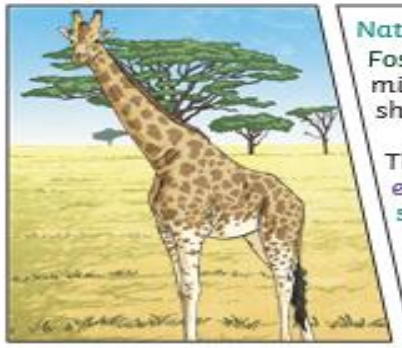
Year 6 Evolution and Inheritance

Key Vocabulary	
offspring	The young animal or plant that is produced by the reproduction of that species.
inheritance	This is when characteristics are passed on to offspring from their parents.
variations	The differences between individuals within a species.
characteristics	The distinguishing features or qualities that are specific to a species.
adaptation	An adaptation is a trait (or characteristic) changing to increase a living thing's chances of surviving and reproducing.
habitat	Refers to a specific area or place in which particular animals and plants can live.
environment	An environment contains many habitats and includes areas where there are both living and non- living things.



Year 6 Evolution and Inheritance

Key Vocabulary	
evolution	Adaptation over a very long time.
natural selection	The process where organisms that are better adapted to their environment tend to survive and produce more offspring.
fossil	The remains or imprint of a prehistoric plant or animal, embedded in rock and preserved.
adaptive traits	Genetic features that help a living thing to survive.
inherited traits	These are traits you get from your parents. Within a family, you will often see similar traits, e.g. curly hair.

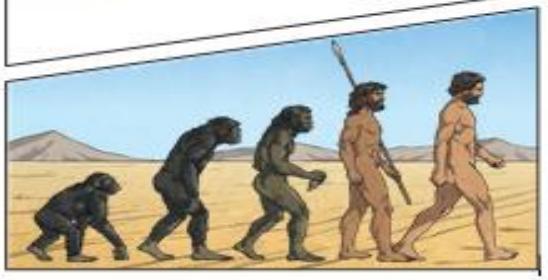


Natural Selection

Fossils of giraffes from millions of years ago show that they used to have shorter necks. They have gradually evolved through natural selection to have longer necks so that they can reach the top leaves on taller trees.

Fossils are the preserved remains, or partial remains, of ancient animals and plants. Fossils let scientists know how plants and animals used to look millions of years ago. This is proof that living things have evolved over time.

Evolution is the gradual process by which different kinds of living organism have developed from earlier forms over millions of years. Scientists have proof that living things are continuously evolving - even today!



Living Things		Habitat		Adaptive Traits
polar bear		arctic		Its white fur enables it to camouflage in the snow.
camel		desert		It has wide feet to make it easier to walk in the sand.
cactus		desert		It stores water in its stem.
toucan		rainforest		Its narrow tongue allows it to eat small fruit and insects.

Year 6 Light

Key Vocabulary	
light	A form of energy that travels in a wave rom a source.
light source	An object that makes its own **light**.
reflection	**Reflection** is when **light** bounces off a surface, changing the direction of a ray of **light**.
incident ray	A ray of **light** that hits a surface.
reflected ray	A ray of **light** that has bounced back after hitting a surface
the law of reflection	The law states that the angle of the **incident ray** is equal to the angle of the **reflected ray**.

Key Knowledge

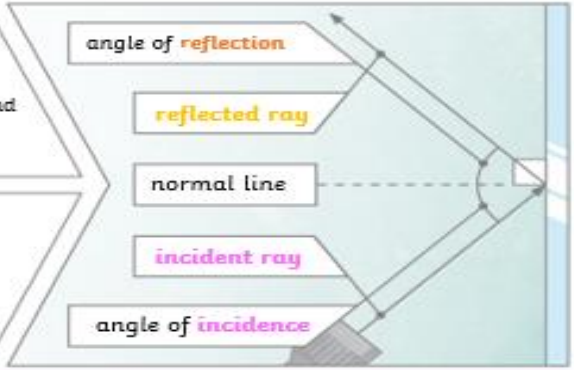
We need **light** to be able to see things. **Light** waves travel out from sources of **light** in straight lines. These lines are often called rays or beams of **light**.

Light from the sun travels in a straight line and hits the chair. The **light** ray is then **reflected** off the chair and travels in a straight line to the girl's eye, enabling her to see the chair.

The law of reflection states that the angle of **incidence** is equal to the angle of **reflection**. Whenever **light** is **reflected** from a surface, it obeys this law.

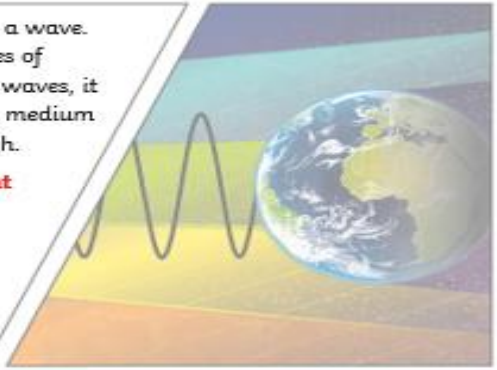
The angle of **reflection** is the angle between the normal line and the **reflected ray** of **light**.

The angle of **incidence** is the angle between the normal line and the **incident ray** of **light**.



Light travels as a wave. But unlike waves of water or sound waves, it does not need a medium to travel through.

This means **light** can travel through a vacuum - a completely airless space.



Year 6 Light

Key Vocabulary	
refraction	This is when light bends as it passes from one medium to another. E.g Light bends when it moves from air into water.
visible spectrum	Light that is visible to the human eye. It is made up of a colour
prism	A prism is a solid 3D shape with flat sides. The two ends are an equal shape and size. A transparent prism separates out visible light into all the colours of the spectrum.
shadow	An area of darkness where light has been blocked.
transparent	Describes objects that let light travel through them easily, meaning you can see through the object.
translucent	Describes objects that let some light through, but scatters the light so we can't see through them properly.
opaque	Describes objects that do not let any light pass through them.

Key Knowledge

The spoon in this water looks as if it is bent. This is because light bends when it moves from air to water. When light bends in this way, it is called refraction.

A shadow is always the same shape as the object that casts it. This is because when an opaque object is in the path of light travelling from a light source, it will block the light rays that hit it, while the rest of the light can continue travelling.

Isaac Newton shone a light through a transparent prism, separating out light into the colours of the rainbow (red, orange, yellow, green, blue, indigo and violet) - the colours of the spectrum. All the colours together merge and make visible light.

Shadows can also be elongated or shortened depending on the angle of the light source. A shadow is also larger when the object is closer to the light source. This is because it blocks more of the light.