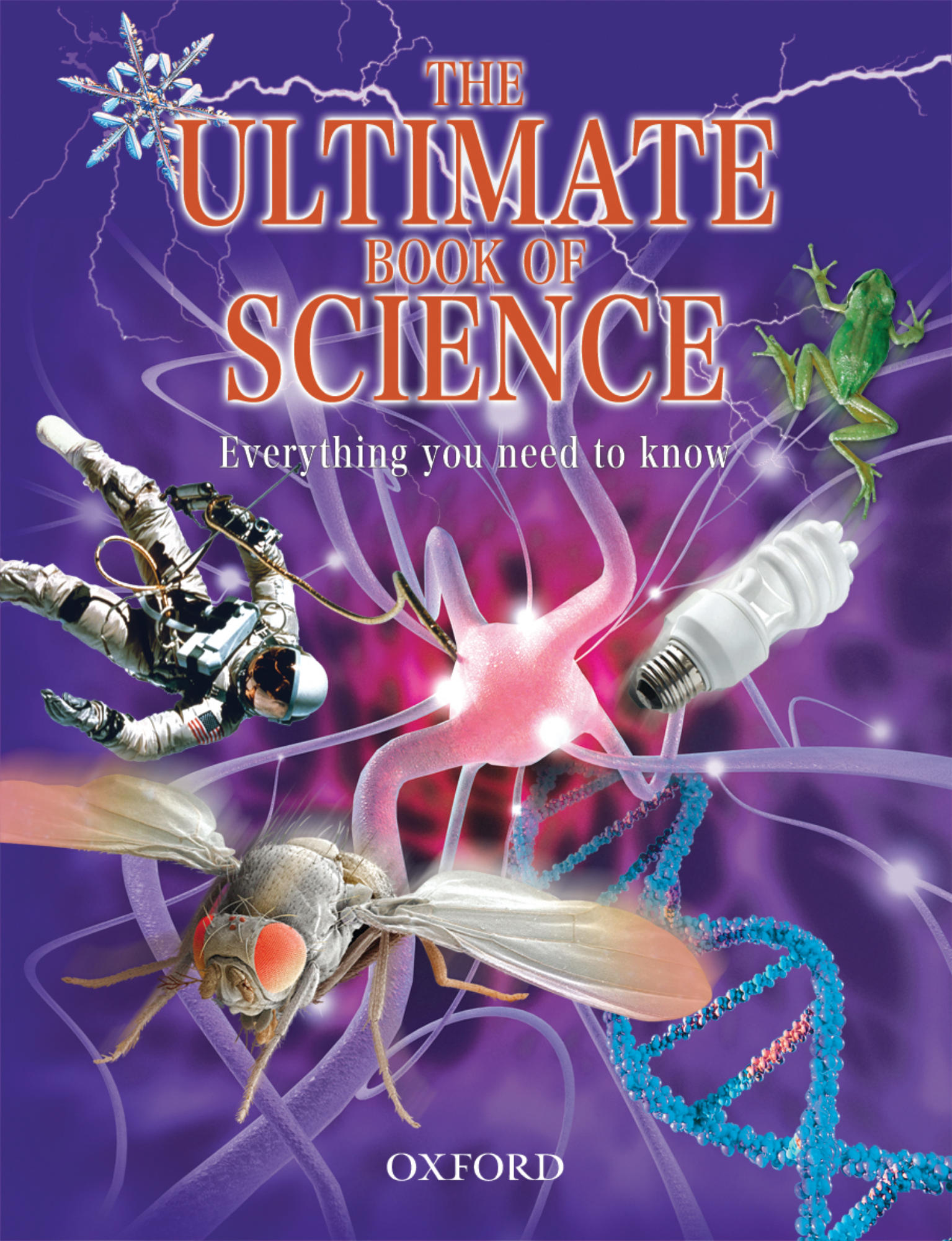

THE
ULTIMATE
BOOK OF
SCIENCE
Everything you need to know
OXFORD

Classification

Classification is a way of organizing all the living things on Earth. Scientists group together living things that share certain features.

Tiger classification

The scientific naming system was invented by a Swedish naturalist called Linnaeus in the 18th century. In his system, each group is divided into smaller groups. This table shows how a tiger is classified.

Group	Subdivision	Meaning
Kingdom	Animals	
Phylum	Chordata	Nerve cord down back
Sub-phylum	Vertebrates	Having a backbone
Class	Mammals	Animal with fur or hair, feeds on mother's milk
Order	Carnivores	Meat-eating
Family	Felidae	Cats
Genus	Panthera	Big cats
Species	Panthera tigris	Tiger

A tiger's two-part name tells us that it is a tiger (*tigris*) that belongs to the big cat group (*Panthera*).

Kingdoms to species

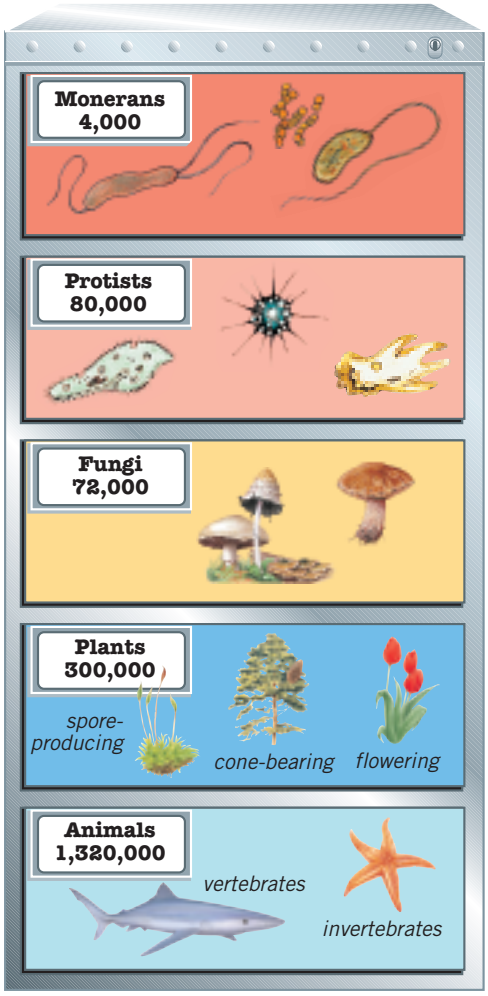
Scientists usually split living things into five kingdoms – animals, plants, fungi, protists, and monerans.

Each kingdom contains thousands of different species of living things. Gorillas are one species, and human beings are another species. A male and female of the same species can breed together.

How are living things classified?

Scientists classify living things by their shape, appearance, and the way they develop. Scientists also compare DNA and genes to help classify living things.

Today, the living world is usually divided into five kingdoms. The number beneath the name of each kingdom is the number of species found in that kingdom.



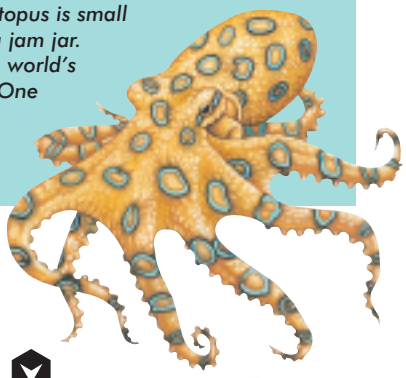
Animals

There are millions of different types of animal. Some are huge but others are tiny and can only be seen under a microscope.

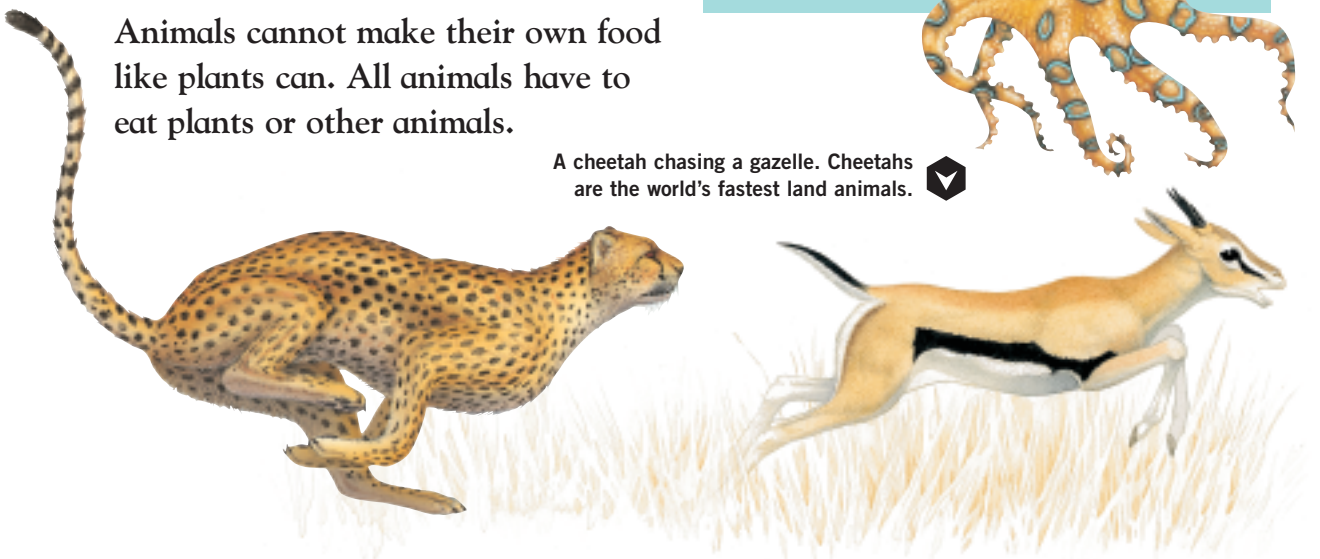
Animals cannot make their own food like plants can. All animals have to eat plants or other animals.

DID YOU KNOW?

The blue-ringed octopus is small enough to fit into a jam jar. It is also one of the world's deadliest animals. One octopus contains enough poison to kill ten people.



A cheetah chasing a gazelle. Cheetahs are the world's fastest land animals.



Warm-blooded animals

Birds and mammals can control their body temperature. This is called being warm-blooded. The animal's body stays at the same temperature no matter how hot or cold its surroundings are.

Warm-blooded animals use lots of energy keeping warm so they must eat a lot of food.

Cold-blooded animals

The body temperature of a cold-blooded animal changes when the temperature of its surroundings changes. Its blood will be warm or cold depending on the temperature around it. Cold-blooded animals use the Sun's heat to warm up. Lizards are cold-blooded animals.

Movement

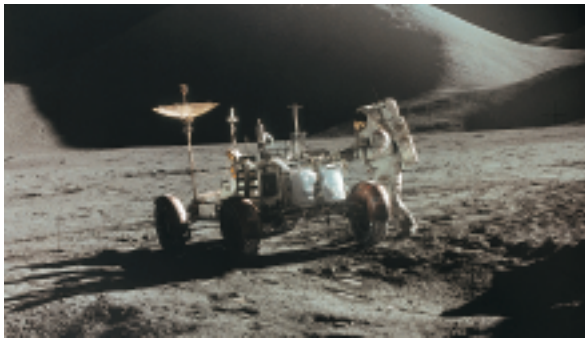
Animals must move around to find food. Most have muscles and a skeleton to do this. Most animals also have some kind of brain to control their bodies and help them move.

Anemones are animals, although they look like plants.

Moon

The Moon is the Earth's natural satellite. A satellite is something that travels around a planet.

The Moon is a ball of rock. There is no life on the Moon and hardly anything has changed there for millions of years.



This vehicle is a lunar rover. The lunar rover was used on Moon missions to explore large areas.

Landing on the Moon

Neil Armstrong and Buzz Aldrin were the first people to land on the Moon. They arrived there on 20 July 1969. The soil was grey and crunchy under their feet. The Sun shone from a completely black sky.

When astronauts visit the Moon, they collect rock samples and carry out experiments.

FAST FACTS

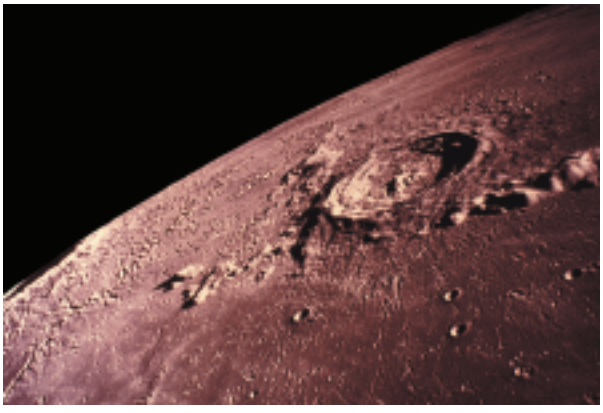
Moon data

- Diameter: 3,476 km (2,160 miles)
- Average distance from Earth: 384,400 km (238,900 miles)
- Time taken to orbit the Earth: 27.33 days
- Time taken to spin on its axis (line between the poles): 27.33 days
- Time between new Moons: 29.53 days

Craters everywhere

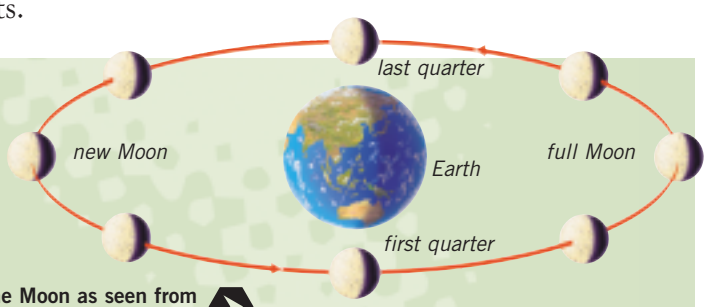
The Moon is covered with craters. Rocks crashed down from space and caused the craters. They range from a few centimetres wide to 295 kilometres (183 miles) wide.

The flat, dark areas between the craters are called seas. But they are dry, rocky land.



The Moon's phases

The Sun shines on the Moon. On the part of the Moon facing the Sun, it is daytime. The other half is in darkness and here it is night. As the Moon orbits the Earth, we see different amounts of its sunlit half. The shape of the Moon is called its phase.



The Moon as seen from space (above) and from the Earth (below).

Stars and galaxies

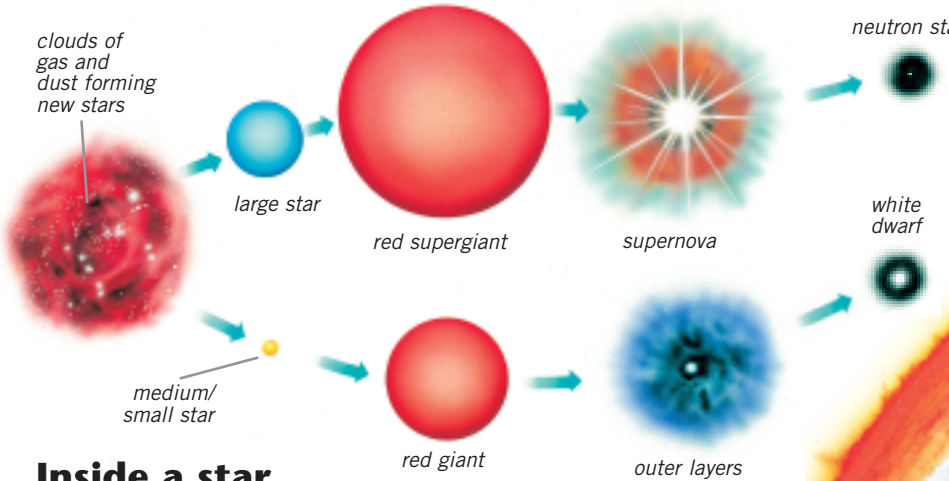
Every star is a giant ball of hot, glowing gas. Our Sun is a star. It looks different from the other stars in the sky because it is much closer to us.

Galaxies are enormous families of stars. The Sun belongs to our own galaxy, the Milky Way. Billions of galaxies are scattered through the universe.

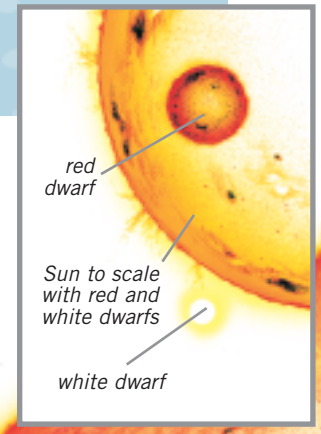
A star's life

Stars do not last forever. They are born and they die. Our Sun is about 5,000 million years old now. In another 5,000 million years, it will swell and become a red giant. Its outer layers will blow away. Eventually it will completely fade away.

Bigger stars swell and become red supergiants. Then they explode! These massive explosions are called supernovae.



Different types of star have different life cycles. The lives of a large and small star are shown here.

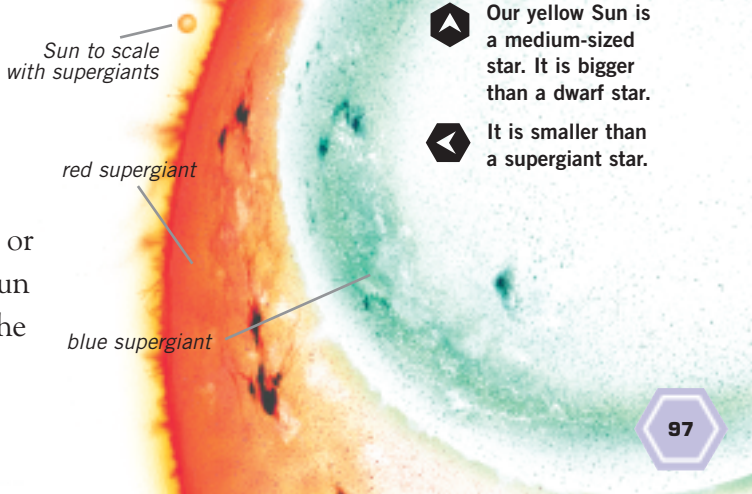


Inside a star

Hydrogen gas in a star changes into helium gas. This change produces heat and light. Every star keeps shining for billions of years because of this change.

Star colour

The colour of a star tells us its surface temperature. The hottest stars are white or bluish. The coolest stars look red. Our Sun is yellow. Its temperature is in between the two extremes.

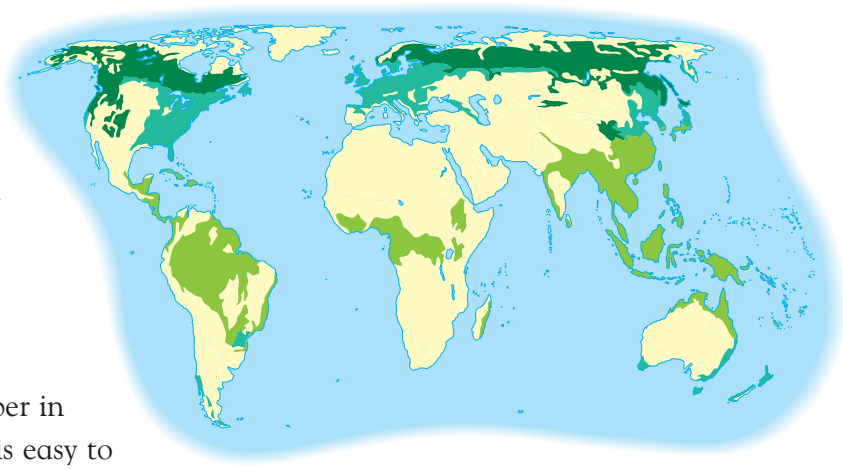


Our yellow Sun is a medium-sized star. It is bigger than a dwarf star.

It is smaller than a supergiant star.

Wood and timber

Timber is the wood from felled (cut-down) trees. Timber is one of our most useful materials. It is used in house-building, for making furniture, building boats, and much more.



The forest regions of the world.

Key

- **coniferous forest** (evergreen conifers)
- **deciduous forest** (trees lose leaves in autumn)
- **tropical forest** (evergreen broad-leaved trees)

Softwood

The most commonly used timber in building is called softwood. It is easy to work with because it is quite soft and easy to cut.

Softwood timber comes from evergreen trees such as firs, pines, cedars, and spruces. These trees grow in cool, northern regions of the world.

Hardwood

Deciduous and tropical forests contain broad-leaved trees. Hardwood timber comes from broad-leaved trees such as oak, beech, chestnut, mahogany, ebony, and teak. These are valuable timbers.

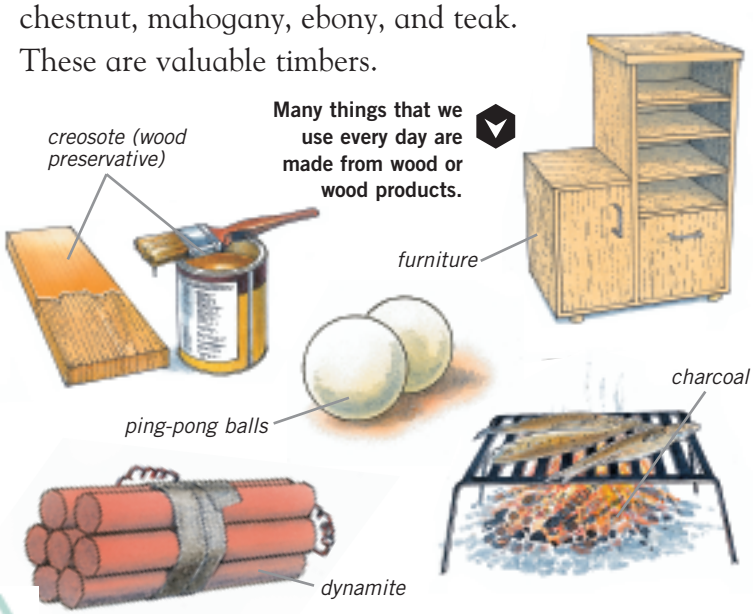
These trees are removed from the forest by truck.

From forest to sawmill

Lumberjacks are people who cut down trees into logs. The logs are taken out of the forest by tractors, animals, cables, or water slides. Next they are taken to a sawmill by truck, railway wagon, or raft.

At the sawmill, the bark is removed. The logs are sawn into pieces of standard sizes. The timber is left to dry.

Many things that we use every day are made from wood or wood products.



Metals

Mercury is a poisonous, liquid metal.

It was around 5,000 years ago that humans discovered how to get metal out of rocks. They learnt to make metal tools. At first, people used copper and bronze. Then came iron, and finally steel.

Properties

Most metals are solids at room temperature. They all have a crystalline structure. This means that they are made of tiny particles arranged in a repeating, regular pattern. Pure metals are shiny when polished.

Mercury is the only metal that is liquid at room temperature.

Steel is very strong. It was used to build the London Eye in the UK.

Name	Uses
Aluminium	Main material used in aircraft. Also used for window frames and soft-drink cans.
Copper	Used for electrical wires and water pipes, and sometimes on roofs.
Gold	Used in jewellery and electronics
Iron	Most widely used metal. Can be made into steel. Used for a huge range of things, from bridges to paper clips.
Lead	Used for small, heavy weights and on roofs. In the past it was used in windows.
Silver	Used in jewellery, ornaments, and photographic film.
Uranium	Used as a fuel to produce nuclear energy.

Strong metals

You can squeeze or stretch metals and they won't easily break. You can shape metals by hammering or rolling them. They can also be drawn out into thin wires. Metals can conduct electricity and heat.