

INSECTS

Insects are a class of invertebrates (6) with six legs and hard external skeletons. The body of an insect is divided into three sections: the head, thorax and abdomen. The hard covering of the legs is jointed to enable the insect to move. Insects have a pair of antennae on their heads and most insects have one or two pairs of wings. The mouth shape of an insect depends on its diet—some have tube-like mouths for sucking up fluids; others have jaws for chewing up their food. After mating, a female lays her eggs. Some species look like tiny adults when they hatch. Others hatch as larvae (6).

Abdomen The rearmost body section of an insect, usually containing the digestive, waste-disposal and reproductive parts.

Antennae A pair of long sense receptors on the head of an insect. They are very sensitive to smells, flavours and touch.

Aphid A small bug that feeds on plant sap. Most species are green. When they feed, aphids produce a sweet liquid called “honeydew” that ants like to eat.



Stick insect

Assassin bug A long-legged, carnivorous bug. Most species ambush other insects, sucking out their bodily fluids, but some species suck the blood of larger animals.

Bed bug A wingless bug that feeds on the blood of mammals and birds. Bed bugs often hide in clothing or mattresses.

Bristletail A small wingless insect. Bristletails include the scaled **silverfish** which lives in bathrooms or kitchens, feeding on starchy food such as paper and the **firebrat**, which lives near boilers or ovens.

Bugs The order of insects with long, beak-like mouthparts, used to pierce food to suck up its liquid contents. Most bugs feed on plant juices, but some are carnivorous.

Cicada A broad-bodied bug with large transparent wings. Cicadas live in warm regions and feed on plant sap. Males are known for their loud “songs”, made by clicking drum-like plates on their abdomens.

Cockroach A nocturnal insect that can live in any environment and eat almost anything it finds. Some species have wings and live in trees. Others are wingless and burrow or hide in small spaces. Some are found in houses, where they eat human food and spread germs.

Compound eye An eye made up of many tiny lenses. Insects have compound eyes, which give them very good vision.

Earwig An insect with a slim, dark body and long antennae. Earwigs have a pair of pincers at the rear of their body and most species have wings, though they rarely fly. Earwigs come out at night to feed on insects and plants.



The compound eyes of a fly

Flea A small, flightless insect that lives on, or near, the bodies of birds and mammals, feeding on their blood. Fleas have a “trigger” in their hind legs that enables them to jump 100 times their own length.

Hopper A small, plant-eating bug that hops from plant to plant. Some species are camouflaged to look like thorns.

Leaf insect An insect shaped like a leaf to disguise itself from predators. Leaf insects live in trees, eating leaves. They may sway in a breeze like the other leaves in the tree.

Louse A wingless insect that feeds on the blood, skin, feathers or hair of birds and mammals. The **headlouse** feeds on human blood. Its claws grasp tightly to human hair.



Claws and sticky hairs help some insects such as flies to walk on walls and ceilings.

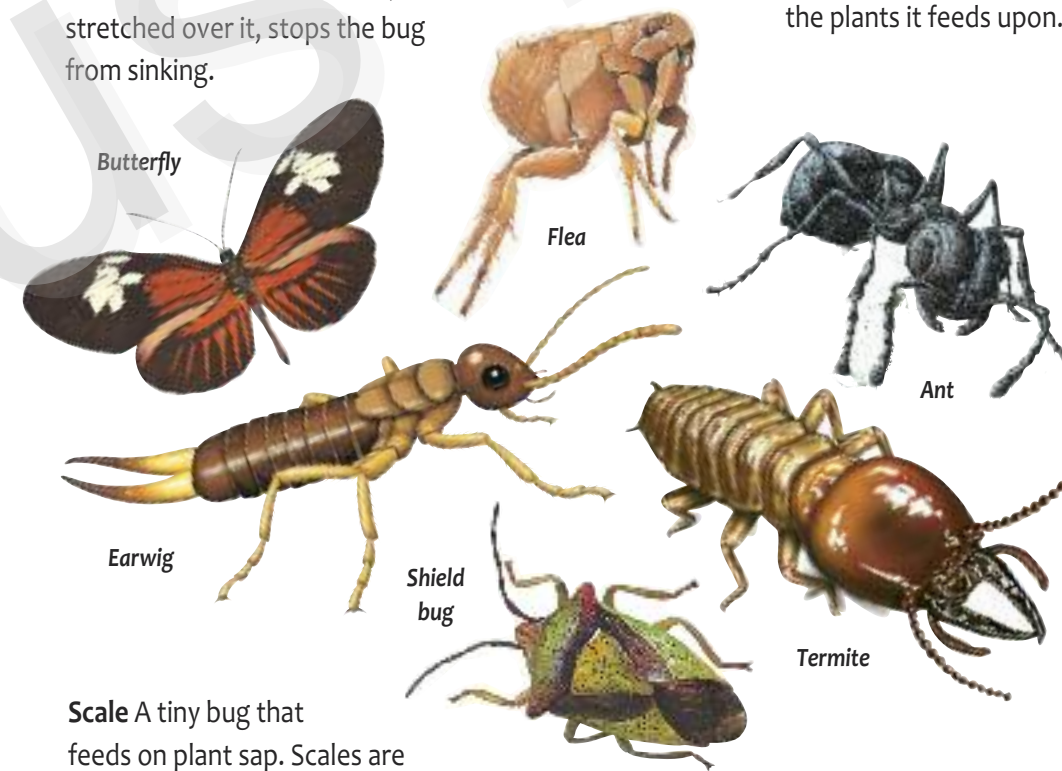
Pond skater A long-legged bug that slides over the surface of ponds or rivers feeding on insects that fall into the water. The surface tension of the water, like a skin stretched over it, stops the bug from sinking.

Spittlebug A sap-feeding bug, whose young produce a frothy, bitter-tasting substance known as spittle, or “cuckoo spit”. This keeps them out of sight from predators, and stops them getting cold or overheating.

Stick insect An insect with a long, branch-like body and long, thin legs, camouflaged to look like a stick. Stick insects live in trees, feeding on leaves.

Thorax The middle segment of an insect’s body, to which its legs and wings are attached. The thorax contains the muscles that enable flying insects to fly.

Thrips A small insect with narrow wings. It feeds on plant sap, damaging the plants it feeds upon.



Butterfly

Flea

Ant

Earwig

Shield bug

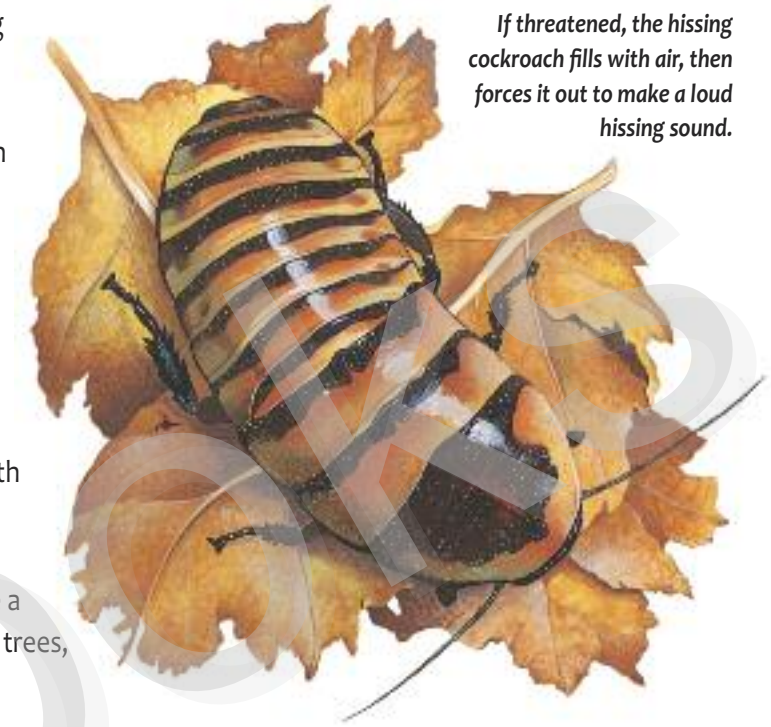
Termite

Scale A tiny bug that feeds on plant sap. Scales are covered in a waxy substance that gives them a scale-like appearance.

Shield bug A shield-shaped bug that secretes a foul-smelling liquid if attacked. Species come in many different colours and patterns.

Spiracle An opening in the thorax or abdomen of an insect, through which air enters the body so the insect can breathe. Some water insects breathe through gills or through tubes that lead out of the water like a snorkel.

If threatened, the hissing cockroach fills with air, then forces it out to make a loud hissing sound.



FACTFILE

★ There are more kinds of insects in the world than all other animals put together. They live in every environment apart from the oceans.

★ Insects have been on the world for at least 300 million years.

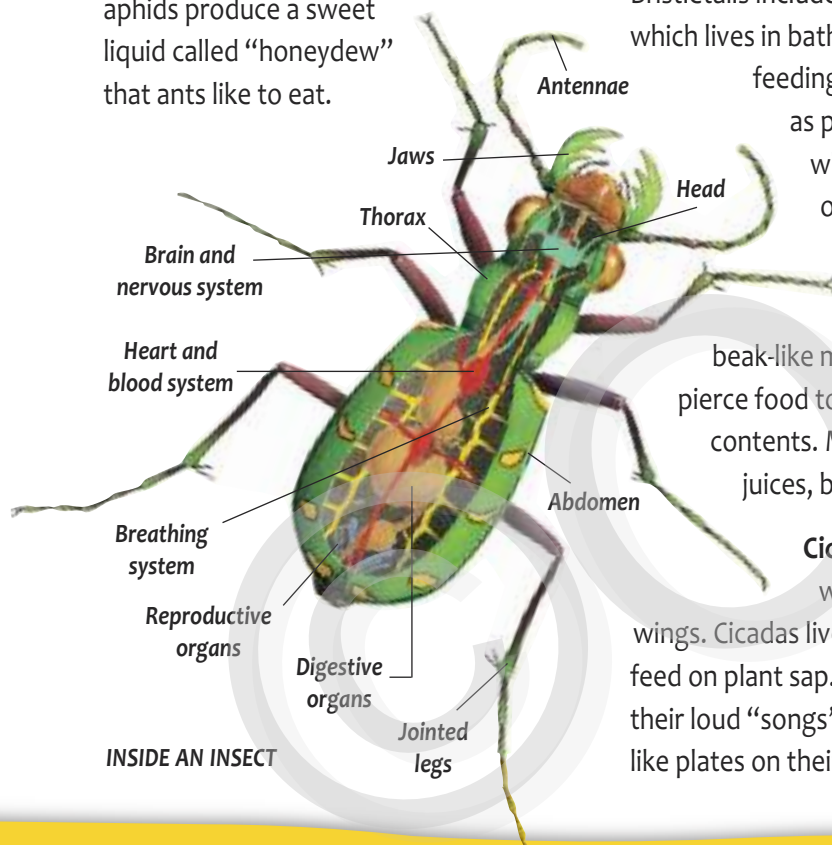
★ Many insects spread pollen between plants, helping them to reproduce. They are also prey for many animals, so are an important part of the food chain.

★ The longest insect is the stick insect, which can grow up to 55 cm long.

★ The fastest insect on land is the tropical cockroach, which can run at over 5 km/h or 50 body lengths per second. The human equivalent of this would be a sprinter running at 330 km/h.

Water bug An aquatic bug that lives in, or above, a lake or river. Most water bugs are carnivorous. They include **water scorpions**, **back-swimmers**, **water toads** and the **water boatmen**.

Webspinner A small brown or black insect that feeds on dead plants and spins silk. It has a long, thin body and lives in large colonies inside tunnels made of silk.



INSIDE AN INSECT

Antennae

Jaws

Head

Thorax

Brain and nervous system

Heart and blood system

Breathing system

Reproductive organs

Digestive organs

Jointed legs

Abdomen

BEETLES

Beetles are a large order of insects. They all have two pairs of wings, but only the back pair are used for flying. The front wings form a hard, protective case that folds over the flying wings. Some beetles do not fly, so their front wings are fused together. Beetles hatch from eggs as larvae, then pupate, emerging as adults (➤6). Plant-eating larvae are legless grubs. Predatory larvae have large jaws and legs for catching prey. Adult beetles have varied diets: some feed on plants, some scavenge and some are ferocious predators. Many species of beetle are very colourful.

Blister beetle A slender beetle that is often brightly-coloured to warn predators it is toxic. To defend itself, it secretes a fluid that can blister human skin.

Carrion beetle A flat-bodied beetle that feeds on carrion. It also lays its eggs beneath carrion so its larvae can feed on it.

Click beetle A flat-bodied beetle that makes a loud click to startle predators. It does this by arching its back and flipping, so that a spine catches on its abdomen.

Cockchafer A small beetle that spreads its feathery antennae as it flies. This helps it to detect the scent of food or a mate.

Darkling beetle A dark beetle that feeds mostly on dead plant or animal matter. The larvae of darkling beetles are known as mealworms.

Dermestid beetle A small scavenging beetle also known as the skin beetle. Its hairy larvae feed on carpets and other material.



Great diving beetle

Dung beetle A scarab beetle that moulds animal dung into balls, in which it lays its eggs. When the young hatch they will be protected inside the ball and feed on the dung while they grow.

Elytra The hard front wings of a beetle, which form a case over its back wings. In some species the elytra are fused together.

Feather-winged beetle The smallest beetle in the world, growing between 0.5 and 2 mm long. It has feather-tipped wings, which help it to float on water, where it feeds on moulds and fungi.



Male stag beetles fighting

Firefly A beetle that can produce light, generated by chemical reactions inside its abdomen. Flashes of light are used to attract a mate. Most species live in warm, wet regions.

Wingless females and larvae are sometimes called glow-worms.

Goliath beetle A scarab beetle that grows up to 11 cm long and weighs as much as a rat. It lives in the tropical forests of Africa, flying through the treetops in search of fruit to eat. At night, it crawls under leaves to hide from predators.



Tiger beetle

Ground beetle A beetle with long, thin legs and a shiny body. Ground beetles are mostly carnivorous, running quickly after their prey. The ground beetle family includes nest beetles, tiger beetles and bombardier beetles.

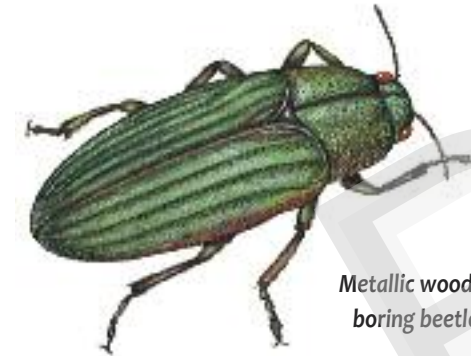
Hercules beetle A huge rhinoceros beetle, that grows up to 18 cm long. About half its length is made up of its huge horns, which are used to fight other males over mates. The fight ends when one beetle throws the other on to its back.

Ladybird A small, round beetle with a red or yellow body and black spots. When threatened, it oozes a smelly substance from its leg-joints. Ladybirds feed on plant-eating insects such as aphids or scale insects.

Leaf beetle A small, brightly coloured, beetle that feeds on plant leaves. Its antennae are half the length of its body.

Longhorn beetle A brightly coloured wood-boring beetle with antennae as long as its body. These help it to feel its way at night.

Rhinoceros beetle A large, tropical scarab beetle. Males have a horn-like structure at the front of their heads, used to fight off rivals. They only eat plants.



Metallic wood-boring beetle

Rove beetle A carnivorous or scavenging beetle with a small, slim body and short elytra. When threatened, it can raise the back of its abdomen to look like a stinger.

Scarab beetle A broad, oval beetle with clubbed antennae and jagged legs. Many species have bright, metallic colouring. Scarab beetles include the rhinoceros, dung, goliath and chafer beetles.

Soldier beetle A slim beetle that lives near flowers, feeding on insects as well as some pollen. Some species have colourful markings.

Stag beetle A large beetle that feeds mainly on tree sap and honeydew (➤23). Males have massive, horn-like jaws, used to fight over territory or mates. Some species grow up to 12 cm long.



A tiny feather-winged beetle. It can only be seen clearly through a microscope.



Ants feed on honeydew, a substance made by aphids. They protect the aphids from predators such as ladybirds.

Tiger beetle A fierce, brightly coloured ground beetle. Its larvae hide in burrows, seizing passing insects to eat. Adults chase and catch their prey in the open. They have powerful jaws and are among the fastest insects running or in flight.



Dung beetle

Water beetle A freshwater beetle with an oval body and powerful, fringed back legs. When it dives, it carries a bubble of air under its elytra to breathe underwater. Water beetles are carnivorous, feeding on insects, tadpoles and small fish. Their young are known as water tigers because of their ferocious predatory behaviour.

Weevil A small, plant-eating beetle with a long snout. Most weevils are wingless and lay their eggs inside plants. Species such as the rive, boll and grain weevil are very destructive to crops.

Whirligig beetle An oval-shaped beetle that lives on the surface of ponds or rivers, feeding on insects that fall into the water. Its eyes are divided to see above and below the water's surface at the same time.

Wood-boring beetle A beetle that eats wood, damaging living trees or furniture. Its larvae are called woodworms. Wood-boring beetles include the death watch beetle, bark beetle and long-horned beetle.

FACTFILE

★ Nearly half of all insects and one quarter of all life-forms are beetles. There are at least 350,000 species of beetle in the world.

★ The rhinoceros beetle is the strongest animal in the world. It can lift 850 times its own weight.

★ A cockroach can live for a week without its head.

★ In 1999, four ladybirds were sent into space.

★ Many insects "play dead" to make themselves less interesting to predators.



Fire fly