



THE INCREDIBLE
⚡ **POP-UP** ⚡
BUG

**WITH 20 FLAPS
TO LIFT AND
GIANT POP-UPS!**

BEN HOARE

JASMINE FLOYD

INSECT ANATOMY

Every insect, whatever shape or size it is, has three main body sections. These are the head, followed by the thorax, and finally the abdomen. The thorax is the part with the legs and wings (if the insect has any). The abdomen, usually the largest section, contains the organs for digesting and breathing.

HEAD

An insect's head is usually a tiny fraction the size of a full stop. At the front are the mouthparts, eyes and a pair of feelers, or antennae, which the insect uses to touch, smell and taste things. Some insects have up to three extra eyes on top of their head, though they are far smaller.



ORCHID BEE
Euglossa imperator

Eyes and joints take up much of the head's length.

THORAX



COMMON WASP
Vespa vulgaris

Wasps have a defined thorax, where the legs and wings attach.

The middle part of an insect can often seem quite small, but it's incredibly important. It is the insect's powerhouse, packed with powerful muscles to move the legs and wings. The thorax also has a feeding tube, blood vessels and nerves that connect the head and abdomen.

FIVE-HORNED INOCEROS BEETLE
Eupatorus gracilicornis

ABDOMEN

The abdomen is where an insect digests and stores its food, and produces waste products. Also here is the insect's main heart — unlike us, it has several smaller ones too, in other parts of the body! The reproductive organs are normally near the tail end of the abdomen.



FOOTBALL HOVERFLY
Megophanes pennsylvanica

Each kind of hoverfly has a different pattern on its abdomen.

LEGS

Insects always have six legs, and this is one of the easiest ways to tell if you are looking at an insect or something else. They come in stiff sections, which are linked by flexible joints, with sharp claws at the tip. Tiny hairs covering the legs help deter movement.

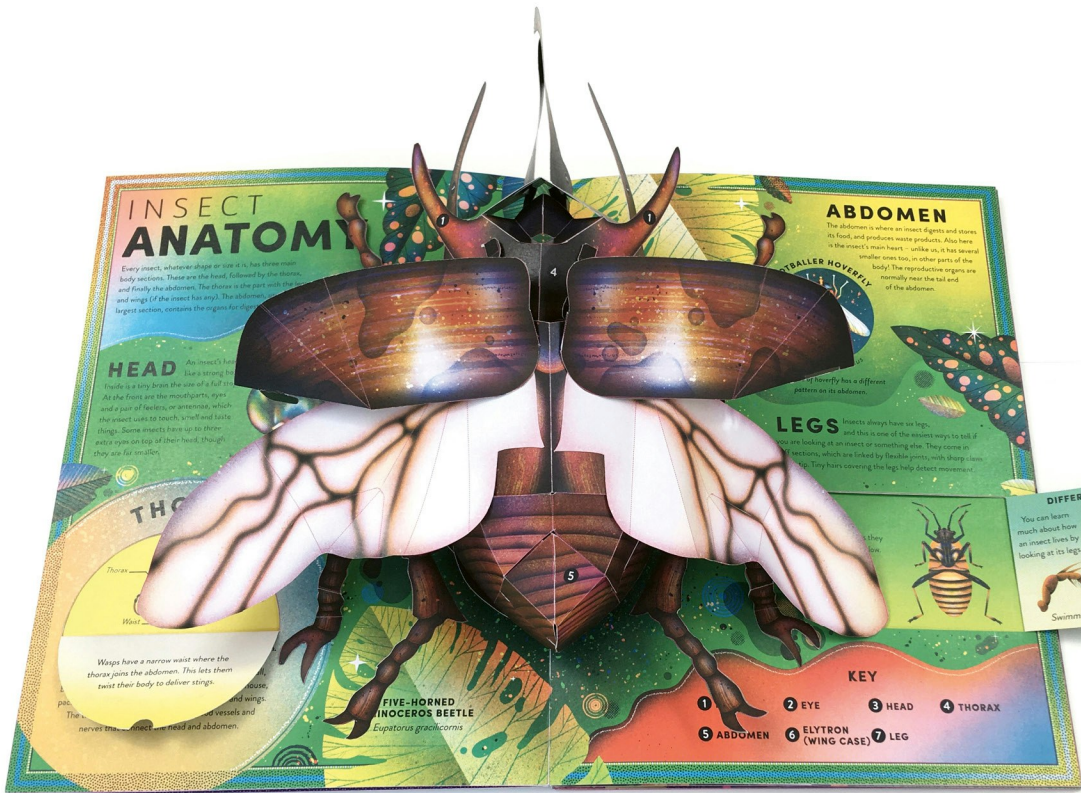
FIRE BUG
Pyrrhocoris apterus



Here we see the firebug's legs from above.

KEY

- 1 HEAD
- 2 EYE
- 3 HEAD
- 4 THORAX
- 5 ABDOMEN
- 6 ELYTRON (WING CASE)
- 7 LEG



INSECT ANATOMY

Every insect, whether as large as you or as small as a fly, has three main body sections. These are the head, followed by the thorax, and finally the abdomen. The thorax is the part with the legs and wings (if the insect has any). The abdomen is the largest section, containing the organs for the digestive and reproductive systems.

HEAD

An insect's head is usually a tiny fraction of the size of a full insect. At the front are the mouthparts, eyes and a pair of feelers, or antennae, which the insect uses to touch, smell and taste things. Some insects have up to three extra eyes on top of their head, though they are far smaller.

THORAX

Thorax
Wings

Wings have a narrow waist where the thorax joins the abdomen. This lets them twist their body to deliver stings.

The thorax contains the heart, lungs, stomach and wings. The heart and lungs are connected by blood vessels and nerves that run through the head and abdomen.

FIVE-HORNED RHINOCEROS BEETLE

Eupatorus gracicornis

ABDOMEN

The abdomen contains an insect's digesters and stores its food, and produces waste products. Also here is the insect's main heart - unlike us, it has several smaller ones too in other parts of the body. The reproductive organs are normally near the tail end of the abdomen.

SPRALLER HOVERFLY

A hoverfly has a different pattern on its abdomen.

LEGS

Insects always have six legs, and this is one of the easiest ways to tell if you are looking at an insect or something else. They come in three sections, which are linked by flexible joints, with sharp claws at the end. They have covering the legs help detect movement.

DIFFERENT TYPES OF LEGS

You can learn much about how an insect lives by looking at its legs.



KEY

- 1 EYE
- 2 THORAX
- 3 HEAD
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HOW INSECTS LIVE

Insects hatch from eggs, then develop in one of two ways. They may live as a larva, a kind of juvenile stage, and go through a spectacular transformation into an adult. Or they have several juvenile stages and change into adults gradually. Many species live alone, but ants, termites and some bees and wasps form large societies called colonies.



AFRICAN TERMITE MOUND



COLONIES

Termites work together as a team to build, look after and defend a huge nest mound. Up to 5 million of them live inside! A queen lays all of the colony's eggs. Her workers are all non-breeding females.

CAMOUFLAGE

Lots of insects are masters of disguise. Their body shape and colour helps them blend into their background to escape predators. The morpheus butterfly has dazzling blue upper wings, but the undersides are camouflaged to look like dead leaves.

MORPHEUS BUTTERFLY



INSECT LOOKALIKES



EUROPEAN HORNET
Vespa crabro

One way to deal with enemies is to look like something more dangerous. Many insects use this strategy, called mimicry. The lookalike insects are harmless, but mimic the appearance of species that are poisonous or have stings.

*Elankia cammintonum laborandi, vixit
vixitque mimio-lutatorum leucae dactyl, fignavit
hanc leucae laborandi. vixitque dactyl
vixitque dactylorum vixitque dactylorum
vixitque dactylorum vixitque dactylorum*



PAINTED LADY
Vanessa cardui

CHANGING SHAPE

Most insects, including butterflies, become adults by complete metamorphosis.



GREEN STINK BUG
Chinavia hilaris

GROWING UP

Some insects, like bugs, grow into adults in a step-by-step process called incomplete metamorphosis.

SPIDER & SCORPION ANATOMY

Spiders and scorpions are arachnids, arthropods with eight legs and two body sections. At the front, the head and thorax are joined to form the cephalothorax, behind which is the abdomen. They are all predators, with venom to overpower prey. Spiders deliver it through sharp fangs, while scorpions use the curved stinger at the end of their bony tail. People often fear spiders and scorpions, but they are beautiful animals that only attack if provoked.

VENOM

Spider and scorpion venom is toxic and causes paralysis. It is produced by venom glands and stored until needed, when it flows along tubes, called venom ducts, and out through the fangs or stinger, as it is.

REDBACK SPIDER

Dugesiella hentzi



MALE OR FEMALE

GIANT HOUSE SPIDER

Tegenaria duellica



MALE



FEMALE

Female spiders are much bigger than males – in fact, they sometimes eat them! Another way to tell the sexes apart is by their palps, which are leg-like structures each side of the jaws. In males, they are rounded, like boxing gloves.



EMPEROR SCORPION

Pandinus imperator

KEY

- 1 PINCER
- 2 JAWS
- 3 STING
- 4 CEPHALOTHORAX

HOW SPIDERS SEE

Most spiders have eight eyes, arranged in two rows, yet can't see well. They rely on sensitive hairs for feeling things move. But the fovea-eyed jumping spiders are massive, giving all-round vision for leaping on prey.



REGAL JUMPING SPIDER

Phidippus regalis



KEY

- 1 PALP
- 2 FANG
- 3 EYE
- 4 CEPHALOTHORAX
- 5 LEG
- 6 ABDOMEN

SPINNERET (silk-spinning organ)