BUGS AND SPIDERS

At any given moment, an infinite number of mysterious and astounding creatures are creeping, crawling, and flying around us in every habitat on our planet. Whether you find insects and spiders fascinating or frightening, you'll be amazed by the larger-than-life-size brilliant photos and incredible fun facts in this wonderful book.

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and Kris Hirschmann

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BUGS AND SPIDERS

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LEARN ABOUT GRASSHOPPERS, BEETLES, AND MORE WITH FUN FACTS!

GIBBS SMITH

ANATOMY AND LIFE CYCLE

Insects are small land invertebrates that have hard exoskeletons instead of backbones like humans have.

All insects have six legs and most also have wings. They were the first animals that had the ability to fly. Some people think all insects are bugs, but this isn't correct. Only some insects are true bugs. Spiders aren't insects either, although they are related to insects.

Insects are part of a larger group of arthropods, which are invertebrates that have exoskeletons, segmented bodies, and jointed appendages.

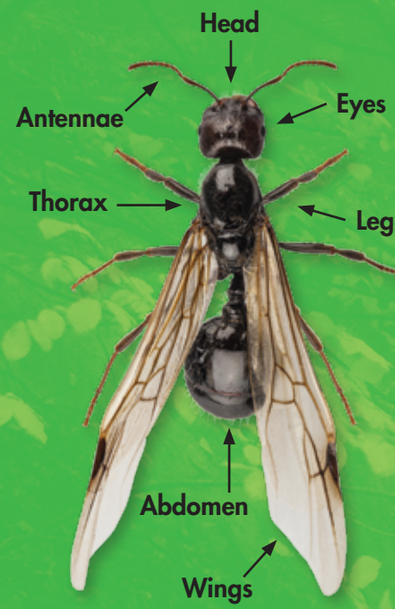
The group of arthropods includes:

- Insects, including some that are true bugs
- Arachnids, which are spiders, scorpions, mites, and ticks
- Millipedes and centipedes
- Crustaceans, including shrimp and lobsters

Weevil

INSECT ANATOMY

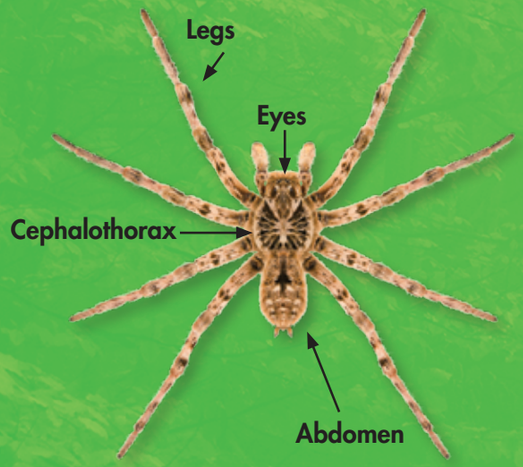
Insects all have a hard external covering made of a material called chitin. Their bodies have three sections called the head, the thorax, and the abdomen. All insects have a pair of antennae on their heads. Their six legs are connected to the thorax. Flying insects have wings connected to the thorax. They have compound eyes, which are clusters of simple eyes.



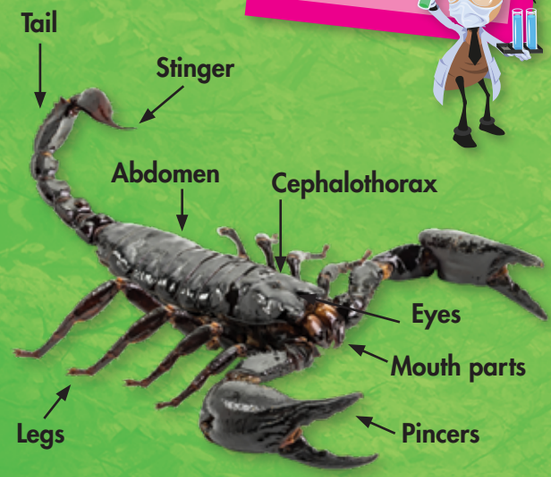
DID YOU KNOW?
In one square mile (2.58 square kilometers) of jungle, there are more insects than the entire human population.

SPIDER ANATOMY

There are over 100,000 species of spiders and their bodies differ from insects in several important ways. They only have two main body sections called the cephalothorax, which is a combination of the head and thorax, and the abdomen. They have eight legs instead of six. Most spiders have eight eyes. They have simple eyes instead of compound eyes and unlike insects they don't have antennae or wings.



DID YOU KNOW?
The scientists who study insects are called entomologists.



SCORPION ANATOMY

There are about 2,000 species of scorpions worldwide. Like spiders, scorpions do have eight legs and don't have wings or antennae. They have a cephalothorax, an abdomen, segmented tail, and venomous stinger.

If you compare a scorpion fly, a scorpion spider, and a scorpion, you'll easily see why these animals are all related to each other.

Scorpion Fly

Scorpion Spider

Scorpion

BUTTERFLIES AND MOTHS

Butterflies and moths look very similar, but there are actually numerous differences between these two types of flying insects. Moths are active at night and butterflies are active during the day. While they are at rest, butterflies usually fold their wings back. Moths flatten their wings against their bodies or spread them out in a "jet plane" position. One of the major physical differences is that butterfly antennae are thin and have club-shaped tips compared to the feathery-looking or comb-looking antennae of moths. The bodies of most moths are stout and fuzzy compared to the slender and smooth bodies of butterflies. Butterflies are usually more colorful than moths. Although they go through the same egg, larva, pupa, and adult life cycle, butterflies form hard chrysalises while moths make cocoons wrapped in silk.

Butterflies are one of the most beautiful insects on earth. They go through four life stages. The female butterfly lays hundreds of eggs. Each tiny egg is placed by itself on a plant. When the egg hatches, it is a caterpillar. It sheds its skin and becomes a pupa. In its final stage, it changes into a butterfly. This life cycle takes about 30 days.

THE LIFE CYCLE OF A BUTTERFLY

DID YOU KNOW?
Birdwing butterflies have more angular wings than other types of butterflies. They also fly in a similar way to birds.

Both butterflies and moths have scales that cover their bodies and wings.

A butterfly drinks nectar using its long tubelike proboscis.

Ulysses

Flickr Photocredit: berniedup

ULYSSES

The Ulysses butterfly has bright blue wings with black edges. This beautiful butterfly lives in the Australian tropical forest and is a type of swallowtail.

DID YOU KNOW?
Butterflies attach eggs with a sticky material like glue to stems and leaves.

PEACOCK

The peacock butterfly is easy to recognize. It has a pattern on its wings that looks like eyes in order to scare predators away.

Adult Monarch Butterfly

QUEEN ALEXANDRA BIRDWING

The Queen Alexandra birdwing is the world's largest butterfly with a wingspan of almost 11 inches (28 cm).

Queen Alexandra Birdwing

Wiki Photocredit: Mark Pellegrini (Raul654)

EASTERN TIGER SWALLOWTAIL

The eastern tiger swallowtail butterfly got its name from the long tails it has on its hind wings, which resemble the tails of swallows. Its distinctive yellow and black, tiger-like stripes make it easy to recognize.

PAINTED LADY

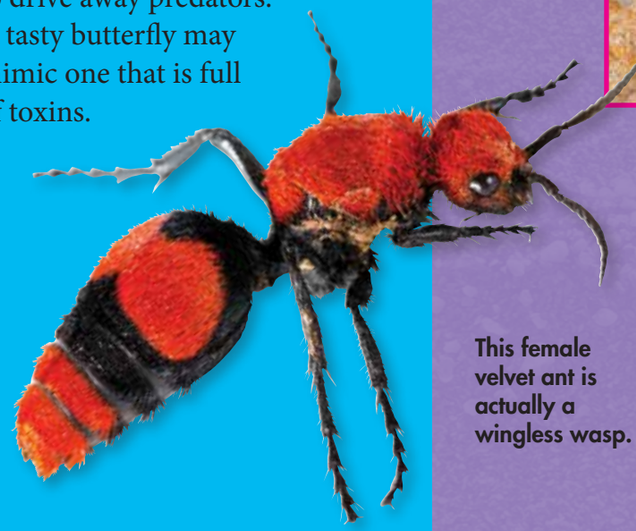
Painted Lady

The painted lady butterfly is also called the cosmopolitan butterfly. It's called the painted lady because of its coloring, and the cosmopolitan because it's the most widely distributed butterfly worldwide.

CAMOUFLAGE AND MIMICRY

Camouflage and mimicry are similar. Both consist of shapes and colors that trick animals. Camouflage hides an insect by making it blend into its background, which makes it very difficult to see. If an insect has markings that break up its outline, it makes it even more difficult to find against its background surroundings. Insects and spiders are masters at camouflage because their exoskeletons can have all sorts of weird shapes and colors.

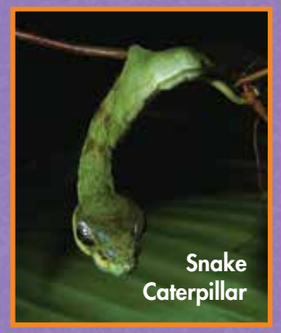
Mimicry is when an insect looks like something else. Sometimes the animal it mimics is more dangerous. A caterpillar that looks like a poisonous snake is likely to drive away predators. A tasty butterfly may mimic one that is full of toxins.



This female velvet ant is actually a wingless wasp.

SNAKE CATERPILLAR

The vivid green snake caterpillar creates the look of a dangerous snake by pulling in its legs and expanding the end of its body, which has markings that look like snake's eyes. If it's threatened, it acts like it's going to bite!



Snake Caterpillar

Photocredit: Daniel Janzen

DID YOU KNOW?
Lichen spiders don't spin webs.

Sand Mottled Grasshopper

SAND MOTTLED GRASSHOPPER

Sand mottled grasshoppers blend in perfectly with the loose, sandy soil where they live. They forage on the ground, occasionally climbing up on stalks of grass.

Lichen Spider

LICHEN SPIDER

Lichen spiders cling to tree trunks or branches that are covered with lichen. Their unique pattern and colors hides them perfectly as they wait to ambush their prey.

Robber Fly

ROBBER FLY

This robber fly mimics a bumble bee.

WRAP-AROUND SPIDER

During the day, the wrap-around spider can wrap its body around a twig and make itself virtually invisible to predators. These spiders build webs at night, which they take down by the morning.

Wrap-Around Spider

OLEANDER HAWK MOTH

The oleander hawk moth is also named the army green moth for the colorful green and white pattern on its wings that looks like army camouflage.

Oleander Hawk Moth

Leaf Mimicking Grasshopper

LEAF MIMICKING GRASSHOPPER

The leaf mimicking grasshopper mimics a dead leaf in the jungle.

SCORPION FLY

The scorpion fly has a coiled tail that mimics the look of a scorpion. Its stinger isn't really a stinger at all.

Scorpion Fly

HUMMINGBIRD HAWK MOTH

The hummingbird hawk moth is frequently mistaken for a hummingbird as it flies from flower to flower. The wings of this moth make a loud humming sound just like the sound of a hummingbird's wings. Unlike most moths, it flies during the day and at night.

Hummingbird Hawk Moth

ODD BUGS

Some insects live in societies and some live alone. Some make really loud sounds and some are quiet. Some can communicate with each other with chemicals and some use chemicals to make stinky smells to ward off predators. Some look like other animals or parts of plants so they can hide or ambush prey. Some are violent hunters and some are quiet and hide most of their lives. Some have amazingly beautiful colors and patterns like jewels and others are dull-colored like soil. Some are so odd-looking that, if they were larger, we would think they were aliens from another planet!


Walking Leaf Insect

WALKING LEAF INSECT

Walking leaf insects look so much like leaves that if they are sitting on a plant you might not even see them. They even have patterns that look like the veins in a leaf.


Goliath Stick Insect

The female Goliath stick insect can grow as long as 9.8 in (25 cm).


Malaysian Stick Insect

STICK INSECT

Stick insects are also known as walking sticks. They resemble the twigs where they live. Some get as long as 21 inches (51 cm) when their legs are outstretched.


Walking Stick Insect

GIANT PRICKLY STICK INSECT

The giant prickly stick Insect looks more like a cactus than a twig.

DID YOU KNOW?
Lanternflies are named for their bright patterns and do not produce light.


Giant Prickly Stick Insect

This lanternfly rests with its wings open.

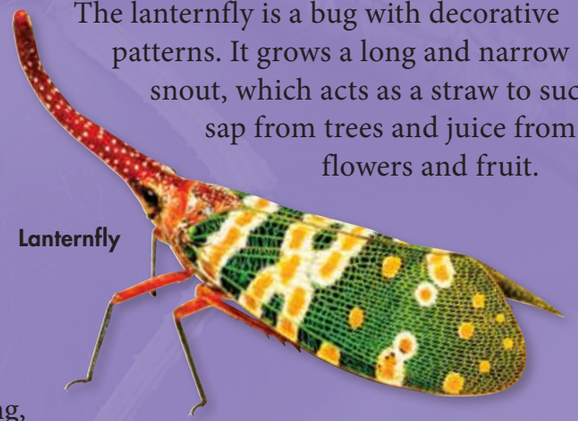

Longhorn Beetle

LONGHORN BEETLE

Most longhorn beetles have antennae that are much longer than their bodies. Some even have what appear to be hairy tufts wrapped around their antennae.

LANTERNFLY

The lanternfly is a bug with decorative patterns. It grows a long and narrow snout, which acts as a straw to suck sap from trees and juice from flowers and fruit.


Lanternfly

ALLIGATOR BUG

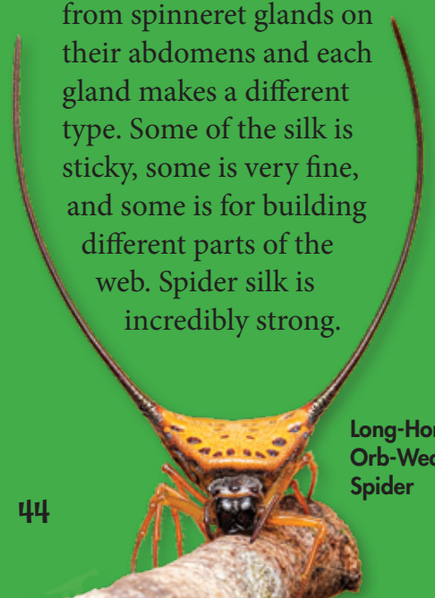
The alligator bug has a funny-looking, peanut-shaped head and a bulky body. Wrapped up inside its awkward shape is a secret weapon. When threatened, it opens its wings to reveal two fake eyes.


Alligator Bug

SPIDERS AND 8-LEGGERS

There are about 40,000 species of spiders and almost all of them are carnivorous, which means they eat insects and other animals to survive. Spiders aren't insects or true bugs. They are arachnids. All spiders have eight legs instead of the six legs that insects have. They also move differently than insects do.

Another major difference between insects and spiders is that most types of spiders spin webs to catch their prey. There are different types of spider webs: orbs, funnels, and sheets. No matter what type of web spiders weave, they do so with silk they produce themselves. The silk comes from spinneret glands on their abdomens and each gland makes a different type. Some of the silk is sticky, some is very fine, and some is for building different parts of the web. Spider silk is incredibly strong.



Long-Horned Orb-Weaver Spider

LYNX SPIDER

Lynx spider legs have many long, stiff, and sharp spines.

Green Lynx Spider

Wiki Photocredit: Chen-Pan Liao

Crab Spider

CRAB SPIDER

Crab spiders look and move like crabs because they have longer front legs than back legs.

SPINY ORB WEAVER

Spiny orb weavers have prominent spines on their abdomens. They look something like crabs.

Spiny Orb Weaver

LONG-HORNED ORB WEAVER

Just like other orb weaver spiders, long-horned orb Weavers build large circular webs. Scientists are not completely sure why this type of spider has such long horns but there's a good chance that the horns help deter potential predators.

DID YOU KNOW?
Even though spiders have eight eyes, most spiders can't see very well!

Tarantula

TARANTULA

Even though they look very scary, tarantulas are quite docile. They rarely bite people and their bite is no worse than a bee sting. The largest tarantula by mass is the Goliath tarantula. It is large enough to capture and eat birds.

DID YOU KNOW?
When a spider needs to grow, it sheds its hard outer skeleton and makes a new, bigger one!

JUMPING SPIDER

Jumping spiders are the largest family of spiders, making up about 13% of all spider species. One unusually large pair of eyes stands out from their other simple eye pairs. When threatened or excited, they make very agile jumps.

Jumping Spider

Wide-Jawed Jumping Spider

Close-up of a jumping spider

TRUE BUGS

All bugs are insects, but not all insects are bugs. The major difference between true bugs and other insects is their mouthparts. True bugs use their mouthparts to suck juices, primarily from plants. They have a proboscis. It looks like a long beak and is used in the same way you use a straw to drink from a juice box. Other types of insects have a proboscis as well, but theirs are retractable, which means they can roll theirs up. The proboscis of a true bug can't be rolled back up. The other difference between true bugs and other types of insects is that they go through an "incomplete metamorphosis." Instead of going through the egg, larva, pupa, and adult stages, they hatch as nymphs, miniature versions of the adult bugs, right from their eggs.

Assassin Bug

LEAF-FOOTED BUG

In some species of leaf-footed bugs, the back legs are wide and may be leaf-like in shape. These bugs make a loud noise when they fly.

Leaf-Footed Bug

Lace Bug

Wiki Photocredit: shaners becker

LACE BUG

The unusual-looking lace bug has a lacelike pattern of ridges on its wings and upper body.

DID YOU KNOW?
The largest true bug in the world is the giant water bug.

ASSASSIN BUG

Assassin bugs use their strong beaks to stab their prey to death. They're often found on shrubs and garden plants as they search for prey. They're also called "kissing bugs" because they attack humans on the lips and give a painful bite.

Red and Black Seed Bugs

RED AND BLACK SEED BUGS

Red and black seed bugs are sometimes called charcoal seed bugs because they look like dying embers from a fire.

Shield bugs, also called stink bugs, emit a smelly chemical if you disturb them.

Hibiscus Harlequin Bug or Cotton Harlequin Bug

DID YOU KNOW?
There are 50,000 to 80,000 species of true bugs.

The proboscis mouthpart on this shield bug is covered with pollen.

AMBUSH BUG

As they blend into their surroundings, ambush bugs wait for their prey to come near. Then, they quickly grab the prey and poison it.

Ambush Bug

WATER STRIDERS

Water striders can float, stand, skate, and walk on water without getting wet. They have very fine hairs on their feet that stay dry. These hairs push against the water to create a tension that holds them above the water surface.

Water Strider