

Informational  
Nonfiction

# Beetles

by Erin Ash Sullivan



## Read to Find Out

What are some different kinds of beetles? How are they unique?

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### STRATEGIES & SKILLS AT A GLANCE

#### Comprehension

- Strategy: Analyze Text Structure
- Skill: Identify Text Structure: Description

#### Vocabulary

- astronomers, communicate, investigate, nutrients, overcome, prehistoric, solitary, territory

#### Vocabulary Strategy

- Word Parts: Greek Roots

#### CONTENT-AREA VOCABULARY

Words related to beetles

(see glossary)

#### NATIONAL CONTENT STANDARDS

##### Science

- Life Science

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\*\*The total word count is based on words in the running text and headings only. Numerals and words in captions, labels, diagrams, charts, and sidebars are not included.

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# Introduction

When you think about beetles, you might picture an ordinary insect crawling in your backyard. But think again. Beetles are extraordinary insects.

What makes beetles so interesting? First of all, there are more beetles than any other animal on Earth. Another thing that makes beetles special is that they come in all shapes and sizes. Scientists have estimated that there are about 350,000 different **species**, or kinds, of beetles on Earth. And scientists are still discovering new kinds of beetles every day.

Beetles are some of the oldest creatures on Earth. They have been around since prehistoric times for almost 240 million years. Since then, beetles have **adapted**, or changed, in ways that help them survive in different kinds of environments.

Many scientists believe that beetles are the most successful animals on Earth. When you read about the ways these amazing animals move, eat, find shelter, and communicate, you might agree.

Like other insects, beetles are perfectly symmetrical. That means that if you drew an imaginary line down the middle of a beetle, it would look the same on both sides.



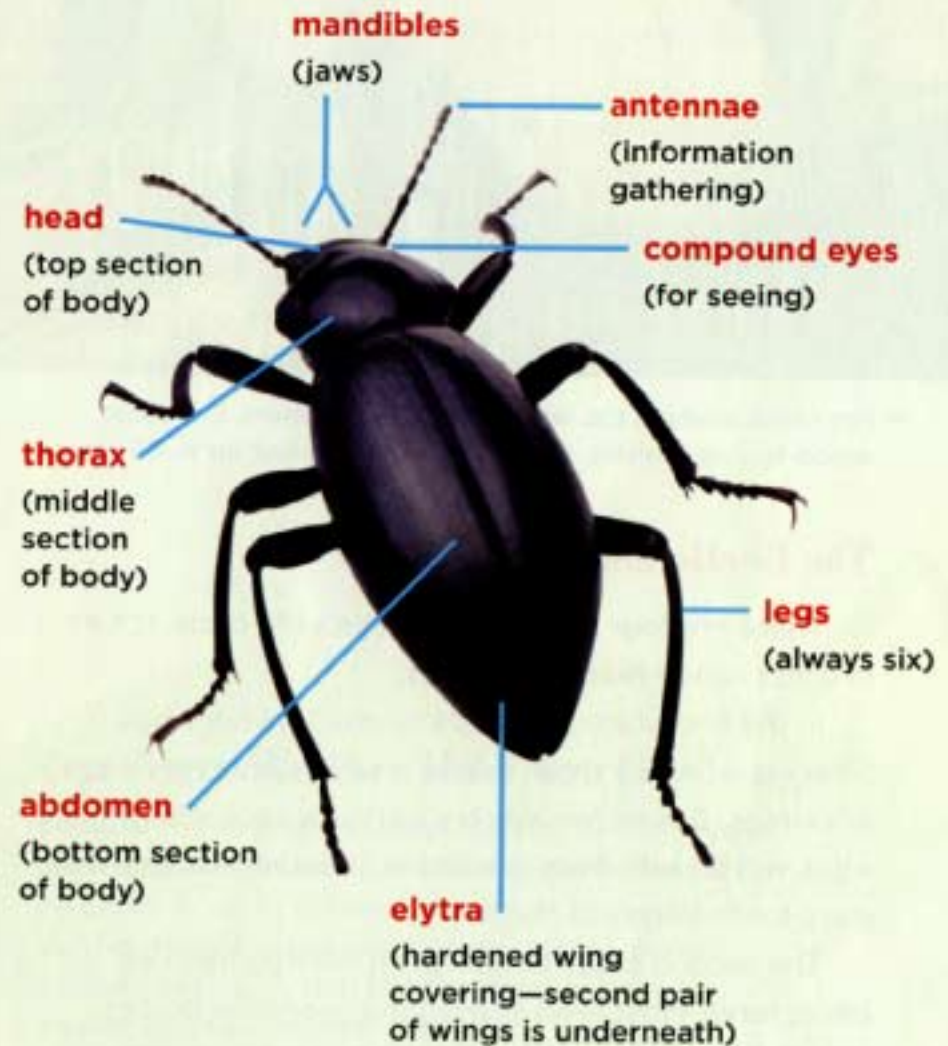
# Beetle Basics

Like all insects, beetles have six legs and three body parts. Like many insects, beetles have wings and can fly. What makes beetles special is their forewings, called **elytra**. The elytra fold over the beetle's back to form a protective cover.

The scientific name for beetles, *Coleoptera*, describes this protective cover. It comes from the Greek words *coleos*, meaning "sheath" or "cover," and *pteron*, meaning "wing."

The elytra are one of the keys to the beetles' success. The wings work like armor to protect them from hungry **predators**. They also protect beetles from harsh climates. For example, the ironclad beetle lives in the hot deserts of North America. Its elytra are covered with a gray waxy substance that reflects light and keeps moisture in. In this way, the ironclad beetle can survive all the harsh conditions of the desert—glaring sun, hot temperatures, and lack of water.

## Beetle Body Diagram





🔗 For some beetles, the larval stage is very short. For some wood-boring beetles, the larval stage can last up to 35 years.

## The Beetle Life Cycle

There are four stages in a beetle's life cycle. It's a process called **metamorphosis**.

In the first stage, a female beetle lays her eggs. Some species lay them one at a time. Others lay eggs in clumps. But all females try to find a spot where the eggs will be safe from predators. It usually takes a few days for the eggs to hatch.

The second stage begins once the egg hatches into a **larva**. Most larvae have long, wormlike bodies, mouthparts for chewing, and short legs for moving around. The larva's only important job is to eat, and it eats a lot. As the larva grows, it **molts**, or sheds its skin.

The third stage is called a **pupa**. In Latin, the word *pupa* means "little doll." This stage probably got its name because the beetle pupa looks like a doll. During this stage, the larva weaves a cocoon out of silky strands. Inside the cocoon, the pupa develops legs, wings, and antennae.

Finally, the beetle reaches the fourth stage, when it becomes an adult. After it comes out of the cocoon, it takes a few hours for the beetle's covering to harden and for its legs and wings to move into place.

How long does an adult beetle live? It's different for every species. Some can live for up to 10 years.

## Can Warm Weather Make You Live Longer?

Some of the largest and longest-living beetle species are found in areas near the Equator, the hottest place on Earth. In warm climates, it is easier for beetles to survive. Many beetles cannot survive cold, harsh winters. Beetles in cold climates tend to be smaller and have shorter life spans.

## Beetle Adaptations

One of the most fascinating things about beetles is how their bodies have adapted to a wide range of different environments.

Some desert beetles have very long, thin legs. Their legs keep their bodies far away from the burning hot sand. Water beetles on the other hand have curved legs shaped like paddles. These legs help them move quickly through the water.

The whirligig beetle had an interesting problem to overcome. It lives on the surface of ponds and streams. It needs to be able to see above and below water and at the same time to look out for predators and to hunt for food. So it evolved special eyes. They are divided into two parts. The top part can see objects above water while the bottom part can focus underwater.

### Predacious dining beetle



**Darkling beetle**



🔗 When this South African jewel beetle sits on a leaf, its coloring makes it hard for predators to see.

Beetles' heads have parts that have adapted, too. Weevils are beetles with long, thin noses called snouts. Many female weevils use their snouts to drill holes in leaves and lay eggs. Other beetles use their snouts for eating nectar from flowers.

Some beetles use **camouflage**, or protective coloring, to hide from predators. Other beetles have coloring that scares away enemies. For example, the eyed click beetle has large spots on its elytra called eyespots. These eyespots trick predators into thinking that the beetle is larger than it actually is.

## How Beetles Live

Where do beetles live? Everywhere! Beetles have adapted to survive in many different **habitats**. These places where they live provide food, water, and shelter. You can find beetles in polar climates. They hibernate during the winter to survive the coldest temperatures. You can also find beetles in the desert. They hide in the sand during the hottest part of the day to escape the sun's rays. Many beetle species live in rainforests. The damp weather and warm temperatures means many plants grow there. This makes it easy for beetles to find food and shelter. Most beetles are **nocturnal**. They are active at night.

Some beetles are solitary. They aggressively defend their territory. Stag beetles have long **mandibles**, or jaws, which they use to move other stag beetles out of the way.

There are beetles who make their homes with other insects. For example, some rove beetles move in with ant or termite communities. The beetle gets protection from the insect colony. In return, it keeps the colony clean by eating the other animals' waste products.

 This beetle is being overwhelmed by red ants.



## What Beetles Eat

One of the reasons that beetles have survived so successfully is that they have adapted to eat the foods that are found in different environments. Some beetle species are **herbivores**, or plant eaters. Other beetle species are **carnivores**, predators that eat other animals.

Some herbivore beetles eat only living plants and leaves. Other beetles feed on dead and rotting wood and plants. These beetles do an important job. They break down the plant materials so the nutrients can be recycled back into the soil.

🔗 Longhorned beetles eat decaying wood. Without the work of longhorned beetles, many forests would be full of dead trees.



## Beetle Baby Food

Beetle larvae often eat different food than the adults. The Japanese beetle larvae eat plant roots, while the adults eat leaves and fruits.



Carnivorous beetles often have strong jaws to help them catch and eat their prey. For example, tiger beetle larvae build long vertical burrows. When another insect comes close, the larva darts out of its burrow, pounces on its prey, and drags it home to eat.

Other carnivorous beetles are **scavengers**. They eat dead animals. Like the beetles that eat dead and rotting plants, scavengers are important. They break down material to be recycled back into the earth. The American burying beetle buries dead animals and lays its eggs there. When the eggs hatch, the larvae feed on the dead animal.

## Helpful Beetles, Harmful Beetles

Are beetles helpful or harmful? Some beetles play a very helpful role in our environment. Many are **decomposers**. That means they break down plant and animal material so the nutrients can be recycled. These beetles are like nature's garbage collectors.

Scarabs, or dung beetles, eat animal waste. They roll animal dung into round balls. They use the dung balls for food and as nests for laying eggs. Cattle farmers appreciate dung beetles because they help to keep the pastures clean.

When settlers first brought cattle to Australia, there were no native beetles to eat the cow dung. Scientists had to bring in a special dung beetle to solve the problem.



### Sacred Scarabs

The ancient Egyptians believed a scarab beetle pushed the sun across the sky, just as they had observed scarabs on the ground rolling balls of dung. You can see scarab beetles in ancient Egyptian art.

Ladybugs are another species of helpful beetle. Ladybugs eat aphids, small insects that live in gardens and eat plant leaves. Many gardeners use ladybugs to control aphids instead of using chemicals that could be harmful to the environment.

Some beetle species are pollinators. Like bees, they eat nectar from plants and spread pollen so plants can reproduce and grow.

The ladybug's coloring warns predators that it does not taste good.



## Harmful Beetles

Not all beetles are helpful. Many people think of some beetles as terrible pests that ruin crops and spread disease.

The boll weevil is a species of beetle that feeds on cotton plants. The boll weevil chews on the blossoms of the plant and lays its eggs there. The young larvae feed on the plant, too. For years it has destroyed the cotton crops of farmers throughout the United States.

The Colorado potato beetle is a leaf beetle. It lays its eggs on the underside of a potato plant's leaves. When the eggs hatch, the larvae eat through the leaves. The plant dies.



© The boll weevil gets its name from the cotton blossom, which is called a boll.

Beetle pests eat through other materials, too. There are beetles that eat through clothing, leather, carpet, even flour and cereals.

Some beetles carry disease. Bark beetles spread Dutch elm disease. They have been responsible for the death of thousands of Dutch elm trees throughout the United States.

When people want to control beetles, they have difficult choices to make. If they use chemicals to kill pests, they must be careful. They don't want to harm other plants and animals or pollute the air and water. Many scientists are looking for ways to control pests without chemicals.

## Beetle Invaders

Beetles can become a problem when humans bring them into an environment where they did not originally live. If there are no natural predators in the new environment, the beetle population may grow without any limits. This happened with the Japanese beetle. It was accidentally brought into the United States in the early 1900s. The Japanese beetle eats through plant leaves and causes the plants to wither and die.



## Cool Beetles

Beetles are exciting insects to investigate because there are so many different kinds. Some have special talents. Others have adapted and look odd. Others make special noises as they release bad smells. Here is more information about a few of them.

### Click Beetles

Click beetles have a special skill. If the beetle falls onto its back, it can arch and straighten its hinged elytra. This causes it to pop up in the air with a loud "click." This is how the beetle got its name. Often, the beetle lands on its feet and runs away. It's a handy way to escape from predators.

[🔗 The click beetle feeds on nectar from flowers.](#)



Fireflies are also [🔗](#) called lightning bugs or glowworm beetles.

### Fireflies

Did you know that fireflies are beetles? A firefly has two special chemicals in its abdomen. When the firefly allows oxygen into its abdomen, the oxygen combines with the two chemicals and another chemical called ATP. The chemical reaction causes the firefly to glow brightly.

Fireflies use their light to communicate with each other. Male fireflies fly around and give off light signals in patterns. The female fireflies stay perched in a safe place and reply with other light patterns.

Astronomers at NASA are very interested in how fireflies give off light. They are thinking about using a similar chemical reaction to help look for signs of life on other planets.

## Bombardier Beetles

During World War II, fighter pilots who dropped bombs on the enemy were called bombardiers (bahm-buh-DEERZ). The bombardier beetle gets its name because it, too, has a special kind of "bomb."

Bombardier beetles belong to the family of ground beetles. All ground beetles can produce bad-smelling liquids from the ends of their bodies. Bombardier beetles protect themselves by releasing these fluids with a loud popping noise. The noise and the smell tell predators to stay away.

🔗 The bombardier beetle's spray comes out at a boiling hot 100° Celsius (212° Fahrenheit).



## Conclusion

Beetles are truly unique and beautiful insects. Their unusual adaptations make them exciting to study. Beetles can give us a lot of information about how animals adapt to their environments. They can also tell us a great deal about how living things interact with each other.

Beetles are the most numerous kind of animal on Earth. But sadly there are some endangered beetle species. As humans take over more and more land on Earth, some beetles are losing their habitats. Scientists are watching closely to make sure that beetles in danger are protected and preserved.

🔗 Some bright colors, like yellow, act as a warning. These warning colors tell predators that the insect may be poisonous.



## Glossary

**adapt** (*uh-DAPT*) to change over time (page 2)

**camouflage** (*KAM-uh-flahzh*) coloring that helps animals to hide in their surroundings (page 9)

**carnivore** (*KAHR-nuh-vawr*) a meat-eating animal (page 12)

**decomposer** (*dee-kuhm-POH-zuhr*) a living thing that eats and breaks down dead plant or animal material so it can be recycled into the earth (page 14)

**elytra** (*E-luh-truh*) the hardened forewings of a beetle (page 4)

**habitat** (*HAB-i-tat*) the place where an animal lives (page 10)

**herbivore** (*HUR-buh-vawr*) a plant-eating animal (page 12)

**larva** (*LAHR-vuh*) the newly hatched form of some insects and other animals without backbones (page 6)

**mandible** (*MAN-dih-buhl*) jaw (page 11)

**metamorphosis** (*met-uh-MAWR-fuh-sis*) the series of changes in shape and function that certain animals go through as they develop from an egg to an adult (page 6)

**molt** (*MOHLT*) to shed an outer covering and grow a new one (page 6)

**nocturnal** (*nok-TUR-nuhl*) active only at night (page 10)

**predator** (*PRED-uh-tuhr*) an animal that hunts and eats other animals (page 4)

**pupa** (*PYEW-puh*) an insect at the stage after it is a larva and before it is an adult (page 7)

**scavenger** (*SKAV-uhn-juhr*) an animal that eats dead or rotting plants or animals (page 13)

**species** (*SPEE-sheez*) a group of plants or animals that have many characteristics in common (page 2)

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# Comprehension Check

## Summarize

Beetles have unique characteristics. Use a Description Chart to help tell what beetles look like, what they do, and how their adaptations help them survive.

↓
↓
↓

## Think and Compare

1. Look at pages 8 and 9 in this book. The author describes some ways that beetles have adapted to live in their environments. How have adaptations helped beetles to survive? (**Identify Text Structure: Description**)
2. What kinds of beetles do you see in your own environment? How are they similar to or different from the beetles in this book? (**Analyze**)
3. On page 17, the author describes some ways humans have tried to control beetles that are pests. How could killing beetles affect the food web in a habitat? Explain. (**Evaluate**)

# Literacy Activities



## Write a Beetle Story

What would it be like to be a beetle? Choose one of the beetles you read about in this book. Then write a story about a typical day from the beetle's point of view.



## Investigate Word Parts

Many English words come from ancient Greek. For example, the word "Coleoptera" has two parts. The Greek word *coleos* means "sheath," and *pteron* means "wing." Look up the Greek word parts "meta" and "morph" to find out what *metamorphosis* means.

# Beetles

Humans have admired beetles for thousands of years. The ancient Egyptians believed that a beetle rolled the sun across the sky. What makes beetles so special?



4.6 Week 5

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