

# Arthropod Characteristics

## Key Words

arthropods:	animals with segmented bodies that have hard outer coverings and jointed legs
exoskeleton:	hard outer covering of an arthropod that protects and supports the animal
molt:	to shed an old exoskeleton

## KEY IDEAS

Arthropods make up the largest group of animals. All arthropods share the following traits: segmented bodies, jointed legs, and hard outer coverings.

**Arthropods** (AHR-throh-pahdz) are animals with segmented bodies, jointed legs, and hard outer coverings. They make up the largest group of animals. There are more species of arthropods than all other types of animals combined. Arthropods include huge lobsters that live at the bottom of the ocean and mites that are tiny enough to be parasites of wasps. Each species of arthropods differs from the others as it has adapted to its own environment. As a result, arthropods have many adaptations of a basic body plan.



1. What is an arthropod? \_\_\_\_\_

**Body Form.** The body of an arthropod is divided into segments, or parts. Most arthropods have three main body parts: a head, a thorax, and an abdomen. The head contains the mouth and sense organs. Jointed legs are attached to the thorax, or middle part. The last part, the abdomen, contains the reproductive and digestive systems. Other arthropods have only two segments: a head and thorax that are fused together, and an abdomen.

Like all invertebrates, arthropods have no bones. Instead, they have a hard outer covering called an **exoskeleton** (ehks-oh-SKEHL-uh-tuhn). The exoskeleton protects and supports the soft inner parts of the animal in many ways. The exoskeleton protects arthropods from drying out and allows them to live in dry areas as well as in water. The exoskeleton also protects the arthropod from injury.

An exoskeleton has some drawbacks. It is heavy to carry around. Unlike the skeleton inside your body, an exoskeleton cannot grow. When an arthropod grows, it must molt (mohlt), or shed its old exoskeleton, and grow a new one. The old skeleton splits open, and the animal wriggles out. Because it has no protection, the animal usually hides while its new exoskeleton grows.



2. What are three functions of an exoskeleton?

---

---

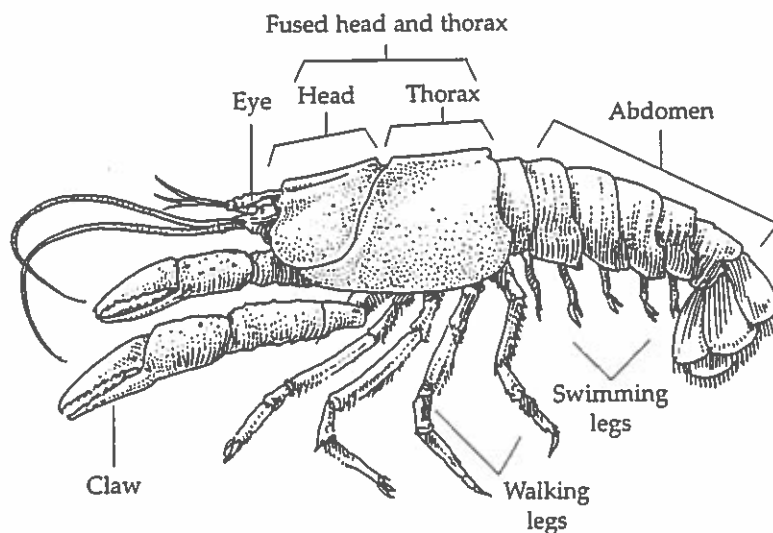
All arthropods have pairs of jointed legs. The joints, or places where the legs bend, allow the legs to move. The legs may be used for walking, swimming, hopping, or grabbing food. The number and type of legs depends on the type of arthropod.

**Reproduction.** Arthropods reproduce sexually. Separate male and female adults produce sperm and eggs that join to form fertilized eggs. Some arthropods reproduce in the water.

**Feeding.** Arthropods eat almost anything, including plants, other animals, wood, and paper. They have strong jaws used for chewing and specialized appendages such as claws used for capturing food.

**A Typical Arthropod?** Because there are so many different species of arthropods, there is no typical arthropod. Fig. 28-1 shows the structure of a crayfish, an arthropod that lives in water. This animal has four pairs of walking legs attached to a fused head and thorax. A much larger pair of legs are adapted as claws that are used to grab food. Smaller legs that are used for swimming are tucked under segments of the abdomen.

Fig. 28-1 Crayfish



# TAKE ANOTHER LOOK

Fig. 28-2 shows how arthropods differ from other invertebrates.

Fig. 28-2

	Sponges and cnidarians	Worms	Mollusks	Arthropods
<b>Body form</b>	Soft bodies made of two layers surrounding central cavity; no organs or organ systems	Soft bodies with three tissue layers; organs and organ systems	Soft bodies often with one or more hard shells; organs and organ systems	Segmented body; jointed legs; exoskeleton; organs and organ system
<b>Reproduction</b>	Reproduce sexually and asexually by fragmentation and budding	Reproduce sexually and asexually by fission; Some adults have both male and female sex organs	Reproduce sexually; separate sexes	Reproduce sexually; separate sexes
<b>Movement</b>	Some do not move from place to place; others do	Most move; some parasites stay attached to host	Some do not move; others do	Except for some stages, move from place to place; some fly
<b>Feeding</b>	Many are filter feeders; some capture prey	Some are parasites, others vary	Many are filter feeders; others capture prey	Many different food sources

## Check Your Understanding

Write a sentence explaining the connection between each pair of words.

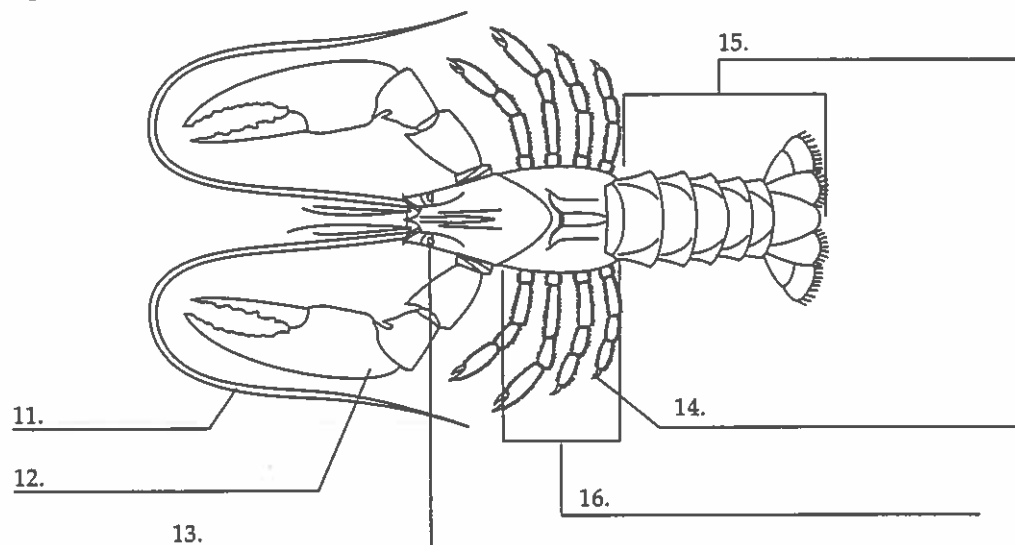
3. arthropod, segmented body \_\_\_\_\_  
\_\_\_\_\_
4. exoskeleton, protection \_\_\_\_\_  
\_\_\_\_\_
5. exoskeleton, molt \_\_\_\_\_  
\_\_\_\_\_

Complete the following sentences.

The three main parts of most arthropods are the (6) \_\_\_\_\_,  
(7) \_\_\_\_\_, and (8) \_\_\_\_\_. After an arthropod  
(9) \_\_\_\_\_, it often hides. At this time, its body has little or  
no (10) \_\_\_\_\_.

Fig. 28-3 shows a different view of the same arthropod that is shown in  
Fig. 28-1. Label its main parts.

Fig. 28-3



17. Why do arthropods live in so many different places?

---

---

18. What are two disadvantages of an exoskeleton? \_\_\_\_\_

---

19. Sometimes many different arthropods live close together but have  
different adaptations. As a result, they may not eat the same things  
and do not compete for food. How do you think this might affect  
arthropods as a group?

---

---

---



**Key Words**

**insects:** arthropods with three pairs of jointed legs  
**compound eyes:** eyes made up of many tiny lenses that can sense movement  
**simple eyes:** eyes that can sense only light and dark and cannot form images

**KEY IDEAS**

Insects are the most successful class of arthropods. They are a large and diverse group. Most insects can fly, have compound eyes, and produce large numbers of offspring.

Mosquitoes bite. Wasps sting. Moths eat wool. Some insects are harmful to humans. Others are helpful. For example, most flowering plants are pollinated by bees. If bees did not pollinate flowers, they would not produce seeds and fruit. As a result, we would have little fruit to eat.

The arthropods are made up of several classes of animals. The largest class is the insects. Insects (IHN-sehks) are arthropods with three pairs of jointed legs. Insects vary in size and structure, in the type of food they eat, and in the places they live. Because there is so much variety, many different kinds of insects can live in a small area without competing for food or space.

In general, most insects are small. Because they are small they need little space and little food. Because both space and food can be limited, the small size of insects helps them survive and thrive.

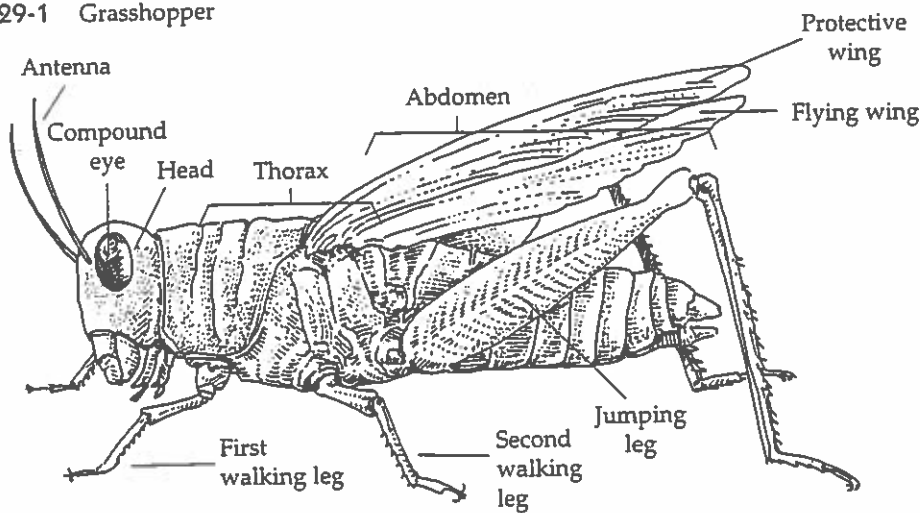


1. What is an insect? \_\_\_\_\_

**Body Form.** All insects have the same basic body form and parts. An insect has three body parts: the head, the thorax, and the abdomen. All insects have three pairs of jointed legs. In some insects, the legs may have special adaptations. In a grasshopper, for example, the third pair of legs is large and strong. These legs are well adapted for jumping. See Fig. 29-1.

Insects also have antennae (sing. *antenna*) on their heads. In most insects, the antennae can sense touch and smell. In others insects, the antennae may also sense taste and aid in hearing.

Fig. 29-1 Grasshopper



Most insects have large **compound eyes** (KAHM-pound eyez) that are made up of many tiny lenses. Each lens sees only part of the world around the insect. Together, the lenses make up the whole picture. A compound eye is very good at sensing movement. This eye helps insects catch prey and keeps the insects safe. Most insects also have **simple eyes** (SIHM-puhl eyez) that do not form images, but sense only light and dark.

Most adult insects have wings. However, some insects, such as certain types of ants, do not have wings. Mosquitoes and flies have only one pair of wings. Other insects, such as butterflies, bees, and dragonflies, have two pairs. In some insects, such as beetles, the first pair of wings covers and protects a more fragile second pair of wings that is used for flight.

Insects are the only arthropods, and the only invertebrates, that can fly. This adaptation helps insects survive. By being able to fly, insects can travel long distances in search of food and can quickly escape danger.



2. What are three traits of insects? \_\_\_\_\_

**Feeding.** Insects feed on a wide variety of plants, animals, and other materials. They have special mouth parts adapted for the kinds of food they eat. Butterflies, for example, have long tubes in their mouths that enable them to suck nectar from flowers. A mosquito has piercing mouth parts that allow it to puncture the skin of an animal and suck its blood.

## Check Your Understanding

Write a sentence explaining the connection between each pair of words.

3. insect, arthropod \_\_\_\_\_  
\_\_\_\_\_
4. compound eye, lenses \_\_\_\_\_  
\_\_\_\_\_
5. simple eye, light \_\_\_\_\_  
\_\_\_\_\_

Complete the following sentences.

6. One way to identify insects from other arthropods is by counting their legs. Insects have \_\_\_\_\_ pairs of legs.
7. Because of the \_\_\_\_\_ size of most insects, they need little space and little food.
8. The \_\_\_\_\_ of insects can often sense touch and smell, and in some insects it can also sense taste and aid in hearing.
9. Insects are the only invertebrates that can \_\_\_\_\_.
10. Most female insects lay \_\_\_\_\_ eggs.

- 
11. Describe at least one way in which insects are helpful to people.  
\_\_\_\_\_  
\_\_\_\_\_

12. Give at least three reasons that explain why insects thrive so successfully.  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



**Reproduction.** Another reason insects thrive is their ability to reproduce. Although the life span of an individual insect may be very short, the insect makes up for it by the large number of offspring it produces. In most cases, the female lays hundreds of eggs that later develop into adults. Between the stages of egg and adult, the insect may go through one or two other stages, depending on the type of insect.

## TAKE ANOTHER LOOK

Fig. 29-2 shows a variety in insect traits.

Fig. 29-2

Insect	Mouthparts	Wings	Other characteristics
Flies (houseflies, black flies, mosquitoes midges, gnats, horseflies)	Sucking	1 pair	Some feed on plants, others are parasites, and still others feed on insects. Some damage plants, some transmit animal diseases.
Mayflies	No real mouthparts	2 pairs	Found in and around ponds and streams. Adults live only a day or so, and do not eat.
Bugs (water bugs, water striders, bedbugs, assassin bugs, stinkbugs)	Sucking	None or 2 pairs	Very large group. Most live on land; some live in water; few parasitic. Some feed on plants, others prey on insects.
Bees, wasps, ants, sawflies	Bees: sucking Wasps, ants, and sawflies: chewing	None or 2 pairs	Live mainly on flowers, and on the ground. Some are parasites of other insects. Ants and some wasps and bees live in colonies.
Butterflies and moths	Sucking, with coiled sucking tube	Usually 2 pairs	Found on vegetation. The young are caterpillars, which feed on plants. Silk is produced by silkworm moths.