

ARE YOU ONE OF US?

INSECTS | GRADES 5 & 6

Skills

Sorting, classifying, comparing

National Science Standard

Content Standard C: Life Science

Students should develop an understanding of the characteristics of living organisms.

Content Standard G: History and Nature of Science

Students should develop an understanding of science as a human endeavour.

Objectives

- Students will learn that scientists classify living things according to similarities and differences.
- Students will be able to list the characteristics of arthropods.
- Students will be able to list the characteristics of insects.
- Students will be able to name the five classes of arthropods and give an example of an arthropod in each of the classes.

Assessment

Given pictures or models of arthropods, students will be able to sort them into the classes.

Materials

- “Invertebrate Photographs” template
- Chart paper or whiteboard
- Plastic arthropod models (optional)

Background

One of the most important jobs of being a scientist is to sort and classify. The science of classification is called systematics. Systematics gives scientists the tools to communicate clearly about the natural world. Living organisms are grouped according to how closely related they are (their evolutionary history). These groups start out very large and become increasingly specific until finally scientists name individual species. Each species has a scientific name that is recognized anywhere in the world no matter what language is spoken. Most people think that mammals are the most important and numerous group of animals on the earth. If asked to name a list of animals, most people will name mammals long before they name any other group.

Subjects

Science

Time

Preparation: 10 minutes

Teaching: 60 minutes

Evaluation: 10 minutes

Vocabulary

Definitions on Page 4 of Lesson

systematics

mammal

exoskeleton

vertebrae

arthropod

thorax

abdomen

antennae

millipede

centipede

crustacean

arachnid

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In reality, mammals are a relatively small group, and insects are a much larger one. There are about 4,500 species of mammals and more than a million known species of insects. Eighty percent of the world's animals are insects.

If an animal has an exoskeleton, segmented body and jointed legs, and is symmetrical on both sides of its body (bilaterally symmetrical), then it fits into the group scientists call arthropods. There are five major groups of arthropods, and insects are the largest. Scientists call each of these groups a class.

Lesson Presentation

Activity: Challenge students to fill one notebook-size sheet of paper (both sides) with the names of as many animals as they can think of in ten minutes. Ask them to be as specific as possible (for example, instead of "bird," write "cardinal"). At the end of ten minutes ask them to stop writing and count how many animal names they listed.

Ask students how many mammals were on the list. Have them write that number on paper and circle it. Ask how many insects were on the list. Have them write that number on paper and circle it.

Do not share the following information with students until they have finished the above exercise.

Explain: Most people think that **mammals** are the most important and numerous group of animals on the earth. If asked to name a list of animals, most people will name mammals long before they name any other group. In reality mammals are a relatively small group, and **insects** are a much, much larger group. There are about 4,500 species of mammals and more than a million known species of insects. Eighty percent of the world's animals are insects.

Ask: "Does your list reflect what most people think?" "Why do you think that most people do not think of insects when they are asked to make this list?"

Ask: "Do you know what characteristics scientists use to classify an animal as an insect?"

Have students brainstorm before the list is put on the board.

Insects have:

- An **exoskeleton**
- Three body parts: **head, thorax, abdomen**
- Six **legs** attached to the thorax
- Many adult insects have two or four **wings** also attached to the thorax
- Many adult insects have two **antennae** attached to the head

(write this list on the board or large chart so students can refer to it)

Activity: Divide the students into small groups and give each group the Invertebrate Photographs (from the downloadable PDF template) to sort. Ask them to sort the pictures into piles of insects and non-insects. Discuss the process. Was it easy or hard since they already knew the characteristics of insects?

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Ask the students to sort the non-insects into piles.

Ask how each group made the decisions they did.

Ask how all of the animals in the piles are related to each other.

Explain: All the insects have skeletons on the outside of their bodies. This is called an exoskeleton.

Other animals have exoskeletons as well. If an animal has an exoskeleton, segmented body and jointed legs, and is symmetrical on both sides of its body (bilaterally symmetrical), then it fits into the group scientists call **arthropods**. There are five major groups of arthropods. Insects are the largest group of arthropods. Scientists call each of these groups a class.

1. **Millipedes**
2. **Centipedes**
3. **Crustaceans**: crabs, lobsters and shrimp
4. **Arachnids**: spiders, mites, ticks, scorpions
5. **Insects**

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Definitions:

ABDOMEN One of three regions of an insect's body.

ANTENNAE Sensory organs attached to and extending from the head.

ARACHNID Class of arthropods including spiders, scorpions, ticks, and mites. Arachnids have eight legs in four pairs and one or two body regions.

ARTHROPOD An animal that has an exoskeleton, segmented body and jointed legs, and is symmetrical on both sides of its body (bilaterally symmetrical).

CENTIPEDE Arthropods that have a worm-like flattened body with many segments and one pair of antennae. They have many legs with one pair on most body segments.

CRUSTACEAN Arthropods such as sowbugs, crayfish, lobsters, and crabs that have 10 or more legs in pairs, two body regions, and two pairs of antennae.

EXOSKELETON Skeleton on the outside of an animal's body. Arthropods have exoskeletons.

MAMMAL One of a relatively small class of vertebrate animals. Mammals produce milk for their young. Most also give birth to live young and have hair or fur. There are about 4,500 species of mammals.

MILLIPEDE Class of arthropods that have a worm-like cylindrical body with many segments. Most body segments have two pairs of legs. Millipedes have one pair of antennae.

SYSTEMATICS The science of classification. Living organisms are grouped according to how closely related they are (their evolutionary history). These groups start out very large and become increasingly specific until finally scientists name individual species.

THORAX One of the three regions of an insect's body. An insect's wings and legs are attached to the thorax.

VERTEBRAE Bones that make up the backbone of a vertebrate animal.

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