Social Insects

Social insects live in highly organized groups of genetically related individuals. **› Social insects have elaborate social systems involving specialization of labor, parental care, and communication between individuals.** The role that an individual plays in a colony is called a **caste.** Caste is determined by a combination of heredity; diet, especially as a larva; hormones; and *pheromones,* hormonelike chemicals that are used for communication.

Honeybees A honeybee hive contains a queen, workers, and drone males. The honeybee queen usually is the only reproductive female in the hive. The workers care for the eggs, the larvae, the queen, and the drones. Workers also forage for food and maintain and defend the hive.



Figure 12 Centipedes and millipedes are relatives of insects and share many of the characteristics of insects.

Termites Termite colonies are similar to colonies of honeybees and ants. However, termites have kings as well as queens, and the kings have functions in addition to reproduction. Only the king and queen reproduce. Workers gather the food, raise the young, and excavate tunnels. Larger soldiers use their immense jaws to defend the colony.

Centipedes and Millipedes

The subphylum Myriapoda means "many footed." **› Myriapods include centipedes and millipedes.** Myriapods are not considered insects, though they share certain characteristics. Centipedes, such as the one in **Figure 12,** and millipedes have similar bodies. Each myriapod has a head region that is followed by many similar segments. Each segment bears one or two pairs of legs. Centipedes have one pair of legs per segment and can have up to 173 segments. Millipedes have from 11 to 100 or more body segments, and most of these segments have two pairs of legs.

SCILINKS
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Section 3 Review

› KEY IDEAS

1. **Describe** the most common characteristics of insects.
2. **List** the adaptations that allow insects to fly.
3. **Define** the unique life cycle of an insect, and explain why this life cycle is unique among arthropods.
4. **Describe** the qualities of social insects.
5. **Classify** which arthropods are myriapods.

CRITICAL THINKING

6. **Inferring Conclusions** An unknown arthropod has three body regions, one pair of antennae, and three pairs of jointed legs. What kind of arthropod is it? Explain your answer.
7. **Making Inferences** A certain chemical does not kill crop-eating insect larvae but rather keeps them from pupating. Could this chemical be an effective insecticide? Explain your answer.

CONNECTING KEY IDEAS

8. **Report** Conduct research in the library or on the Internet about the historical and current importance of the study of the fruit fly *Drosophila melanogaster* to our understanding of genetics. Explain any unusual characteristics of this insect that made it particularly valuable for these genetic studies. Prepare a one-page report on your findings.

Answers to Section Review

1. three body regions, three pairs of legs, antennae, compound eyes, and wings
2. lightweight bodies, and strong muscles to move their wings
3. Metamorphosis is the phased transition between the egg and adult. The intermediate stages are larva and pupa or nymph. This life cycle is an adaptation for different environments.
4. Many individuals live together by dividing the labor. Select members have the job of reproduction. Others get food and maintain and protect the colony.
5. Myriapods are centipedes and millipedes.
6. These are all characteristics of insects.
7. It would depend on the insect. Most larvae cause damage by eating vegetation. Some adults, such as grasshoppers, can cause damage as well. It would be best to stop the insects from mating.
8. The research that led to the concept that genes are located on chromosome was conducted with this organism. Studies of this fly have informed our understanding of development. Students' work should include the ties to genetic discoveries.

Teaching Key Ideas

How Are They Different? Ask students which arthropod characteristic is most pronounced in centipedes and millipedes. (segmented body) Which features distinguish centipedes from insects? (number of body regions and number of legs) LS Visual

Math Skills

Cricket Thermometer Crickets are sensitive to changes in air temperature and chirp faster as temperatures rise. To calculate air temperature (**T** in Fahrenheit), count the number of chirps for 15 seconds (**c**), and add 40. $\mathbf{T} = \mathbf{c} + 40$

› Close

Formative Assessment

An organism has a segmented body, paired and jointed appendages, a mandible, no wings, and lives on land. The organism is most likely a _____.

A. spider (Incorrect. Spiders do not have mandibles.)
B. centipede (Correct. These are characteristics of centipedes and millipedes.)
C. grasshopper (Incorrect. Grasshoppers have wings.)
D. crab (Incorrect. Crabs are aquatic animals.)