
SYNOPSIS:

Travel nearly anywhere in the world and you're sure to find bees. With over 20,000 species, these flying insects have settled into every corner of the globe except Antarctica. Many live a solitary existence, but over time, have some bees have evolved into cooperative social insects with an astonishing ability to communicate with each other.

This program offers a bee's eye view into some of nature's most highly developed insects. Discover how the appearance of flowers on our planet over 130 million years ago led to the evolution of bees. Follow some interesting species on their daily rounds as they build their nests and hives; lay their eggs and raise their young; and find and gather sweet nectar and pollen. Learn why their pollen-gathering is vital to the survival and cultivation of many plants and how they relay detailed information to each other.

CURRICULUM UNITS:

Biology
Entomology
General Science
Life Science

CAREER OPPORTUNITIES:

Beekeeper
Biologist Botanist
Ecologist
Entomologist
Farmer
Life Scientist
Naturalist

BACKGROUND INFORMATION & PROGRAM OVERVIEW:

Bees are flying INSECTS and share common characteristics with other insects. They have six legs, and their bodies are divided into 3 main parts; the head, a middle

section called the THORAX. and the ABDOMEN. The buzzing noise most bees make is the result of their rapid-fire wings flapping up to 1000 times a second. A bee doesn't have a nose or ears. but uses the antennae on its head to touch, smell, and taste. It drinks NECTAR, the sweet liquid that flowers produce, through its long, straw-like tongue, or PROBOSCIS.

It is in their search for nectar that bees inadvertently perform one of their most important roles in nature, POLLENATING flowers. As bees explore the insides of flowers, they collect POLLEN in the BRANCHING HAIRS on their legs or bodies, then drop some of it or brush it off with the PUSHER HAIRS on their legs as they visit other flowers. This helps to pollinate the flowers.

Students are introduced to the concept of EVOLUTION, bees are the VEGETARIAN DESCENDANTS of ancient predatory wasps. When flowers appeared 136 million years ago, the wasp-like ancestor of the bee began a long, slow process of EVOLVING. About 19 million years ago the first true bee appeared.

In a honeybee colony, most larvae will develop into female WORKERS. Workers usually live about six weeks. During the first weeks of their lives they care for eggs and larvae and are known as NURSE BEES. Later, they perform other work in the hive such as building hexagonal cells from the BEESWAX they secrete from glands in their abdomens. The cells are used to hold pollen, nectar, and honey as well as eggs, larvae, and pupae. Worker bees then go on to spend the last weeks of their lives flying afield as food hunters, or FORAGERS. A few larvae will be specially fed to become queens. Some larvae develop into male DRONES whose purpose is to mate with a queen bee on her one MATING FLIGHT, the only occasion she will leave her hive unless she is forced. This can happen when the colony gets too large,

or the queen gets too old and unable to produce enough of the QUEEN SUBSTANCE which controls the workers' activities.

ISSUES AND CRITICAL THINKING:

- 1) After showing this program. ask students the following:
 - a) When talking about insects what is meant by the terms "solitary" or "social"?
 - b) What is a bee's main source of food?
 - c) During cold winters. what advantage do honey bees have over bumblebees, which must hibernate?
 - d) How does one honeybee communicate to other bees where flowers are located?
 - e) Why are bees important to us?
- 2) Trace the ancestry of modern bees.
- 3) Draw a diagram representing the metamorphosis of a bee. Include all four life stages.
- 4) Discover which types of bees can be found in your state. Which are native to your area?
- 5) Have students draw bees of different species and cut them out, or construct models of them from various materials. Hang them around the classroom.
- 6) Visit an apiary or invite a beekeeper to explain how Honeybees are kept and how their honey is harvested. An agricultural extension agent should be able to direct you to one.
- 7) Discuss why different honeys have different colors or tastes. Then have a "honey tasting".
- 8) Discuss some ways to avoid getting stung by a bee. Have a school nurse or other medical professional explain the kinds of physical reactions one could expect from a sting and what should be done about them.
- 9) Discuss what could happen if bees disappeared.

GLOSSARY:

Abdomen- One of the three regions of the body of an insect: head, thorax, abdomen.

Antennae- A pair of flexible, thread-like structures on the head of an insect, used for touch, smell, and taste.

Branching hairs- Split hairs on the legs of bees to which pollen sticks.

Colony- the total family or hive of bees having one Queen leader.

Drone- Male bees which develop in the unfertilized eggs of an old queen bee, their purpose is to mate with a new queen bee.

Foragers- A worker bee that flies afield to collect pollen, nectar, and water for the colony.

Honey- A sweet, viscous liquid produced by honeybees from the nectar of flowers.

Larva- The form of some insects just after hatching from the egg, in which they are wingless, wormlike, and generally unlike the adult form.

Mandibles- Jaws of an insect.

Nectar- A sweet secretion of flowers which bees collect and convert into food.

Nurse Bee- Young worker bee that cares for the colony's eggs and larva.

Pollen- the fine, powdery material produced by the anthers of a flower, which is necessary for fertilization and seed formation in plants. Collected and used by bees to feed young bees.

Pollination- The transfer of pollen from the anther of

a flower to the stigma of the same flower or one on another plant.

Proboscis- Tongue of the bee.

Pupa- the form of some insects just after the larval stage, in which they go motionless and undergo many changes before emerging as an adult.

Pusher hairs- Specially shaped hair on the inner side of bee's legs used to scrape pollen from the branching hairs.

Queen substance- A chemical material produced in glands within the queen's hood that controls the workers' activities, i.e. prevents them from rearing a new Queen.

Swarm- A queen and a large number of followers, split from a previous colony and gathered together in an effort to establish a new home.

Thorax- The middle region of an insect's body which bears its wings, if it has them, and its legs.

Worker bee- Sexually undeveloped female bees that comprise the bulk of a colony and carry on all functions necessary for colony survival, except egg laying and queen mating.



TMW MEDIA GROUP

2321 Abbot Kinney Blvd., Venice, CA 90291

(310) 577-8581 Fax (310) 574-0886

Email: sale@tmwmedia.com

Web: www.tmwmedia.com

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Wonders of Biology – Animals,
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Show Me Science

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ENTOMOLOGY: THE BUZZ ABOUT BEES

