3. Stuff the cotton into the mouth of the jar around the branches so that the caterpillars do not fall into the water.
4. Gently place the caterpillars on the cotton; they will instinctively climb upwards to the milkweed leaves.
5. It is important to replace the milkweed branches with fresh ones every two or three days. **Caterpillars need fresh leaves or they will not eat!**
6. After three weeks your caterpillars will stop eating and form their pupae. They will remain in the pupae for about a week. Adult monarchs can then be fed sugar water in a small dish for a few days and then be released, or they can be released immediately.

There are biological supply companies that sell moth and butterfly kits; instructions and food are provided. The animals are shipped as caterpillars or pupae.

- Insect Lore: **800-LIVE-BUG.**
- Carolina Biological Supply: **800-334-5551**

Suggested Extensions

Investigate the life cycles of other insects. There are many kinds of insects that go through complete metamorphosis like butterflies and moths: beetles, ants, bees, wasps, flies and mosquitoes all have larval and pupal stages.

Setting up a meal worm colony in your classroom is an easy way to watch a darkling beetle undergo complete metamorphosis. Other insects, such as crickets, do not undergo complete metamorphosis.

Have students investigate animals which use aposematic coloration (colors as a warning). Using examples such as the brightly hued poison dart frog, monarch butterfly and coral snake, explore which colors mean CAUTION in the animal world.

Vocabulary

abdomen
antennae
aposematic coloration
chrysalid, chrysalis
cocoon
exoskeleton
larva, larvae
Lepidoptera
metamorphosis
pheromones
proboscis
prolegs
pupa, pupae
thorax

TEACHER'S GUIDE

Suggested Internet Resources

Periodically, Internet Resources are updated on our Web site at www.LibraryVideo.com

members.aol.com/YESbutrfly/home.html — All about butterflies and moths sponsored by the Young Entomologist's Society.

www.entsoc.org — This site includes links to many bug-related sites on the Web, as well as educational information and projects for elementary and middle school students.

www.nhm.org — The Natural History Museum of Los Angeles County's web site includes pages devoted to the Insect Zoo.

Suggested Print Resources

Boring, Mel. *Caterpillars, Bugs and Butterflies.* Creative Publishing International, Chanhassen, MN; 1999.

Cole, Joanna. *The Magic School Bus Butterfly And the Bog Beast: A Book About Butterfly Camouflage.* Scholastic Inc., New York, NY; 1996.

Whalley, Paul Ernest. *Butterfly & Moth.* DK Publishing, Inc., New York, NY; 2000.

TEACHER'S GUIDE BY:

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COMPLETE LIST OF TITLES

- **ANTS**
- **AQUATIC INSECTS**
- **BEES**
- **BEETLES**
- **BUTTERFLIES & MOTHS**
- **CRICKETS, GRASSHOPPERS & FRIENDS**
- **FLIES & MOSQUITOES**
- **HOUSE & BACKYARD INSECTS**
- **LADYBUGS & FIREFLIES**
- **SPIDERS & SCORPIONS**

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7/02

TEACHER'S GUIDE

BUTTERFLIES & MOTHS

Grades 1–6

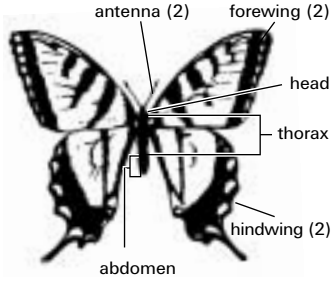
This guide is a supplement, designed for educators to use when presenting this program in an instructional setting.

Before Viewing: Research in learning suggests that it is important for the teacher to discover what the students know — or think they know — about a topic, at the start of a new unit, so that their accurate conceptions can be validated and reinforced, and their misconceptions identified and corrected. Therefore, create an "Everything We Know About…" list. Preview key vocabulary words and have students raise questions they hope will be answered by this program. Most importantly, students should be told to pay close attention to the show, so that after viewing the program, they will be able to tell whether or not the facts/beliefs they put on their list were scientifically accurate.

After Viewing: After a brief discussion about the program, challenge your students to prove or disprove the accuracy of the facts they put on their "Everything We Know About…" list. Discuss what else they learned and any additional questions they may have. Encourage students to research the topic further with the Internet and print resources provided.

SCHLESSINGER MEDIA — A DIVISION OF LIBRARY VIDEO COMPANY®

Imagine a delicate, fragile butterfly. These brightly colored beings may seem frail, but did you know that monarch butterflies fly hundreds of miles in their yearly migration? That is the equivalent of a person walking over 2 million miles on foot! There is one moth species with a wingspan that is 14 inches across, while another has a tongue, or proboscis, that is a foot long. These are just a few of the interesting things about butterflies and moths.



Butterflies and moths are insects, complete with an exoskeleton, the hardened shell that protects their bodies. All insects have six legs as adults, one pair of antennae and three body sections. The head contains the mouth parts and the sensory organs; the thorax contains muscles needed to move the legs and wings, if any; and the abdomen is where the internal organs needed for respiration, digestion and circulation are located. Butterflies and moths are in the insect order *Lepidoptera*, which means "scaly winged."

Thousands of tiny colored scales arranged like shingles on a roof give them their colors. Color is very important for mate recognition and, in the case of the monarch butterfly, defense. These scales rub off if you touch the butterfly's wing, making the wing feel slippery. This may help the butterfly escape from a predator's grasp.

Tagging Butterflies

There are several methods scientists use to tag butterflies in order to learn more about their migration patterns. One, as shown on the video, involves holding the butterfly and gently rubbing away a small amount of scales on the upper and lower surfaces of the top of the butterfly's right wing. An adhesive numbered tag is then folded over the wing. In the past few years a newer method of tagging butterflies has been adopted. This involves placing a circular tag over the large, mitten-shaped discal cell on the underside of the hindwing of the butterfly. This new method reduces the chances of the butterfly being harmed during tagging and does not impede the butterfly's ability to fly. Once the butterflies are set free and have gone through a migration cycle, scientists use binoculars to read the numbers on the tags and keep track of their travels.

How to Tell Butterflies and Moths Apart

Butterflies usually fly during the day. Moths usually fly around at night, which is why you find moths and not butterflies around your porch light. Butterfly antennae are thin and clubbed at the ends. Moths have feathery or thread-like antennae. Males may have large antennae for picking up pheromones, or the scent of females. At rest, a butterfly's wings are held vertically above its back. At rest, a moth's wings are usually folded flat against its body. A butterfly's body is usually slim. A moth's body is heavier, wider and furry. A butterfly's pupa is called a chrysalid or chrysalis. A moth's pupa is sometimes covered with a silk bag, or a cocoon.

Life Cycle

Some think that butterflies only live for a few weeks. Actually, many of these insects live for about one year, but the majority of that time is spent in the larval, or caterpillar stage. There are four distinct stages in the life of butterflies and moths, which are known as complete metamorphosis:

Egg

All insects develop from eggs. Most butterflies and moths lay their eggs directly on the food plants favored by their larvae.

Larva

Caterpillars are the larval form of butterflies and moths. Almost all caterpillars are herbivores. Plant leaves are a poor source of energy, so caterpillars spend most of their time eating. It appears that caterpillars have more than six legs; these other legs are called prolegs and are absorbed back into the body during metamorphosis.

Pupa

Inside the pupa, the body rearranges itself from a non-reproductive larva to an adult whose main function is to propagate.

Adult

After a period of several days or weeks in the pupa, an adult butterfly or moth emerges. Adult butterflies and moths consume flower nectar to give them the energy needed to fly. The adult phase is often the shortest of the stages of the butterfly and moth life cycle.

Create a Butterfly Garden

There are many plants that attract local butterflies to their flowers. Some butterflies will even lay eggs on the plants, which your students can collect. Following is a list of some plants that are easy to find in local nurseries:

- New England aster
- bergamot
- cone flowers
- ox eye daisy
- milkweed
- butterfly weed
- phlox
- chrysanthemum
- zinnia
- ironweed
- spearmint
- verbena
- thistles
- cosmos
- lantana
- marigold
- geranium
- goldenrod
- impatiens
- violets
- clover
- fireweed
- petunia
- dahlia

If you don't have a flower bed in which to plant, you can use a window box or plastic pots and put the plants near a sunny window. Be sure to keep the plants watered. Place a metal jar lid filled with water on the soil for the butterflies to drink. Adding a dish of sliced fruit (apples, pears, plums, peaches, bananas) may attract butterflies as well. Check the host plants for eggs, larvae and other insects once a week. A field guide next to the host plants will help identify any insects or arachnids that you may find.

Build Your Own Caterpillar Habitat

You can watch the fascinating changes of metamorphosis when you raise some caterpillars in the classroom. Milkweed, the preferred host plant of monarch caterpillars, is easily procured from a nursery specializing in native plants. There are several species available, all in the genus *Asclepias*. You can plant milkweed outside and collect monarch eggs in the spring (look under plant leaves), or purchase caterpillars from a biological supply company and raise them on fresh milkweed.

Materials:

- aquarium with a screen lid
- paper towels
- large glass jar
- spray bottle with distilled water
- several rolls of cotton
- monarch caterpillars

What To Do:

1. Line the bottom of the aquarium with paper towels.
2. Place a few milkweed branches into a jar filled with distilled water.

(Continued)