

Teaching through Trade Books

Activities inspired by children's literature

Life-Cycle Science

Spring bursts forth with new life! And students and teachers are bursting with spring fever. It's time for outdoor adventures! After a nature walk observing butterflies or the plants they use for food, take advantage of this opportune time to discover the science of the butterfly's life cycle. From egg to caterpillar, chrysalis to butterfly, the journey is a source of wonder and excitement for children.

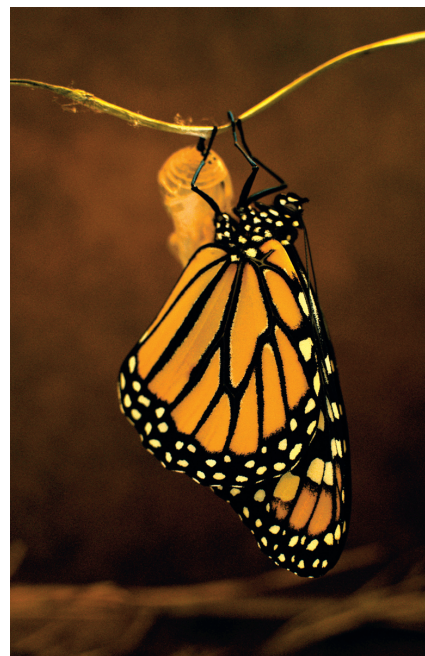
This Month's Trade Book

Waiting for Wings Lois Ehlert



Waiting for Wings
By Lois Ehlert.
Unpaged.
Harcourt. 2001.
ISBN 0-15-202608-8.

the egg and begins the second stage of life. The third stage begins when the caterpillar stops eating, attaches itself to a leaf or twig, and then forms a chrysalis. Finally, the butterfly emerges from the chrysalis beginning the fourth, and last, stage of the butterfly's life cycle.



Synopsis

A book for all ages, *Waiting for Wings* begins as an easy reading book. Bright and colorful, the opening pages are uniquely altered from pages of uniform size to smaller pages embedded into larger pages. The color and size gives the reader an impression of being among the leaves where the butterfly eggs are deposited.

In poetic form, the rhythm of the story gently leads the reader through the life cycle of the butterfly from egg to caterpillar to chrysalis and finally to emergent butterfly. As the butterfly emerges in new life, the pages grow to book size, and the reader discovers a brilliant flower garden that is busy with butterflies of many colors. The final pages are large, vibrant, and thoroughly descriptive. Butterflies in various stages are identified as well as the plants that provide their food. Concluding pages share valuable butterfly information as well as how to grow a butterfly garden.

Background Science

The life cycle is a concept that can be taught in a short period of time through the four-stage life cycle of a butterfly. It begins when a female butterfly deposits an egg on the underside of a leaf. A caterpillar hatches from

Closely related to the butterfly, the moth shares a similar life cycle. Although the terminology of the stages is different, the process reflects that of the butterfly. The moth's life cycle also begins when the adult female moth lays her eggs on leaves. After approximately ten days, a larva eats its way out of the egg beginning the second stage. The third stage begins when the larva forms a cocoon securing it to a leaf with a sticky thread. In two to three weeks, the final stage brings forth the moth.

NSTA Connection

Meet Lynne Cherry, author of *The Great Kapok Tree* and other science trade books, on the NSTA website! She'll be answering your questions about science writing and her new book, *How Groundhog's Garden Grew*. This book introduces young readers to the joys of gardening. To participate in the discussion and to read about making your own garden at home or in the schoolyard, go to www.nsta.org/main/forum and look for the "Meet Lynne Cherry" link. Coming in May: Mia Posada, author of *Ladybugs: Red, Fiery, and Bright*, © 2002, Lerner.

Trade Book–Inspired Investigations

With warm weather returning in spring, children are eager to spend more time outdoors. This gives teachers an opportunity to take their students for a nature walk to discover life beginning anew. As Ehlert’s book begins with eggs on leaves, part of the search for new life can be for butterfly eggs on the underside of leaves. Look for eggs of the Monarch butterfly on the underside of milkweed leaves, and look for Painted Lady eggs on the underside of small flowering plants found in grassy parks, meadows, and yards. If the nature walk does not yield such plants, the children need not miss out on the excitement of seeing the life cycle of the butterfly unfold firsthand. Teachers may order butterfly kits (see Resources) for a classroom demonstration of this amazing process.

For older children, the life cycle of the butterfly can be compared to that of the moth. Moth kits and butterfly kits can be ordered together. The comparisons can begin right away!

For Grades K–3: Egg to Butterfly

Journaling is an authentic assessment tool for the scientific observation of the butterfly life cycle, revealing the thought processes of the writer. It allows the writer to observe the stages of butterfly development, record information, interpret data, and make predictions. It allows the practice of fundamental concepts and skills in science, such as sequencing and ordinal position. Children can draw or write their prediction of the upcoming stage, and then compare their prediction to what they observe. How are the caterpillar and the chrysalis alike? How are the butterfly and chrysalis alike?

In a measuring activity, students can measure a caterpillar through the clear plastic cup and record (again by drawing or writing) their results on a chart or graph. Since the children cannot touch the caterpillar, they can extend this measuring activity by finding other items in the classroom that they can touch and manipulate that are roughly the same length of their caterpillar,

thus giving more meaning and appreciation for the size of the caterpillar.

Young children can also use this activity to practice counting skills. Using a large magnifying glass, they can count the segments of the caterpillar’s body and then compare those segments to how many parts they count in their own bodies (their arms or legs, for example). They can count the days the egg remains on the leaf before a caterpillar hatches, then how many days the caterpillar remains before it becomes a chrysalis, and finally how many days the chrysalis remains before the butterfly emerges.

As the butterflies emerge, children can compare the similarities and differences of the colors and shapes they discover in the butterfly wings, recreating these in drawings in their journals. Recording this information in a butterfly journal allows young children to process new information through concrete experiences. It encourages the scientific process skills most appropriate for primary students: observing, comparing, classifying, measuring, and communicating.

The metamorphosis of the butterfly can then be reinforced by integrating it with other areas of the curriculum. In language arts, children can see how many words they can make from “butterfly,” “caterpillar,” and “chrysalis.” They can write and illustrate poetry of rhyming words or haiku about butterflies or caterpillars, or they can unscramble words to make a



sentence stating a fact they learned about butterflies. To improve visual memory skills, make a memory game of cards with pictures of the four stages. In a game of Memory, once the cards of the four life cycle stages are obtained, the cards could be placed into sequential order. In art, the beauty and symmetry of butterfly wings can be recreated by painting watercolors on one side of a butterfly pattern, and then pressing the wings together. Finally, children can use their thumbprints to illustrate the four stages of the butterfly life cycle.

For Grades 4–6: Compare and Contrast

Waiting for Wings also has appeal for older children. Students' basic interest in the life cycle of the butterfly can be extended to a comparative study of the life cycle of moths. The comparisons can begin with vocabulary. Although the stages of metamorphosis for the butterfly and moth are similar, the terminology varies, for example, a butterfly forms a chrysalis and a moth forms a cocoon.

Second, allow children to compare the similarities and differences in the length of stage development between various butterflies and moths. What observations about each stage can students make? Once the butterflies and moths emerge, more observations can be made. For example, children will notice that moth wings are flat when resting, while butterfly wings are upright when resting. What other differences can the children discover about the antennae, the abdomen, or the colors of the butterflies and moths? Children can research questions such as, "When are butterflies and moths more active?" "How long do butterflies and moths live in the wild?" "Do all butterflies and moths migrate?" The children can create illustrated charts of these similarities and differences. The charts will be varied, interesting, and beautiful!

Another avenue of investigation is butterfly migration. Children can explore the migratory patterns of butterflies or moths and seek answers to questions such as "Where do butterflies/moths migrate from/to?" "What are the climatic differences in regions where butterflies and moths are found?" and "Which other animals migrate?"

In further exploration, students can discover the

flowers of choice for different butterflies and moths. Ehlert encourages children, "Find out which butterflies live in your area and which nectar-rich flowers will entice those butterflies to visit your garden." This might lead some children to ask, "What kind of flowers do moths like?"

One colorful page at the end of *Waiting for Wings* illustrates hollyhock, gaillardia, impatiens, sweet william, marigold, zinnia, and many other plants that attract butterflies. This invites an ecological direction to your investigation of butterflies—creating a butterfly garden and seeing how the interconnection of living things is supported by the "dance," or nectar-gathering, of the butterfly. Children can begin their butterfly gardens with seeds of the flowers suggested by Ehlert.

At the end of *Waiting for Wings*, a variety of butterflies are shown. This page in itself can lead children on a never-ending journey of discovery—into the astounding diversity of butterfly species. Students can attempt identification of butterflies found in their area (see Resources).

Waiting for Wings is well worth the wait. Allow this book to carry your class on a fascinating journey through the butterfly life cycle.

Internet Resources

Butterflies of North America

www.npwrc.usgs.gov/resource/distr/lepid/bflyusa/bflyusa.htm

Earth's Birthday Project

www.earthsbirthday.org

Educational Science Company Online Science and Nature Store

www.educationalscience.com

Journey North

www.learner.org/jnorth/

Moths of North America

www.npwrc.usgs.gov/resource/distr/lepid/moths/mothsusa.htm

Gloria Tansits Wenzel is an assistant professor of education at the University of Scranton, Pennsylvania. She can be reached at wenzeg2@scranton.edu.