Berkshiremuseum

All About Butterflies

Pre & Post Visit Resources

Program Description and Frameworks

Life cycles come alive! Students take flight in movement activities and observe live butterflies in one of the stages of metamorphosis. Explore symmetry and pattern to create butterfly art prints.

Location: Berkshire Backyard Gallery
Length/Grades: PreK - K (45 minutes); Grades 1 - 2 (one hour)

Massachusetts

Science and Technology/ Engineering Strand 2

1 Recognize that animals (including humans) and plants are living things that grow, reproduce, and need food, air, and water.

3 Recognize that plants and animals have life cycles, and that life cycles vary for different living things.

6 Recognize that people and other animals interact with the environment through their senses of sight, hearing, touch, smell, and taste.

8 Identify the ways in which an organism's habitat provides for its basic needs (plants require air, water, nutrients, and light; animals require food, water, air, and shelter.

Mathematics

K.P.3 Identify, reproduce, describe, extend and create color, rhythmic shape, number, and letter repeating patterns with simple attributes.

K.G.4 Identify positions of objects in space and use appropriate language (e.g., beside, inside, next to, close to, above, below, apart) to describe and compare their relative positions.

2.P.1 Identify, reproduce, describe, extend and create simple rhythmic, shape, number, color, and letter repeating patterns.

2.G.4 Identify shapes that have been rotated (turned), reflected (flipped), translated (slid), and enlarged. Describe directions of translations, e.g., left, right, up, down.

2.G.5 Identify symmetry in two dimensional shapes.

2.G.6 Predict the results of putting shapes together and taking them apart.

2.G.7 Relate geometric ideas to numbers, e.g., seeing rows in an array as model of repeated addition.

Dance Standards

1.1 Identify and demonstrate basic locomotor and non-locomotor movements.

1.3 Identify and demonstrate accuracy in moving to a musical beat and responding to changes in tempo.

1.4 Demonstrate the ability to define and maintain personal space**.**

1.6 Demonstrate partner skills of copying, leading, following, and mirror imaging.

3.4 Present dances or movement phrases and discuss how movement choices convey meaning.

10.1 Integrate knowledge of dance, music, theatre, and visual arts and apply the arts to learning other disciplines.

Visual Arts Standards

1.1 Use a variety of materials and media, *for example, crayons, chalk, paint, clay, various kinds of papers, textiles, and yarns,* and understand how to use them to produce different visual effects

1.2 Create artwork in a variety of two-dimensional (2D) and three-dimensional (3D) media, *for example: 2D – drawing, painting, collage, printmaking, weaving; 3D – plastic (malleable) materials such as clay and paper, wood, or found objects for assemblage and construction*

2.4 For shape and form**,** explore the use of shapes and forms in 2D and 3D works. Identify simple shapes of different sizes, *for example, circles, squares, triangles,* and forms, *for example, spheres, cones, cubes,* in the environment and in artwork

2.5 For pattern and symmetry, explore the use of patterns and symmetrical shapes in 2D and 3D works. Identify patterns and symmetrical forms and shapes in the environment and artwork.

10.1 Integrate knowledge of dance, music, theatre, and visual arts and apply the arts to learning other disciplines.

New York

Standard 3 Mathematics

4 Students use mathematical modeling/multiple representation to provide a means of representing, interpreting, communicating, and connecting mathematical information and relationships.

7 Students use patterns and functions to develop mathematical power, appreciate the true beauty of mathematics, and construct generalizations that describe patterns simply and efficiently.

Standard 4 Science The Living Environment

1 Living things are both similar to and different from each other and nonliving things.

3 Individual organisms and species change over time.

5 Organisms maintain a dynamic equilibrium that sustains life.

6 Plants and animals depend on each other and their physical environment.

Visual Arts Standards

1 Students will make works of art that explore different kinds of subject matter, topics, themes, and metaphors. Students will understand and use sensory elements, organizational principles, and expressive images to communicate their own ideas in works of art. Students will use a variety of art materials, processes, mediums, and techniques, and use appropriate technologies for creating and exhibiting visual art works.

2 Students will know and use a variety of visual arts materials, techniques, and processes. Students will know about resources and opportunities for participation in visual arts in the community (exhibitions, libraries, museums, galleries) and use appropriate materials (art reproductions, slides, print materials, electronic media). Students will be aware of vocational options available in the visual arts.

Dance Standards

1 Students will perform set dance forms in formal and informal contexts and will improvise, create, and perform dances based on their own movement ideas. They will demonstrate an understanding of choreographic principals, processes, and structures, and of the roles of various participants in dance productions.

Program Outline

- Introduction to Butterflies — Students will share what they know about butterflies. Using the Museums' insect collection, pictures, and hands-on objects, the group will learn about butterfly life cycles, how to tell a moth from a butterfly, and how caterpillars and butterflies interact with their surroundings.
- Live Butterflies — This is an opportunity for students to see real butterflies in one of their stages of development.
- Movement — Students will create movements for each stage of a butterfly's life cycle, and for specific moments or activities in a butterfly's life.
- Symmetry & Pattern — Students are introduced to the concepts of symmetry and patterns as we look at examples of art featuring butterflies.
- Printmaking — Students make their own butterfly prints, applying what they've learned about pattern and symmetry.
- Conclusion — A discussion of any questions and connections to the *Bug Out of the Box* exhibit.

Concepts Covered

- Butterflies and moths are insects.
- Butterflies have clubbed antennae, while moths have unclubbed or feather-like antennae.
- Butterflies go through complete metamorphosis.
- Butterflies and caterpillars have the same senses that we have, but they use different body parts than we do to sense their surroundings.

Key Terms Used During the Program

Insects	animals that have no back bone, and do have an outer covering called an exoskeleton; all adult insects have three body sections and three pairs of legs.
Metamorphosis	the change of an insect from one form to another as it develops into an adult. Some insects go through incomplete or simple metamorphosis, changing gradually from egg to nymph to adult. Others go through complete metamorphosis, changing from egg to larva to pupa to adult.
Larva	the stage between egg and pupa in complete metamorphosis; butterfly larvae are called caterpillars.
Pupa	the stage between larva and adult in complete metamorphosis; a butterfly pupa is called a chrysalis.
Antenna	a long, thin body part, usually located on the head, used for sensing surroundings, usually through touch and smell.
Proboscis	a long, tube-like mouth part used for sucking nectar and other liquids.
Nectar	a sweet liquid given off by flowers.
Pollen	a yellow powder-like material made by many plants. When pollen is carried from one plant to another by animals or the wind, it joins with ovules and seeds form.
Cocoon	a case of silk (or similar material) spun by insects, in which the eggs or pupa develop.
Chrysalis	a butterfly pupa (including its protective covering); the word chrysalis is also sometimes used in place of "pupa" for insects other than butterflies.
Symmetry	an object or shape has symmetry when it can be divided in half along a single line, with both halves being mirror images of one another (if you folded it in half, the halves match).

Pattern repeating a shape in a systematic way.

Pre & Post Visit Activities

Butterfly Life Cycle Review

To review the butterfly life cycle, or any other animal life cycle with students. each student can make their own, or a large version can be made to use with the whole class on a chalkboard or felt board.

Start with a printout of the butterfly life cycle (Enchanted Learning http://www.enchantedlearning.com/subjects/butterfly/ has several) or with the students' own drawings of each stage of the life cycle: egg, larva, pupa, adult. If using a printout, have students color the images.

Give each student two small paper plates and two copies of the template (included at the end of this document) to cut out and paste to their plates (this divides the plate into 4 sections). One plate is for the pictures. Each stage of the life cycle should be pasted into its own section, progressing in order clockwise. The other plate should have one section cut out. It is then placed on top of the other plate, and fixed in place in the center with a brass fastener. This allows the top plate to be rotated so that the window reveals just one life cycle stage at a time.

An alternate format is a moebius strip. Simply cut one long, thin strip of paper for each student. The stages of the life cycle should be pasted on the strip, in order. Then twist the strip once and glue or tape the ends together. Now you should be able to follow the life cycle continuously, without end.

Butterfly Metamporphosis Craft

Materials for each student: 1 toilet paper tube, 1 coffee filter, construction paper, piece of yarn or string, small pompoms, small googley eyes. Students can create a caterpillar by gluing several small pompoms together, and adding eyes. Wrap the coffee filter loosely around the toilet paper tube, and tack in place with a little glue to make a chrysalis. For colored chrysalids, the filters can be dipped in a solution of water and food coloring (and dried) ahead of time. Students can use any stiff paper like construction paper to create their butterflies. You may ask them to think about their butterfly's defenses as they color it (Does it have fake eye spots? Colors like bright orange that warn that they taste bad? Camouflage?). Use the yarn to attach the caterpillar to one end of the chrysalis and the butterfly to the other end. That way the caterpillar can go into the chrysalis and the butterfly can emerge from the other end.

Movement Activity

After your visit to the Museum, review the movements students created during the butterfly program. To make it into a game, call out the names of the different stages, with students making the appropriate poses and movements, as long as you go in the correct order (egg-larva-pupa-adult…). If you go out of order (pupa-adult-pupa), they should freeze.

See our web links below for more activities.

Suggested Print and Web Resources

All of these resources are available through the Central/Western Massachusetts (C/W MARS) library system. Use the Berkshire Athenaeum's on-line catalogue, <http://wmars.cwmars.org/search/>, to search for these print resources in Western Massachusetts.

Print Materials for Students

Allen, Judy and Tudor Humphries. Are You a Butterfly? (Backyard Books). MA: Kingfisher, 2003. *Follows the life cycle of butterflies with illustrations. Other titles in the Backyard Books Series include: Are you an Ant? Are You a Bee? Are You a* Dragonfly? Are You a Grasshopper? Are You a Snail? Are You a Spider?

Carle, Eric. The Very Hungry Caterpillar. NY: Philomel Books, 1984. *The classic for young children featuring the life cycle of a butterfly. Illustrated in Carle's classic collage style. Also by Carle:* The Very Busy Spider, The Grouchy Ladybug.

Dussling, Jennifer. Bugs! Bugs! Bugs! (Eyewitness Reader Level 2). NY: DK Publishing, 1998. *Very simple text with lots of color photos.*

Heigilman, Deborah. From Caterpillar to Butterfly. NY: HarperCollins, 1996. *The illustrated story of a classroom that watches the developing life cycle of painted lady butterflies, told from the students' perspective.*

Lerner, Carol. Butterflies in the Garden. NY: HarperCollins, 2002. *An illustrated book about the lives and habits of butterflies.*

Sandved, Kjell Bloch. The Butterfly Alphabet. NY: Scholastic,1999, c. 1996. *Englarged photos reveal numbers and letters hidden in the patterns of butterfly and moth wings.*

Kroll, Virginia. Butterfly Boy. PA: Caroline House, 1997. *The story of a boy and his abuelo (grandfather) who enjoy a visiting flock of red admiral butterflies.*

Mound, Laurence. Amazing Insects (DK Eyewitness Junior). NY: Alfred A. Knopf, 1993. *A simplified version of eyewitness defining insects, and illustrating their adaptations for communication, defense, sensing surroundings and more. Other titles in the series include:* Amazing Spiders,and Amazing Butterflies & Moths.

Pallotta, Jerry. The Icky Bug Alphabet Book. MA: Charlesbridge Publishing, 1986. An insect-themed alphabet book, with a simple paragraph of information about each featured insect.

Rabe, Tish. On Beyond Bugs! NY: Random House, 1999. *Rhyming book featuring the Cat In the Hat covering all the bug basics-- insect characteristics and body parts, definition of arachnid, insect senses, and interesting species.*

Reasoner, Charles. Who's Bugging You (A Sliding Surprise Book). NY: Penguin Young Readers Group, 1997. *Simple text gives characteristics of mystery bugs, whose identities are revealed when you slide the images out, prompting the reader to guess and then pull.*

Terry, Trevor and Margaret Linton. The Life Cycle of a Butterfly. NY: The Bookwright Press, 1988. *Simple text and illustrations follow a butterfly through its life cycle.*

Whalley, Paul Ernest Sutton. Eyewitness Books: Butterfly & Moth. London, Dorling Kindersley, 2000. *An original and exciting look at the natural history of butterflies and moths. Stunning photographs provide a unique view of the behavior of these complex and vividly beautiful insects, their structure and life cycles, habitats, feeding habits, and modes of self-protection.*

Yep, Laurence. The Butterfly Boy. NY: Farrar Straus Giroux, 1993. *A poetic illustrated story, set in ancient China, of a boy who imagines he is a butterfly, gaining a unique perspective on life.*

Yolen, Jane. An Invitation to the Butterfly Ball. PA: Caroline House, 1991. *Animals are invited one-at-a-time to the butterfly ball in this illustrated counting book.*

Print Materials For Educators

Doris, Ellen. Entomology (Real Kids/Real Science Series). New York: Thames and Hudson, 1993. *This book presents lots of information on methods for studying insects through a wide variety of investigative activities including observing metamorphosis, exploring a pond, raising insects, developing a collection, and more. While the book is project-oriented, it also provides a great deal of background information on insects.*

Hamilton, K.R. The Butterfly Book: Attracting, Raising, and Keeping Butterflies. NM: John Muir Publications, 1997. *Though this is written for older elementary students, it can be used by teachers for a quick and accessible introduction on attracting, collecting, and raising butterflies.*

National Wildlife Federation. Incredible Insects. New York: Learning Triangle Press, 1998. *This book will have even the most bug-shy child impressed with incredible insect feats and facts. It includes reproducible "Copycat Pages," ready-to-use activities, essays, case studies, a glossary and bibliography.*

Hickman, Pamela. Bug Wise. Reading, Massachusetts: Addison – Wesley Publishing Company, 1990. *Learn about insects, arachnids and other arthropods with this easy-to-use book. Explanations, identification, and fun facts are included along with 30 activities to do with children.*

Opler, Paul A. Peterson First Guide to Butterflies and Moths. Boston: Houghton Mifflin, 1998. *Describes and illustrates 183 butterflies and moths of North America, and includes advice on butterfly-watching and butterfly conservation.*

Richard E. White. A Field Guide to Insects : America North of Mexico, A Peterson Field Guide. Boston: Houghton Mifflin, 1998.
Detailed descriptions of insect orders, families, and many individual species are illustrated with 1,300 drawings and 142 superb color paintings. Illustrations - which use the unique Peterson Identification System to distinguish one insect from another. Includes glossary.

Wright, Amy Bartlett. Caterpillars of North America (Peterson First Guides). Boston: Houghton Mifflin Co., 1998. *This First Guide is filled with simple, factual text and superb artistic illustrations. The images are particularly valuable because they not only show the caterpillars, but also pupae (chrysalides and cocoons) and adults, as well as the plants they feed on. It also includes an easy-to-use identification key.*

Web Materials for Students

Beal Early Childhood Center's Butterfly Page
http://www.shrewsbury-ma.gov/schools/beal/curriculum/butterfly/butterflies.html

This Shrewsbury school has a butterfly greenhouse. This section of their site is easy for young children to navigate and understand, even if they are not able to read all of the text. It includes lots of photos of the school's students, their work, the greenhouse, butterflies, moths, and cocoons.

Web Materials for Educators

All About Butterflies
http://www.enchantedlearning.com/subjects/butterfly/

All About Butterflies provides information about all facets of butterflies, and includes coloring sheets, quizes, puzzles, and more.

BugBios: M.C.Escher
http://www.insects.org/ced1/mc_esh.html

An article with many images of M.C. Escher's bug-inspired artwork.

Children's Butterfly Site
http://bsi.montana.edu/web/kidsbutterfly/faq

Answers to frequently asked questions about butterflies and moths provided by a professor of bioagricultural sciences at Colorado State University.

Discovery School Lesson Plan Library
http://school.discovery.com/lessonplans/k-5.html

Lesson plans for K – 5 including animals, ecology, earth science and more.

Enature
http://www.enature.com

A fantastic resource for studying and identifying plants and animals, including insects and other arthropods. The insect pages are well-organized and easy to navigate, and the pictures make identification easy. Another feature of this site includes a zip code search function, which allows you to gather pictures of the plants and animals to be found in your own neighborhood.

Montana State University: Butterflies and Moths of North America
http://www.butterfliesandmoths.org/map

This fabulous site allows you to search for images and information on butterflies and moths that live in your region. Information on each species includes life history, habitat, range, food for caterpillars and adults (good information for planning a butterfly garden), and conservation status.

The North American Butterfly Association
http://www.naba.org/

This web site provides information about this organization for butterfly enthusiasts, including an online store, information on the NABA chat list, the NABA park, and butterfly counts.

Smithton Consolidated School: Mrs. Beggs' Kindergarten
http://www.homestead.com/kindergarten2/bugs.html

A wonderful and almost endless compilation of activities and resources for a bug unit with young elementary students, created by kindergarten teacher Kelly Beggs at an Illinois school. It includes photos of the projects and activities in her classroom.

Texas A & M University, Entomology Department: Insects in the Classroom
http://iitc.tamu.edu/lesson_plans.html#grade

A wealth of insect lesson plans for K - 8, organized by grade level and topic.

Using Live Insects in Elementary Classrooms for Early Lessons in Life.
http://insected.arl.arizona.edu/uli.htm

Activities and lesson plans from University of Arizona: Center for Insect Science Education Outreach. Early elementary integrated lessons about insects with targeted National Science standards.

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