

Second Grade

BUTTERFLIES

OVERVIEW:

This unit, “The Life Cycle of Butterflies”, introduces students to life cycles using butterflies as the main organism to study. Throughout this unit students will learn to observe, record data, and appreciate the needs of living things.

STANDARDS AND INDICATORS:

1.3 – Organisms change in form and behavior as part of their life cycles.

GRADE-LEVEL CONCEPT: ♦ Some organisms undergo metamorphosis during their life cycles; other organisms grow and change, but their basic form stays essentially the same.

GRADE-LEVEL EXPECTATIONS:

1. Plants and animals have life cycles that include a predictable sequence of stages: they begin life, develop into adults, reproduce and eventually die. Plants and animals produce offspring of their own kind. Offspring closely resemble their parents, but individuals vary in appearance and behavior.
2. Animals are either born alive (for example, humans, dogs and cows) or hatched from eggs (for example, chickens, sea turtles or crocodiles).
3. Animals change throughout their lives. Many animals begin life as smaller, less capable forms of the adult. As they develop, they grow larger and become more independent (for example, humans or robins).
4. Some animals change dramatically in structure and function during their life cycle in a process called metamorphosis.
5. Frogs are amphibians that undergo metamorphosis during their life cycle. As they grow, frogs develop different structures that help them meet their basic needs in water and then on land:
 - a. Tadpoles hatch from eggs, live in water, breathe using gills, and swim using a tail. As they metamorphose into frogs, tadpoles lose their gills and their tails.
 - b. Adult frogs live on land and in water. They breathe air using lungs and develop webbed feet and hinged legs for swimming in water and hopping on land. After a female frog mates, she lays her eggs, and the cycle begins again.
6. Butterflies are insects that undergo metamorphosis during their life cycle. As they go through egg, larva, pupa and adult stages, butterflies develop different structures that help them meet their basic needs in very different ways:
 - a. Caterpillars hatch from eggs, live on plants, get food by chewing leaves and move about using legs. As they metamorphose into butterflies inside a chrysalis, they develop wings, antennae and different mouth parts.
 - b. Butterflies live on land and in the air. They get food by sucking nectar from flowers and move around primarily using wings to fly. After a female butterfly mates, she searches for the proper host plant to lay her eggs, and the cycle begins again.
7. Comparing the life cycle stages of different organisms shows how they are alike in some ways and unique in other ways.

GRADE-LEVEL CONCEPT: ♦ Plants and animals have structures and behaviors that help them survive in different environments.

GRADE-LEVEL EXPECTATIONS:

1. Plants and animals have physical and behavioral adaptations that allow them to survive in certain environments. Adaptations are passed from parents to offspring. Individuals that happen to be bigger, stronger or faster can have an advantage over others of the same kind for finding food and mates.
2. Animals have behavioral and structural adaptations for getting food. Structural adaptations include things such as specialized teeth for tearing meat or grinding grasses; specialized beaks for cracking seeds, snatching insects, tearing meat or spearing fish; sharp claws for grasping; keen sense of smell, or long, sticky tongues for reaching food. Behavioral adaptations include actions such as following herds of prey animals, spinning webs or stalking.
3. Animals have behavioral and structural adaptations for protection from predators. Some animals have camouflage that allows them to stay concealed by blending in with their surroundings; some animals look like other animals to avoid being eaten. Structural adaptations include things such as sharp quills, hard shells or antlers. Behavioral adaptations include actions such as staying absolutely still, producing a bad odor, appearing or sounding scary, or fleeing.
4. Animals have behavioral and structural adaptations for surviving harsh environmental conditions. Animals that live in cold climates have insulating body coverings such as blubber, down or thick undercoats that keep them warm. Animals that live in hot climates keep cool by releasing heat from big ears or by panting, or by living underground. Some animals survive seasonal changes by slowing down body functions (hibernating in dens, tunnels or mud) or moving to more favorable conditions (migrating).

KEY SCIENCE VOCABULARY: adaptation, camouflage, hibernation, life cycle, egg, metamorphosis, structures (body parts), amphibian, tadpole, gills, lungs, insect, caterpillar

CONCEPTS: Need to know about...

- The different stages of a butterfly's life cycle are egg, larva, caterpillar, chrysalis, and adult.
- Caterpillars need food, air, and space to live and grow.
- The caterpillar forms a chrysalis, and a butterfly emerges from the chrysalis.
- A butterfly needs food to live, but it does not grow after emerging from the chrysalis.
- A butterfly lays eggs, which hatch into larvae.

SKILLS: Be able to do:

- Observing, describing, and recording growth and change in the larva.
- Predicting, comparing, and discussing the larva's appearance and change over time.
- Communicating observations through drawing and writing.
- Relating observations of the butterfly's life cycle to students' own growth and change.
- Extending knowledge of butterflies through reading.

Misconceptions:

- Insects shed their "skin" when they molt.
In fact, all insects have an exoskeleton, not skin. When butterflies molt, they shed the exoskeleton and grow another one.
- Record liquid that comes out from the tail end of the butterfly is blood.
The record liquid is meconium, or waste tissue, that is left over from metamorphosis.

Big Idea:

Butterflies undergo a complete metamorphosis during their life cycle as do many other organisms. Some organisms grow and change, however, their basic form basically stays the same. Through observations children can appreciate the needs of living things and develop an interest in studying insects.

Cumulative question:

What are the four stages of a butterfly's life cycle?

ESSENTIAL QUESTIONS TO GUIDE INSTRUCTION AND ASSESSMENT:

- What do caterpillars need to survive and grow?
- How do caterpillars transform into a chrysalis?
- How does a chrysalis transform into a butterfly?

MATH SKILLS TAUGHT/USED:

- Measuring
- Symmetry
- Graphing

Lesson 1: Pre-Assessment - Getting Ready for Caterpillars

- Students look forward to the arrival of the caterpillars
- Students express in words and drawings what they already know about caterpillars and butterflies for evaluation for the teacher
(See pp 7-14 of STC Kit; Pre-Assessment pp 13-14)

Lesson 2: Caring for Caterpillars

- Students prepare the food cups and learn how to care for the caterpillars.
- Students learn how to use a magnifying glass
- Students make and record their first observations of the caterpillars.
(See pp 15-20 of STC Kit)

Lesson 3: Learning More about Caterpillars

- Students learn about the characteristics that living things share.
- Students become aware of what living things need to survive.
- Students recognize the specific needs of their caterpillars.
- Students observe how caterpillars grow and change.
(See pp 23-26 of STC Kit)
*Extension: Making Predictions

Lesson 4: Observing the Caterpillars

- Students observe the structures and activities of caterpillars more closely.
- Students predict what changes may occur next.
(See pp 27-32 of STC Kit)
*Extension: Students design own caterpillar model

Lesson 5: Observing Change: Growth and Molting

- Students observe growth and change in the caterpillars and relate this to changes in their own bodies.
- Students notice evidence of changes, such as shed skin, the shed head capsule, or increase in frass and decreases in food.
(See pp 33-37 of STC Kit)
*Extension: Children dramatize how a caterpillar moves in order to shed its skin.

Lesson 6: Silk Spinning

- Students observe and draw the silk threads spun by a caterpillar.
- Students understand how a caterpillar uses silk.
(See pp 39-42 of STC Kit)
 - *Extensions: Research how silk is produced and used in our everyday lives.
 - Compare/contrast the ways caterpillars and spiders use silk.
(Choose one of the following to read to your students:

Spinning Spiders by Melvin Berger and S.D. Schindler, or
Are You A Spider? by Judy Allen.

Lesson 7: From Caterpillar to Chrysalis

- Students observe the J-shape that precedes the caterpillar's transformation into a chrysalis.
- Students witness the final molt that results in the chrysalis, if possible.
- Teacher assesses student progress in learning caterpillar anatomy and finds out how much students know about butterfly anatomy.
(See pp 43-49 of STC Kit)
*Assessment 1 – Caterpillar anatomy

Lesson 8: Observing the Chrysalis

- Students work on their observational skills.
- Students realize that even at this apparently inactive stage, important changes are taking place within the chrysalis.
- Students make predictions about what will emerge from the chrysalis.
(See pp 51-55 of STC Kit)
*Extensions: Students can act out the life cycle of the butterfly using a puppet sock (the caterpillar), paper bag (the chrysalis), and a butterfly made out of construction paper (p. 53)

Lesson 9: The Butterfly Emerges

- Students observe the butterflies emerging from the chrysalis (or discover the butterfly and empty chrysalis case.)
- Students observe some distinct butterfly body parts.
(See pp 57-67 of STC Kit)

Lesson 10: Feeding the Butterflies

- Students compare the way a butterfly eats with the way a caterpillar eats.
- Students observe how the butterfly uses the proboscis to eat.
(See pp 67-71 of STC Kit)

Lesson 11: The Butterfly's Body

- Students observe the physical characteristics and the behavior of their butterflies.
- Students compare the butterflies to themselves.
- Teacher prepares students for the release of the butterflies by helping them see how butterflies are equipped to survive in the natural world.
(See pp 73-78 of STC Kit)
*Extensions:
 - Venn Diagram comparing student's body to the body of the butterfly.
 - Make butterfly kites. Students can write a cinquain poem inside the butterfly or write a goodbye letter to their butterfly.

Lesson 12: The Butterflies Go Free

- Students realize that butterflies have their place in the environment.
(See pp 79-80 of STC Kit)
***Culminating Activity:**
 - Have a picnic celebration celebrating the release of the butterflies. Serve butterfly crackers or cupcakes and juice. Students can fly kites made in Lesson 11. Read When It Comes to Bugs by Aileen Fisher, which is a collection of poems to read to students.

Lesson 13: Using Our Data

- Students use their data to answer their questions.
(See pp 83-85 of STC Kit)
*Extension: Students graph the length of time it took for the life cycle changes to occur

Lesson 14: Discovering that Butterflies Are Insects

- Students learn that the butterfly is an animal called an insect.
- Students discover the characteristics that all insects share.
(See pp 87-90 of STC Kit)

Lesson 15: Researching Other Life Cycles

- Students apply a concept they have learned in this unit to new situations.
 - Students expand their knowledge of the life cycles of other plants and animals.
 - Students realize that cycles are regenerative; life begets life.
(See pp 91-95 of STC Kit)
- * Students research the life cycle of other animals.
See: How It Grows Series By Pamela Nash (includes life cycles of the frog, bird, pony, etc.); Chickens Aren't the Only Ones by Ruth Heller; and The Silkworm Story by Jennifer Coldrey

Lesson 16: Post-Assessment

- Students understand that butterflies go through a life cycle and can sequence it correctly.
- *Assessment 2

Websites:

**Please check sites to ensure material has not been altered since publication!*

<http://www.lmf-educator-award.com/index.html>

www.enchantedlearning.com

<http://journeynorth.org>

Follow the migration of the monarch butterfly

www.unitedstreaming.com

<http://dep.disney.go.com>

Bill Nye explains life cycles and shows why many different living things have similar life cycles.

Videos:

- “Magic School Bus: Butterfly and the Bog Beast”
- “Peep and the Big Wide World: Wandering Beaver/Peep’s New Friend”
- “Animal Lifecycles”