

Photo Description



Two butterfly cocoons hang from a building corner. One cocoon is brown and looks empty. The other cocoon is bright green with small yellow spots and a black line at the top.

Scientific Phenomena

This image shows the Anchoring Phenomenon of metamorphosis in monarch butterflies. The green structure is a chrysalis (not a cocoon) where a caterpillar has transformed its body completely into a butterfly. Inside the chrysalis, special cells called imaginal discs rebuild the caterpillar's body parts into wings, antennae, and other butterfly features. The brown structure appears to be an empty chrysalis after a butterfly has emerged. This complete change from caterpillar to butterfly is called complete metamorphosis and takes about 10-14 days.

Core Science Concepts

1. Complete Metamorphosis: Butterflies go through four distinct life stages - egg, larva (caterpillar), pupa (chrysalis), and adult butterfly. Each stage looks completely different from the others.
2. Life Cycles: All living things have predictable patterns of growth, development, and reproduction that repeat over time.
3. Adaptation and Survival: The hard chrysalis protects the developing butterfly from predators and weather while the transformation happens inside.
4. Observable Changes: Scientists can observe and document the external changes that happen during metamorphosis, even though the internal changes are invisible.

Pedagogical Tip:

Have students create a simple T-chart comparing "What I can see" vs "What I cannot see" when observing chrysalises. This builds observation skills and introduces the concept that important scientific processes often happen where we cannot directly observe them.

UDL Suggestions:

Provide multiple ways for students to represent the butterfly life cycle: drawing, acting it out with body movements, using play dough to sculpt each stage, or creating a digital presentation. This supports different learning preferences and abilities.

Zoom In / Zoom Out

Zoom In: Inside the chrysalis, the caterpillar's body breaks down into a nutrient-rich soup. Special groups of cells called imaginal discs, which were dormant in the caterpillar, now activate and use this soup to build completely new body parts like wings, reproductive organs, and compound eyes.

Zoom Out: Monarch butterflies are part of a larger ecosystem where they serve as pollinators for flowers and food sources for birds and spiders. Their famous migration connects ecosystems across North America, from Canada to Mexico, making them important for maintaining biodiversity across the continent.

Discussion Questions

1. What do you notice that is the same and different about these two chrysalises? (Bloom's: Analyze | DOK: 2)
2. Why do you think the chrysalis is hard on the outside? (Bloom's: Evaluate | DOK: 3)
3. What questions would you ask a scientist who studies butterflies? (Bloom's: Create | DOK: 3)
4. How might the location where this chrysalis is hanging help or hurt the butterfly inside? (Bloom's: Evaluate | DOK: 3)

Potential Student Misconceptions

1. Misconception: "The butterfly is sleeping inside the cocoon."
Reality: The caterpillar's body is actively being broken down and rebuilt into a completely different form.
2. Misconception: "Butterflies make cocoons."
Reality: Butterflies make chrysalises, while moths make cocoons. A chrysalis is a hard shell, while a cocoon is made of silk threads.
3. Misconception: "The caterpillar just grows wings inside."
Reality: The caterpillar's entire body structure changes - it grows new organs, loses old ones, and completely reorganizes its body plan.

NGSS Connections

Performance Expectation: 2-LS4-1: Make observations of plants and animals to compare the diversity of life in different habitats.

Disciplinary Core Ideas:

- 2-LS4.D: There are many different kinds of living things in any area, and they exist in different places on land and in water.
- K-LS1.A: All animals need food in order to live and grow.

Crosscutting Concepts:

- Patterns: Patterns in the natural world can be observed and used as evidence.

Science Vocabulary

- * Chrysalis: The hard shell where a caterpillar changes into a butterfly.
- * Metamorphosis: The process of an animal changing from one form to a completely different form.
- * Life cycle: The stages a living thing goes through as it grows and develops.
- * Larva: The caterpillar stage of a butterfly's life.
- * Pupa: The chrysalis stage when the caterpillar transforms into a butterfly.

External Resources

Children's Books:

- From Caterpillar to Butterfly by Deborah Heiligman
- The Very Hungry Caterpillar by Eric Carle
- Waiting for Wings by Lois Ehlert

YouTube Videos:

- "Monarch Butterfly Metamorphosis Time Lapse" - Shows the complete transformation process in fast motion: <https://www.youtube.com/watch?v=ocWgSgMGxOc>
- "Butterfly Life Cycle for Kids" by National Geographic Kids - Simple explanation with real footage and animations: <https://www.youtube.com/watch?v=hYqX3YbhvEs>