Life Cycle Stage of Monarch Butterfly

4th Grade

Life Science | Lesson Guide

Photo Description

Two butterfly chrysalises hang from a building corner. One chrysalis is brown and appears empty with a clear window showing it has opened. The other chrysalis is bright green with small yellow spots and looks full, suggesting a butterfly is still developing inside.

Scientific Phenomena

This image shows the metamorphosis anchoring phenomenon - specifically the pupal stage of butterfly development. The green chrysalis contains a developing butterfly undergoing complete transformation from caterpillar to adult. Inside, the caterpillar's body structures are breaking down and reorganizing into entirely new body parts like wings, antennae, and reproductive organs. The brown, empty chrysalis shows evidence that this amazing transformation has been completed and an adult butterfly has emerged.

Core Science Concepts

1. Complete Metamorphosis: Butterflies undergo four distinct life stages - egg, larva (caterpillar), pupa (chrysalis), and adult butterfly
2. Life Cycle Patterns: All organisms have predictable life cycles that repeat generation after generation
3. Structural Adaptations: The hard chrysalis shell protects the developing butterfly during its vulnerable transformation period
4. Environmental Interactions: Butterflies choose specific locations like building overhangs to protect their chrysalises from weather and predators

Pedagogical Tip:

Have students compare the two chrysalises in the photo and make predictions about what's happening inside each one. This develops their observation and inference skills while building excitement about the transformation process.

UDL Suggestions:

Provide multiple ways for students to represent their understanding of metamorphosis - through drawings, clay models, dramatic play, or digital presentations. This supports diverse learning preferences and abilities.

Zoom In / Zoom Out

1. Zoom In: Inside the green chrysalis, special cells called imaginal discs are rapidly dividing and growing to form new butterfly body parts. Digestive enzymes are breaking down caterpillar tissues to provide building materials for wings, legs, and other adult structures.

2. Zoom Out: These developing butterflies are part of larger ecosystem food webs as pollinators. When they emerge, they'll transfer pollen between flowers, helping plants reproduce and maintaining the health of gardens, forests, and agricultural systems across entire regions.

Discussion Questions

1. What evidence can you observe that tells you these two chrysalises are at different stages? (Bloom's: Analyze | DOK: 2)

2. Why might butterflies choose to attach their chrysalises to human-made structures like buildings? (Bloom's: Evaluate | DOK: 3)

3. How does the butterfly's life cycle pattern compare to other animals you know about? (Bloom's: Compare | DOK: 2)

4. What would happen to the developing butterfly if the chrysalis was damaged during the transformation? (Bloom's: Predict | DOK: 3)

Potential Student Misconceptions

1. Misconception: The caterpillar just grows wings and becomes a butterfly gradually
   Reality: The caterpillar's body completely breaks down and rebuilds into an entirely different form during the chrysalis stage

2. Misconception: The chrysalis is like a house the butterfly lives in temporarily
   Reality: The chrysalis IS the butterfly during its transformation stage - it's not a separate container

3. Misconception: All insects go through the same life cycle stages
   Reality: Some insects like grasshoppers have incomplete metamorphosis with only three stages (no pupal stage)

NGSS Connections

- Performance Expectation: 3-LS1-1 Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death
- Disciplinary Core Ideas: 3-LS1.B Growth and Development of Organisms
- Crosscutting Concepts: Patterns and Systems and System Models
- Science and Engineering Practices: Developing and Using Models, Analyzing and Interpreting Data

Science Vocabulary

* Chrysalis: The hard protective casing where a caterpillar transforms into a butterfly
* Metamorphosis: The process of complete change from one life stage to another
* Pupa: The life stage when an insect is inside its chrysalis transforming
* Life cycle: The series of changes an organism goes through as it grows and develops
* Emerge: To come out of something, like a butterfly coming out of its chrysalis

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 actual transformation footage in accelerated time: https://www.youtube.com/watch?v=ocWgSgMGxOc
- "Butterfly Life Cycle for Kids" by National Geographic Kids - Educational animation explaining all four life stages: https://www.youtube.com/watch?v=6dFaYp2GsrM