Chrysalis

Earth & Space Science | Lesson Guide

3rd Grade

Photo Description

A green chrysalis hangs from a wooden beam. The chrysalis is smooth and shaped like a teardrop. Inside this protective case, a caterpillar is changing into a butterfly.

Scientific Phenomena

This image shows the chrysalis stage of metamorphosis - specifically the pupal stage where a caterpillar transforms into a butterfly. This anchoring phenomenon represents complete metamorphosis, where an organism undergoes dramatic structural changes through distinct life cycle stages. The caterpillar has formed a protective casing around itself while its body completely reorganizes - tissues break down and rebuild into entirely different structures like wings, antennae, and reproductive organs. This process is controlled by hormones and typically takes 1-2 weeks depending on the species and environmental conditions.

Core Science Concepts

1. Life Cycles: Living things go through predictable stages of growth and development from birth to death
2. Metamorphosis: Some animals undergo complete transformation during their life cycle, changing body structure and function
3. Adaptation: The chrysalis structure protects the developing butterfly from predators and weather
4. Growth and Development: Organisms change over time in observable ways that help them survive in their environment

Pedagogical Tip:

Use real chrysalises or high-quality photos at different stages to help students visualize the transformation process. Consider setting up a butterfly garden in your classroom so students can observe metamorphosis firsthand.

UDL Suggestions:

Provide multiple ways for students to demonstrate understanding - drawing life cycle diagrams, acting out metamorphosis stages, or creating stop-motion videos. This supports different learning preferences and abilities.

Zoom In / Zoom Out

1. Zoom In: Inside the chrysalis, special cells called imaginal discs are rapidly dividing and forming new body parts like wings, legs, and antennae. The caterpillar's digestive system completely dissolves and rebuilds into a butterfly's feeding system.

2. Zoom Out: This metamorphosis is part of a larger ecosystem cycle where butterflies serve as pollinators for flowering plants, helping plants reproduce while feeding on nectar. The timing of butterfly emergence often matches when their preferred flowers bloom.

Discussion Questions

1. What do you think is happening inside the chrysalis that we cannot see? (Bloom's: Analyze | DOK: 2)
2. How might the chrysalis protect the developing butterfly from danger? (Bloom's: Evaluate | DOK: 3)
3. Why do you think some animals go through metamorphosis while others do not? (Bloom's: Synthesize | DOK: 3)
4. What evidence could we collect to prove that metamorphosis is happening? (Bloom's: Apply | DOK: 2)

Potential Student Misconceptions

1. Misconception: The caterpillar just grows wings inside the chrysalis
   Clarification: The caterpillar's body actually breaks down and rebuilds into a completely different form

2. Misconception: All insects make chrysalises
   Clarification: Only some insects undergo complete metamorphosis; others grow gradually through molting

3. Misconception: The chrysalis is like a house the caterpillar lives in
   Clarification: The chrysalis is actually formed from the caterpillar's own skin and becomes part of the transformation process

Cross-Curricular Ideas

1. Math - Life Cycle Timing: Students can create a simple bar graph showing how many days it takes for a caterpillar to go through each stage (egg: 3-5 days, larva: 3-5 weeks, pupa: 1-2 weeks). They can compare the lengths of different stages and practice measuring and comparing numbers.

2. ELA - Narrative Writing: Students write a creative story from the perspective of a caterpillar going through metamorphosis. "Dear Diary: Today I made my chrysalis..." This helps students practice sequencing events and descriptive writing while reinforcing the order of life cycle stages.

3. Art - Life Cycle Illustration: Students create a four-panel comic strip or wheel diagram showing the butterfly life cycle (egg, caterpillar, chrysalis, butterfly). They can use watercolors, colored pencils, or collage materials to illustrate each stage, developing fine motor skills and visual representation abilities.

4. Social Studies - Plant & Animal Communities: Students research which plants butterflies need to survive (host plants for caterpillars, nectar plants for adults). They can create a simple habitat map showing how butterflies depend on their local environment and how humans can help by planting native flowers.

STEM Career Connection

1. Entomologist (Insect Scientist): An entomologist is a scientist who studies insects like butterflies, beetles, and bees. They observe how insects live, grow, and change. Some entomologists help protect butterflies that are disappearing, while others study how insects help plants grow. Average Annual Salary: $65,000

2. Butterfly Garden Designer: A butterfly garden designer plans and creates special gardens where butterflies can live and grow. They choose the right plants that caterpillars eat and that adult butterflies drink nectar from. These designers help people create beautiful spaces in parks, schools, and homes while protecting butterflies. Average Annual Salary: $58,000

3. Wildlife Biologist: A wildlife biologist studies how animals like butterflies live in nature and interact with their environment. They might count butterflies to track if populations are healthy, study migration patterns, or teach people about protecting butterfly habitats. Average Annual Salary: $68,000

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 - Patterns of change can be used to make predictions

Science Vocabulary

* Chrysalis: The hard protective case that forms around a caterpillar as it changes into a butterfly
* Metamorphosis: The process of changing from one form to another during an animal's life cycle
* Life cycle: The stages a living thing goes through as it grows and develops
* Larva: The caterpillar stage of a butterfly's life cycle
* Pupa: The stage when an insect is inside its chrysalis transforming
* Transformation: A complete change in form or appearance

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