Chrysalis

Earth & Space Science | Lesson Guide

Kindergarten

Photo Description

A green chrysalis hangs from a wooden fence. The chrysalis looks like a small green bag. Inside, a caterpillar is changing into a butterfly.

Scientific Phenomena

This image shows the metamorphosis phenomenon, specifically the pupal stage of a butterfly's life cycle. The caterpillar has formed a protective casing called a chrysalis where its body completely transforms through a process called metamorphosis. During this stage, the caterpillar's tissues break down and reorganize to form the adult butterfly's wings, antennae, legs, and reproductive organs. This dramatic transformation is controlled by hormones and typically takes 1-2 weeks depending on the species and environmental conditions.

Core Science Concepts

1. Life Cycles: All living things go through stages of growth and change from birth to death
2. Animal Growth and Development: Young animals look different from their parents and change as they grow
3. Animal Needs: Animals need safe places to grow and develop, like the protection a chrysalis provides
4. Observable Changes: We can observe and document changes in living things over time

Pedagogical Tip:

Use real chrysalises or high-quality photos to help students make concrete observations. Encourage them to draw what they see and predict what might happen next, building their scientific observation and prediction skills.

UDL Suggestions:

Provide multiple ways for students to engage with this concept: tactile models of life cycle stages, movement activities where students act out each stage, and visual charts with pictures and simple words to support all learners including English language learners.

Zoom In / Zoom Out

1. Zoom In: Inside the chrysalis, special cells called imaginal discs are growing into butterfly parts like wings and antennae. The caterpillar's body is breaking down and rebuilding at the cellular level.

2. Zoom Out: This butterfly life cycle is part of a larger ecosystem where butterflies pollinate flowers, helping plants reproduce and maintaining biodiversity in gardens, forests, and meadows.

Discussion Questions

1. What do you think is happening inside the green chrysalis? (Bloom's: Analyze | DOK: 2)
2. Why do you think the caterpillar needs to make a chrysalis? (Bloom's: Evaluate | DOK: 3)
3. What patterns do you notice in how butterflies grow and change? (Bloom's: Understand | DOK: 1)
4. How is a butterfly's life cycle different from how you grow? (Bloom's: Compare | DOK: 2)

Potential Student Misconceptions

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

2. Misconception: All animals go through metamorphosis like butterflies
   Clarification: Only some animals (like butterflies, frogs, and beetles) have complete metamorphosis; mammals like humans grow gradually

3. Misconception: The chrysalis is like a house the caterpillar lives in
   Clarification: The chrysalis is made by the caterpillar's own body and is part of the transformation process

Cross-Curricular Ideas

1. Math - Counting and Patterns: Students can count the stages of the butterfly life cycle (egg, caterpillar, chrysalis, butterfly = 4 stages) and create repeating patterns using pictures of each stage. They can also count how many days it takes for a chrysalis to transform (1-2 weeks) using a calendar.

2. ELA - Story Sequencing and Retelling: Students can arrange pictures of the butterfly life cycle in order and use sentence frames like "First, the caterpillar _____. Next, _____. Then, _____. Finally, _____." to retell the story. This builds narrative skills and vocabulary.

3. Art - Life Cycle Mobile or Collage: Students create a hanging mobile or paper collage showing all four stages of butterfly metamorphosis using tissue paper, paint, and natural materials. This reinforces the sequence while developing fine motor skills and artistic expression.

4. Social Studies - Habitats and Communities: Explore where butterflies live and what plants they need. Students can plant a small butterfly garden or discuss how butterflies help their community by pollinating flowers that give us food and beautiful gardens.

STEM Career Connection

1. Entomologist (Bug Scientist): An entomologist is a scientist who studies insects like butterflies, caterpillars, and beetles. They observe how bugs live, grow, and change. They might raise chrysalises in a lab, draw pictures of what they see, and teach other people about insects. They work in museums, zoos, and universities. Average Salary: $63,000 per year

2. Butterfly Farmer/Breeder: A butterfly farmer raises caterpillars and helps them transform into beautiful butterflies. They create special gardens and safe spaces for chrysalises to grow, then release the butterflies into nature or sell them to gardens and schools. They need to understand what caterpillars eat and how to keep them healthy. Average Salary: $28,000-$45,000 per year

3. Environmental Scientist: An environmental scientist studies how animals like butterflies help nature stay healthy. They learn about which plants butterflies need to survive and how to protect butterfly habitats so they don't disappear. They might work in parks, gardens, or nature centers helping keep our world beautiful. Average Salary: $71,000 per year

NGSS Connections

- Performance Expectation: K-LS1-1 - Use observations to describe patterns of what plants and animals need to survive
- Disciplinary Core Ideas: K-LS1.C - Organization for Matter and Energy Flow in Organisms
- Crosscutting Concepts: Patterns

Science Vocabulary

* Chrysalis: The hard shell where a caterpillar changes into a butterfly
* Metamorphosis: The big changes an animal goes through as it grows up
* Life cycle: All the stages a living thing goes through from birth to death
* Caterpillar: The young form of a butterfly that looks like a worm
* Transform: To change from one thing into something very different

External Resources

Children's Books:
- The Very Hungry Caterpillar by Eric Carle
- From Caterpillar to Butterfly by Deborah Heiligman
- Waiting for Wings by Lois Ehlert