

## 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

### 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

YouTube Videos:

- "Monarch Butterfly Metamorphosis Time Lapse" - Shows real footage of the complete transformation process: <https://www.youtube.com/watch?v=ocWgSgMGxOc>

- "Butterfly Life Cycle for Kids" by National Geographic Kids - Educational overview with clear explanations: [https://www.youtube.com/watch?v=kmae\\_AQgBgU](https://www.youtube.com/watch?v=kmae_AQgBgU)