

## Photo Description



A green chrysalis hangs from a wooden fence. The chrysalis is smooth and shaped like a small bag. It is attached to the wood by a thin stem at the top.

## Scientific Phenomena

This image shows the pupation stage of butterfly metamorphosis - specifically a monarch butterfly chrysalis. The anchoring phenomenon is complete metamorphosis, where the caterpillar has formed a protective casing around itself while its body completely transforms into a butterfly. Inside this green chrysalis, the caterpillar's tissues are breaking down and reorganizing into wings, antennae, legs, and other butterfly parts through a process called histolysis and histogenesis.

## Core Science Concepts

1. Life Cycles: Animals go through different stages as they grow and change throughout their lives.
2. Metamorphosis: Some animals completely change their body shape and form as they develop from babies to adults.
3. Animal Needs: Animals need safe places to grow and develop, like this protected chrysalis.
4. Adaptation: The hard chrysalis protects the developing butterfly from weather and predators.

### Pedagogical Tip:

Use real chrysalises or high-quality photos rather than cartoon illustrations to help students understand that metamorphosis is a real scientific process, not just a story concept.

### UDL Suggestions:

Provide tactile models or 3D printed chrysalises for students to touch and examine, supporting kinesthetic learners and students with visual impairments in understanding the structure.

## Zoom In / Zoom Out

1. Zoom In: Inside the chrysalis, special cells called imaginal discs are rapidly dividing and growing to form butterfly wings, legs, and antennae while the caterpillar body dissolves.
2. Zoom Out: This butterfly metamorphosis is part of a larger ecosystem cycle where adult butterflies will pollinate flowers, helping plants reproduce and maintaining food webs.

## Discussion Questions

1. What do you think is happening inside this green case? (Bloom's: Analyze | DOK: 2)
2. How is this chrysalis the same or different from other animal homes you know about? (Bloom's: Compare | DOK: 2)
3. What do you predict will come out of this chrysalis? (Bloom's: Predict | DOK: 1)
4. Why do you think the chrysalis is green instead of another color? (Bloom's: Evaluate | DOK: 3)

## Potential Student Misconceptions

1. Misconception: The caterpillar just grows wings inside the chrysalis.  
Reality: The caterpillar's body completely breaks down and rebuilds into a butterfly.
2. Misconception: All animals make chrysalises.  
Reality: Only some insects go through complete metamorphosis with a chrysalis stage.
3. Misconception: The chrysalis is like a house the caterpillar lives in.  
Reality: The chrysalis is made from the caterpillar's own skin and becomes part of its body.

## Cross-Curricular Ideas

1. Math - Counting & Patterns: Create a paper chain or number line showing the four stages of butterfly metamorphosis (egg, caterpillar, chrysalis, butterfly). Students can count how many days or weeks it takes for a butterfly to emerge from its chrysalis, practicing number sequencing and time concepts.
2. ELA - Storytelling & Writing: Have students dictate or write simple sentences about "A Day in the Life of a Caterpillar" or create a class big book where each student illustrates and labels one stage of the butterfly life cycle. This builds vocabulary and narrative skills while reinforcing science concepts.
3. Art - Color & Design: Students can create chrysalises using green paper, paint, or clay, experimenting with different shades of green and textures to match the photograph. They can also design symmetrical butterfly wings using watercolors or tissue paper, exploring how butterflies' wings mirror each other.
4. Social Studies - Habitats & Communities: Discuss where butterflies and caterpillars live in your local community. Take a nature walk to find milkweed plants (monarch caterpillar food) or create a classroom "butterfly garden" area with plants that attract butterflies, learning about caring for living things in their environment.

## STEM Career Connection

1. Entomologist (Bug Scientist): An entomologist studies insects like butterflies, caterpillars, and beetles. They observe how insects live, grow, and change. They might raise butterflies in special labs or gardens to learn more about them. Some entomologists help farmers protect plants from harmful bugs. Average Salary: \$65,000 USD per year
2. Butterfly Garden Manager: A butterfly garden manager takes care of special gardens and parks where butterflies live and lay eggs. They grow the right plants that caterpillars eat, keep the area safe and clean, and teach visitors about butterflies and their life cycles. Average Salary: \$35,000 USD per year
3. Wildlife Photographer: A wildlife photographer takes pictures of animals in nature, like butterflies emerging from chrysalises. They use cameras and patience to capture beautiful and important moments in nature, and share these photos with people to help them learn and care about animals. Average Salary: \$40,000 USD per year

## NGSS Connections

Performance Expectation: 1-LS3-1 Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.

Disciplinary Core Ideas:

- 1-LS3.A Young animals are very much, but not exactly, like their parents and also resemble other animals of the same kind.

Crosscutting Concepts:

- Patterns Students observe patterns in how butterflies develop through predictable stages.

## Science Vocabulary

- \* Chrysalis: The hard case that protects a caterpillar while it changes into a butterfly.
- \* Metamorphosis: When an animal completely changes its body shape as it grows up.
- \* Life cycle: All the stages an animal goes through from birth to death.
- \* Pupa: The stage when an insect is changing from a larva into an adult.
- \* Transform: To change from one form into a completely different form.

## 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