Praying Mantis

Life Science | Lesson Guide

4th Grade

Photo Description

This image shows a praying mantis perched on a plant stem among colorful flowers. The mantis has a long, thin green body with large front legs that are folded up like it's "praying." You can see its large eyes looking forward and its spiky legs ready to grab prey. A bee can be spotted in the background near the pink flowers.

Scientific Phenomena

Anchoring Phenomenon: A praying mantis waiting silently among flowers to catch insects.

Why This Happens: Praying mantises are ambush predators—they hunt by staying very still and camouflaged among plants. Their green color matches the plants around them, making them nearly invisible to insects like bees and butterflies that come to the flowers. When prey gets close enough, the mantis uses its powerful front legs to snap out and capture the insect in a fraction of a second. This hunting strategy is called "sit-and-wait" predation, and it works because the mantis blends in with its environment while waiting for unsuspecting meals to come to it.

Core Science Concepts

- Camouflage and Adaptation: The mantis's green color is a physical adaptation that helps it hide from both predators and prey. This is an example of how animals' body structures help them survive in their environment.

- Predator-Prey Relationships: Praying mantises are predators that eat insects, while they themselves are prey for birds and lizards. This creates a food chain and shows how animals depend on each other in nature.

- Hunting Strategies and Behavior: Different animals hunt in different ways. The mantis uses stealth and speed, while other predators might use teamwork, running speed, or other strategies.

- Life Cycles: Praying mantises go through incomplete metamorphosis—they hatch looking like tiny adults and grow larger through several stages, rather than changing form dramatically like butterflies do.

Pedagogical Tip:

When teaching about predator-prey relationships, help students understand that this isn't "mean" or "unfair"—it's a natural part of how ecosystems work. Use language like "the mantis needs to eat insects to survive" rather than focusing on the "violence" of the hunt. This builds ecological literacy without creating unnecessary emotional distress.

UDL Suggestions:

To support diverse learners: (1) Provide labeled diagrams of a mantis's body parts for visual learners; (2) Use hand motions to demonstrate how a mantis strikes (kinesthetic learning); (3) Create a word bank with key vocabulary for students who need language support; (4) Offer video clips showing mantis hunting in slow-motion so students can observe the behavior multiple times at different speeds.

Zoom In / Zoom Out

Zoom In: Cellular Level
When a praying mantis's eyes see an insect, special cells in the mantis's brain send signals through tiny nerve pathways. These signals travel down to the mantis's leg muscles, telling them to contract (tighten) super fast—in less than a tenth of a second! The muscles are made of millions of cells working together, and each cell uses energy to pull the leg into the striking position. At an even tinier level, atoms in the mantis's muscles rearrange to create this explosive movement. This is why the mantis can snap its legs so incredibly quickly—its cells are specially designed for fast, powerful action!

Zoom Out: Ecosystem and Food Web
A single praying mantis is just one tiny part of a much larger ecosystem. In a garden or meadow, the mantis depends on flowers (for shelter and to attract prey), insects like bees and grasshoppers (for food), and birds or snakes (that hunt the mantis). If we zoom out even further, we see that this garden ecosystem is part of a larger landscape with forests, fields, and waterways—all connected. Weather patterns affect plant growth, which affects how many insects visit flowers, which affects how many mantises can survive in that area. The mantis's hunting success or failure ripples through this entire system, influencing populations of other animals both above and below it in the food chain.

Discussion Questions

1. Why do you think the praying mantis is green instead of red or blue? (Bloom's: Analyze | DOK: 2)
   - This question pushes students to connect the mantis's color to its survival strategy.

2. What might happen to the bee in this picture if it gets too close to the mantis? (Bloom's: Predict | DOK: 2)
   - Students use evidence from the image and prior knowledge to make predictions about predator-prey interactions.

3. The mantis hunts by staying still and waiting. Can you think of other animals that hunt in a different way? (Bloom's: Evaluate | DOK: 3)
   - This extends thinking beyond the mantis and encourages comparison of hunting strategies.

4. If all the flowers near the mantis died, how might that change where the mantis could hide? (Bloom's: Analyze | DOK: 3)
   - This connects the organism to its habitat and explores cause-and-effect relationships.

Potential Student Misconceptions

Misconception 1: "The praying mantis is praying because it's being nice or saying sorry."
Clarification: The mantis's pose looks like "praying" to us, but the insect isn't praying at all. The mantis holds its front legs up because they're folded like a trap, ready to snap shut on insects. The name "praying" mantis is just a human name for the insect—it comes from how the pose looks to us, not from what the mantis is actually doing. The mantis is actually preparing to hunt!

Misconception 2: "The mantis must be a mean animal because it eats other insects."
Clarification: Eating other animals to survive isn't mean or cruel—it's just how nature works. The mantis needs to eat insects to get energy and nutrients to grow and stay alive, just like you need to eat food to survive. Many animals hunt other animals; it's a natural part of ecosystems. The bee and grasshoppers aren't being punished—the mantis hunting is just part of how animals feed themselves in the wild.

Misconception 3: "All camouflage animals are the same color as their background."

Clarification: While the praying mantis is green like plants, camouflage works in many different ways. Some animals have stripes or spots that break up their outline so you can't see their true shape. Others use colors that match their surroundings in different seasons. Some animals even change color! Camouflage is any color, pattern, or shape that helps an animal hide—it doesn't have to be the exact same shade as what's around it.

Extension Activities

Activity 1: Camouflage Hunt
Create a "mantis hunt" game in your classroom or outdoors. Hide small green objects (paper, plastic toys, etc.) among plants or natural items. Have students search for them within a time limit. Discuss how the green color made them harder to find, just like the mantis's camouflage helps it hide. This builds kinesthetic understanding of how adaptation works.

Activity 2: Design Your Own Predator
Provide students with art supplies and have them design an imaginary predator for a specific habitat (desert, forest, ocean, etc.). They must explain: What does it eat? What color is it and why? How does it hunt? This develops their understanding of how animals' structures and behaviors fit their environments.

Activity 3: Food Chain Diagram
Have students create a food chain or food web that includes the praying mantis. Start with the sun !’ flower !’ bee !’ praying mantis !’ hawk (example). Students can draw or cut out pictures to represent each organism and use arrows to show energy flow. Discuss: Where does the mantis fit? What eats the mantis? What would happen if one organism disappeared?

Cross-Curricular Ideas

Math Connection: Data and Measurement
Have students measure and compare the body parts of a praying mantis using a picture or diagram. Students can use rulers to measure (in centimeters) the length of the mantis's legs, body, and head on a printed image enlarged to life-size. Create a bar graph comparing the length of different body parts. Discuss: Which part is longest? Shortest? Why might a hunting insect need long legs? This integrates measurement, data visualization, and structure-function thinking.

ELA Connection: Descriptive Writing and Perspective
Challenge students to write from the point of view of either the praying mantis or a bee approaching the flower. Using sensory details (what they see, hear, feel), students create a short narrative (2-3 paragraphs) describing the scene. For example: "I land on the bright pink flower. The smell of nectar fills my senses. Suddenly, I notice something green..." This builds descriptive writing skills while deepening understanding of predator-prey perspectives and point of view.

Art Connection: Camouflage Collage
Students create an artistic collage or mixed-media piece showing a praying mantis hidden in a garden or natural scene. Using colored paper, leaves, flowers, and other natural materials, students design a background habitat and then place their mantis cutout to demonstrate how camouflage works. Challenge them to make the mantis difficult to spot! Display finished work and have classmates try to find the hidden mantis, reinforcing the concept of camouflage in a creative way.

Social Studies Connection: Habitats Around the World
Research and compare praying mantis habitats across different regions and climates (tropical rainforests, temperate gardens, deserts, grasslands). Students can create a poster or short presentation showing: Where do mantises live? What plants and animals live there? How are different mantis species adapted to their specific habitats? This builds geography skills, understanding of regional biodiversity, and appreciation for how organisms fit into different ecosystems globally.

STEM Career Connection

Entomologist (Insect Scientist)
An entomologist is a scientist who studies insects like praying mantises. Entomologists observe insects in nature, study how they behave, learn what they eat, and discover how they help or harm plants and people. Some entomologists work in museums, universities, or nature centers where they teach others about insects. Others work outdoors in gardens, farms, or forests tracking insect populations. Entomologists might help farmers protect crops from harmful insects, or they might teach people how beneficial insects like mantises help control pest populations. It's a job perfect for someone who loves nature and solving mysteries about tiny creatures!
Average Annual Salary: $63,000–$75,000 USD

Ecologist (Nature Systems Expert)
An ecologist studies how living things interact with each other and their environment—exactly like what you're learning about with the praying mantis and its garden ecosystem! Ecologists might study food chains, track animal populations, learn how plants depend on animals, or discover what happens when part of an ecosystem changes. They work in forests, wetlands, gardens, and other natural places, often taking notes, collecting samples, and using equipment to understand nature's systems. Some ecologists help protect endangered animals or restore damaged habitats. This job requires curiosity, patience, and a real love for the outdoors.
Average Annual Salary: $65,000–$85,000 USD

Agricultural Science Technician (Farm Helper Scientist)
An agricultural science technician helps farmers grow healthy crops by managing insects and other pests naturally. Instead of using harmful chemicals, these scientists encourage beneficial insects like praying mantises to live on farms because they eat crop-damaging pests. They monitor insect populations, keep records, test soil and water quality, and recommend ways to keep farms healthy and balanced. Some work in greenhouses growing plants, while others work directly in fields. This job combines your love of insects, nature, and helping people by making sure farms stay productive and healthy.
Average Annual Salary: $35,000–$50,000 USD

NGSS Connections

Performance Expectation:
4-LS1-1: From Molecules to Organisms: Structures and Processes — "Construct an argument that plants get the materials they need for growth chiefly from air and water." (Note: While this image focuses on the mantis, it can connect to the broader ecosystem context.)

Relevant Performance Expectations:
- 4-LS2-1: From Ecosystems to Interactions, Energy, and Dynamics — "Construct an argument that living things are affected by and can affect their environment." (The mantis's camouflage and hunting affect its ecosystem.)

Disciplinary Core Ideas:
- 4-LS1.A — Structure and Function: "All organisms have internal and external structures that serve various functions in growth, survival, behavior, and reproduction."
- 4-LS2.A — Interdependent Relationships in Ecosystems: "Plants depend on animals for pollination or seed dispersal, and animals depend on plants for food and other uses."

Crosscutting Concepts:
- Structure and Function — The mantis's body structure (long legs, folded posture, large eyes) enables its hunting function.
- Cause and Effect — The mantis's camouflage causes insects to not see it, which affects whether the mantis will catch food.

Science Vocabulary

* Predator: An animal that hunts and eats other animals for food.
* Camouflage: When an animal's color or pattern helps it blend in with its surroundings and hide from other animals.
* Adaptation: A body part or behavior that helps an animal survive in its environment.
* Prey: An animal that is hunted and eaten by other animals.
* Ambush: A surprise attack by an animal hiding and waiting for its target to come close.
* Ecosystem: All the living and non-living things in one area and how they interact with each other.

External Resources

Children's Books:
- Praying Mantis: Master of the Garden by Gail Gibbons (informational text with illustrations)
- The Praying Mantis by Jacqueline A. Ball (simple, engaging narrative)
- What Do You Know About Insects? by Buffy Silverman (includes praying mantis section)

Instructional Note: This lesson works best when paired with outdoor observations (if mantises are native to your area) or with high-quality video footage. Consider inviting a local entomologist or nature expert to visit your classroom if possible. Always emphasize that praying mantises are beneficial insects and should not be harmed.