

## Photo Description



A green dragonfly with clear wings sits on a bright green plant called a pitcher plant. The dragonfly has big eyes and delicate wings with thin lines running through them. The pitcher plant has a special cup-shaped part that looks like a green tube where it can catch insects for food.

## Scientific Phenomena

The anchoring phenomenon shown here is predator-prey relationships in carnivorous plant ecosystems. The dragonfly, an aerial predator, has landed on a pitcher plant, which is itself a predator that captures insects in its modified leaves. This represents the complex feeding relationships in wetland ecosystems where multiple predation strategies exist. The pitcher plant has evolved specialized structures to supplement its nutrition by digesting insects, while the dragonfly uses its exceptional flight abilities and compound eyes to hunt flying prey.

## Core Science Concepts

1. Carnivorous Plant Adaptations - Pitcher plants have modified leaves that form deep cups to trap insects, allowing them to get nutrients from places with poor soil.
2. Insect Body Structures - Dragonflies have compound eyes for excellent vision, transparent wings for flight, and specialized mouthparts for catching prey.
3. Predator-Prey Relationships - Both organisms are predators that have developed different hunting strategies to survive in their wetland habitat.
4. Structural Adaptations for Survival - Each organism has specific body parts that help it get food and survive in its environment.

### Pedagogical Tip:

Use this image to help students practice making observations versus inferences. Have them list what they can directly see (observations) versus what they think is happening (inferences) to build scientific thinking skills.

### UDL Suggestions:

Provide magnifying glasses or digital zoom tools so students can examine the intricate wing patterns and plant structures more closely. This supports students who learn better through detailed visual examination.

## Zoom In / Zoom Out

**Zoom In:** At the cellular level, the pitcher plant's trap contains digestive enzymes that break down captured insects into nutrients the plant can absorb. The dragonfly's compound eyes contain thousands of individual light-detecting cells called ommatidia that create a mosaic view of the world.

**Zoom Out:** This interaction occurs within a wetland ecosystem where carnivorous plants fill an important niche by recycling nutrients from insects back into the food web. These wetlands serve as crucial habitats for many species and help filter water naturally.

### Discussion Questions

1. What specific structures can you observe on both the dragonfly and pitcher plant that help them survive? (Bloom's: Analyze | DOK: 2)
2. How might the relationship between these two organisms change during different seasons? (Bloom's: Evaluate | DOK: 3)
3. What evidence from the image supports the idea that both organisms are predators? (Bloom's: Apply | DOK: 2)
4. If you were to design an experiment to test how pitcher plants catch insects, what would you need to observe? (Bloom's: Create | DOK: 3)

### Potential Student Misconceptions

1. Misconception: Plants can't eat animals or move.  
Clarification: Some plants like pitcher plants can digest insects to get nutrients, though they don't "eat" the same way animals do.
2. Misconception: All insects are harmful to plants.  
Clarification: While some insects eat plants, others like this dragonfly help control pest populations, and some plants actually benefit from catching insects.
3. Misconception: Dragonflies are dangerous to humans.  
Clarification: Dragonflies are harmless to people and are actually beneficial because they eat mosquitoes and other pest insects.

### Cross-Curricular Ideas

1. Math - Measurement and Geometry: Have students measure the wingspan of dragonflies (using actual specimens, photos, or models) and compare measurements. They can also identify and sketch the geometric shapes they see in the pitcher plant's structure and dragonfly wings, then calculate perimeters and areas of these shapes.
2. ELA - Informative Writing: Students can research and write a "Day in the Life" narrative from either the dragonfly's or pitcher plant's perspective. They should include descriptive language about their habitat, hunting strategies, and daily challenges, incorporating vocabulary from the unit.
3. Social Studies - Wetland Conservation: Connect to local ecosystems by researching wetlands in your region. Students can learn about why wetlands are important habitats that need protection, investigate local wetland conservation efforts, and even participate in community wetland restoration projects or virtual field trips.
4. Art - Nature Illustration: Students can create detailed scientific illustrations of the dragonfly and pitcher plant using colored pencils or watercolors. They should focus on accurately representing the patterns, textures, and structural details they observe, then label the key adaptations they illustrated.

### STEM Career Connection

1. Entomologist - An entomologist is a scientist who studies insects like dragonflies. They observe how insects live, what they eat, how they grow, and how they help or harm other living things. Some entomologists work to protect endangered insects or use insects to help control pests on farms. Average Annual Salary: \$65,000
2. Botanist (Plant Scientist) - A botanist studies plants, including special plants like carnivorous ones. They learn how plants grow, adapt to their environments, and survive in different habitats. Some botanists work to protect rare plants or discover new medicines from plants. Average Annual Salary: \$63,000
3. Wildlife Biologist - A wildlife biologist studies animals and plants together in their natural habitats, like wetlands. They observe ecosystems, track how different species interact with each other, and work to protect habitats and endangered species. Many wildlife biologists work outdoors in nature! Average Annual Salary: \$68,000

### NGSS Connections

- Performance Expectation: 4-LS1-1 - Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.
- Disciplinary Core Ideas: 4-LS1.A - Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction.
- Crosscutting Concepts: Structure and Function - Different materials, structures, and systems are designed to serve particular functions.
- Science and Engineering Practices: [[NGSS:SEP:Engaging in Argument from Evidence]]

### Science Vocabulary

- \* Carnivorous: An organism that eats meat or other animals for food.
- \* Compound eyes: Eyes made of many small parts that work together to see movement and shapes very well.
- \* Adaptation: A special feature that helps an organism survive in its environment.
- \* Predator: An animal that hunts and eats other animals for food.
- \* Ecosystem: All the living and non-living things in an area that interact with each other.
- \* Wetland: A habitat where the ground is covered with water for most of the year.

### External Resources

Children's Books:

- Carnivorous Plants by Rebecca Hirsch
- Dragonflies by Gail Gibbons
- What If You Had Compound Eyes? by Sandra Markle