

## Photo Description



This backyard garden shows many different types of plants growing together in flower beds. There are bright orange and yellow flowers, purple flowers, green grass, and tall plants with different shaped leaves. The plants are arranged around a small water feature with stones, and they all seem to be healthy and blooming at the same time.

## Scientific Phenomena

The anchoring phenomenon here is ecosystem interdependence in a managed garden habitat. This garden demonstrates how different plant species can coexist and thrive together when their basic needs for sunlight, water, nutrients, and space are met. The diversity of flowering plants blooming simultaneously shows seasonal adaptation, while the arrangement around the water feature creates microhabitats that support different plant requirements. This is happening because the gardener has created conditions that mimic natural ecosystems where plants with similar needs cluster together, while the variety ensures that different species can occupy different ecological niches within the same space.

## Core Science Concepts

1. **Plant Needs and Survival:** All plants require sunlight, water, air, nutrients, and appropriate temperature to survive and reproduce, as evidenced by the healthy growth throughout this garden.
2. **Habitat and Ecosystems:** This garden represents a human-created habitat where different plants occupy various niches - some near water, others in full sun, creating a mini-ecosystem.
3. **Plant Diversity and Adaptation:** The variety of flower colors, leaf shapes, and plant heights shows how different species have adapted to attract pollinators and compete for resources.
4. **Life Cycles:** The blooming flowers represent the reproductive stage of plant life cycles, where plants produce flowers to create seeds for the next generation.

### Pedagogical Tip:

Use this image to help students make connections between their own observations of gardens or parks and scientific concepts. Ask them to compare what they see here to plants in their own neighborhoods.

### UDL Suggestions:

Provide magnifying glasses or printed close-up photos of different flower types for students who need visual support, and consider having students create tactile models of different leaf shapes using clay or textured materials.

### Zoom In / Zoom Out

**Zoom In:** At the cellular level, plant cells in the green leaves are conducting photosynthesis, using chloroplasts to convert sunlight, carbon dioxide, and water into sugar and oxygen. The colorful flower petals contain specialized cells with pigments that create the bright colors to attract pollinators.

**Zoom Out:** This garden is part of a larger urban ecosystem that connects to the neighborhood, city, and regional food webs. The plants here provide nectar for local pollinators like bees and butterflies, contribute oxygen to the atmosphere, and help filter rainwater as part of the local watershed.

### Discussion Questions

1. What evidence do you see that these plants are getting everything they need to survive? (Bloom's: Analyze | DOK: 2)
2. How might removing one type of plant from this garden affect the other plants and animals that visit? (Bloom's: Evaluate | DOK: 3)
3. What patterns do you notice in how the different plants are arranged in this garden? (Bloom's: Analyze | DOK: 2)
4. If you were to design your own garden, what would you need to consider to make sure all your plants could grow successfully together? (Bloom's: Create | DOK: 4)

### Potential Student Misconceptions

1. Misconception: Plants only need water to grow and survive.  
Clarification: Plants need multiple things including sunlight, air (carbon dioxide), nutrients from soil, and appropriate temperature - water alone is not enough.
2. Misconception: All flowers are the same and serve the same purpose.  
Clarification: Different flower shapes, colors, and sizes have evolved to attract specific pollinators and reproduce in different ways.
3. Misconception: Plants don't interact with each other or affect other living things.  
Clarification: Plants compete for resources, can help each other (like providing shade), and support entire food webs by providing food and habitat for animals.

### NGSS Connections

- Performance Expectation: 5-LS2-1 - Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment
- Disciplinary Core Ideas:
  - 5-LS1.C - Organization for Matter and Energy Flow in Organisms
  - 5-LS2.A - Interdependent Relationships in Ecosystems
- Crosscutting Concepts:
  - Systems and System Models
  - Energy and Matter

### Science Vocabulary

- \* Habitat: The place where a plant or animal lives and gets everything it needs to survive.

- \* Ecosystem: All the living and non-living things in an area that interact with each other.
- \* Photosynthesis: The process plants use to make food from sunlight, water, and carbon dioxide.
- \* Pollinator: An animal like a bee or butterfly that helps plants reproduce by moving pollen between flowers.
- \* Adaptation: A special feature that helps a living thing survive in its environment.
- \* Biodiversity: The variety of different types of living things in an area.

### External Resources

#### Children's Books:

- "The Great Kapok Tree" by Lynne Cherry
- "A Seed Is Sleepy" by Dianna Hutts Aston
- "The Curious Garden" by Peter Brown

#### YouTube Videos:

- "What Do Plants Need to Grow? - Basic Needs of Plants" - Simple explanation of plant requirements for elementary students: <https://www.youtube.com/watch?v=YP7JfhkQgx0>
- "Ecosystems for Kids" - Introduction to how living things interact in their environment: <https://www.youtube.com/watch?v=2pIKXB57IFQ>