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# Flower Power: Design a Pollinator's Paradise

## Materials Needed:

- A few real flowers (e.g., lily, tulip, daisy, or even a wildflower from the yard)
- Magnifying glass
- Tweezers (optional, but helpful)
- A paper plate or tray for dissection
- Blank white paper or a science notebook
- Pencils, colored pencils, or markers
- Modeling clay in various colors OR craft supplies (pipe cleaners, colored paper, cotton balls, etc.)
- Index cards
- Scissors and glue
- Access to a book or website about pollinators (like bees, butterflies, hummingbirds, bats)

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## Lesson Overview

Today, we're not just going to learn *about* flowers; we're going to become flower engineers! Our mission is to understand how flowers work so well that we can design our own unique flower to attract a specific animal helper, called a pollinator.

## Learning Objectives:

- The student will investigate and identify the key reproductive parts of a flower (petals, stamen, pistil) through hands-on dissection.
- The student will analyze the relationship between a flower's features (color, shape, scent) and the needs of its specific pollinator.
- The student will apply this knowledge by designing and constructing a 3D model of a new flower tailored to attract a chosen pollinator, justifying their design choices.

## Time Allotment:

60-90 minutes

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## Part 1: The Flower Detective (15-20 minutes)

**Goal:** To investigate the "secret" parts of a real flower.

1. **Set the Scene:** Place one real flower on the paper plate. Say, "You are a flower detective. Your mission is to carefully explore this flower and discover its hidden machinery. What do you think its job is?" (Guide towards the idea of making seeds).
2. **External Investigation:** Before taking it apart, have the student observe the outside. Ask questions like:
    - "What colors do you see? Why might it be so bright?"
    - "Does it have a smell? What does that remind you of?"
    - "Describe the shape of the petals. Are they a cup? A platform?"

   Have them sketch the whole flower in their notebook.
3. **Internal Investigation (Dissection):** Now, the fun part! Let the student gently pull off the petals one by one. Use the magnifying glass and tweezers to explore the inside parts.
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    - Find the dusty sticks (the **stamens** with pollen). Have them touch the pollen. This is the "boy part."
    - Find the central part (the **pistil**). Explain this is the "girl part" where seeds will grow if pollen lands on it.
4. **Record Findings:** Have the student draw a "blueprint" of the flower's inside parts in their notebook, labeling the petals, stamen, and pistil. They don't need to memorize the terms, just understand their roles.

Part 2: The Pollinator Challenge (25-35 minutes)

Goal: To design a flower for a specific "client."

1. **Choose a Client:** Introduce the idea of pollinators. Explain that flowers and pollinators are partners. Present a few "client profiles" on index cards or just discuss them. For example:
    - **Client A: The Bee.** "I am a busy bee! I am attracted to bright blue and yellow colors. I can't see red very well. I need a sturdy landing pad (a petal) to sit on while I work. I love sweet smells!"
    - **Client B: The Hummingbird.** "I am a hummingbird. I love the color red! I have a long beak and hover in the air, so I prefer flowers shaped like tubes or trumpets. I don't care much about smells, but I need lots of nectar."
    - **Client C: The Bat.** "I am a bat. I come out at night, so I can't see colors well. I am attracted to large, white or pale flowers that are easy to see in the moonlight. I like strong, fruity smells."
2. **Brainstorm & Blueprint:** The student chooses one pollinator "client." On a fresh piece of paper, they will brainstorm and sketch a blueprint for a brand new flower designed perfectly for their client. They must make decisions about:
    - **Color:** What color petals will it have?
    - **Shape:** Will it be a cup, a tube, a flat platform?
    - **Scent:** Will it be sweet, fruity, or have no smell?
    - **Special Features:** Will it have lines pointing to the nectar (nectar guides)? Will it open at night or in the day?
3. **Build the Flower:** Using modeling clay OR the other craft supplies, the student will now build a 3D model of their flower design. This is where their creativity shines! Encourage them to be inventive.

Part 3: The Product Pitch (10-15 minutes)

Goal: To explain and justify their creative choices.

1. **Present the Design:** The student presents their 3D flower model.
2. **Justify the Choices:** Ask them to explain their flower as if they were pitching it to their pollinator client. They should answer the question: "Why would a [bee/hummingbird/bat] love your flower more than any other?"
    - Example: "I made my flower red and shaped like a tube because you, Mr. Hummingbird, love red and your long beak can reach the nectar deep inside where other animals can't."

Assessment & Reflection:

The lesson's success is measured by the student's creative application of concepts, not memorization. Assess based on:

- **The 3D Flower Model:** Did the student thoughtfully incorporate features for their chosen pollinator?

- **The "Product Pitch":** Can the student clearly explain *why* they made their design choices, linking the flower's structure to the pollinator's needs?
- **Reflection Questions:** "What was the most challenging part of designing your flower?" and "If you could design a flower for a different animal (like a mouse or a beetle), what would you change?"

Differentiation & Extension:

- **For Support:** Focus on just one pollinator (like a bee) and provide a pre-made "checklist" of features to include in the design (e.g., "Must have yellow petals," "Must have a landing pad").
- **For Extension:** Challenge the student to invent a completely new, imaginary pollinator and design a flower for it. They would have to describe the imaginary animal's characteristics (how it moves, what senses it relies on) and then design a flower that co-evolved with it. They could write a short story about their flower and its unique pollinator partner.

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