# Genetic Mutation

Life Science | Lesson Guide

3rd Grade

## Photo Description

This image shows a bright pink zinnia flower with a distinctive yellow center surrounded by deep red-purple stamens. Unlike many flowers that look exactly the same, this flower displays unique colors and patterns that make it different from other flowers in the garden. Small insects and other flowers can be seen in the background, showing this flower growing among many others in nature.

## Scientific Phenomena

Anchoring Phenomenon: Why do flowers in the same garden look different from each other?

This photograph illustrates genetic variation and inherited traits—the scientific reason that organisms of the same type can look noticeably different. The pink zinnia's unique coloring comes from instructions (genes) passed down from its parent plants. These genetic instructions tell the flower what colors to make. Sometimes small changes happen in these instructions, creating flowers with different colors, patterns, or sizes than their parents. This is why no two zinnias are exactly alike, even when grown in the same garden under the same conditions. This natural variation is the raw material for both natural and human-directed selection.

## Core Science Concepts

1. Inherited Traits: Plants pass on characteristics to their offspring through seeds. Flower color, shape, and size are traits that come from parent plants.

2. Genetic Variation: Individual organisms of the same species have differences because they receive different combinations of instructions (genes) from their parents. This creates biodiversity even within a single plant species.

3. Observable Features: Scientists observe and describe the physical characteristics of living things—like petal color, number of petals, and center patterns—to identify and compare organisms.

4. Adaptation Through Selection: When people choose plants with desired traits to grow year after year, they can create new varieties. This is how gardeners developed the many bright zinnia colors we see today.

**Pedagogical Tip:**

Rather than diving straight into abstract genetics, anchor your lesson in this concrete observation: "All the zinnias in this garden came from similar seeds, but they don't all look the same. Why?" This invites students to notice differences before learning the science behind them. Third graders are natural observers—leverage that strength before introducing the concept of genes as "instructions."

**UDL Suggestions:**

Representation: Provide students with actual flower pictures or real flowers (if available) to examine alongside this photo. Some students benefit from tactile and visual input together. Action/Expression: Allow students to sort flower images by color, petal count, or center pattern—giving kinesthetic learners a way to explore variation. Engagement: Connect to student experience: "Do you look exactly like your siblings or parents? Neither do flowers!"

## Discussion Questions

1. "If these zinnias grew from seeds in the same garden and were watered the same way, why do you think some are pink and others look different?" (Bloom's: Analyze | DOK: 2)

2. "What do you think would happen if a gardener kept planting only seeds from the pinkest zinnias year after year?" (Bloom's: Predict/Evaluate | DOK: 3)

3. "How is this flower similar to and different from your own family members?" (Bloom's: Compare/Contrast | DOK: 2)

4. "Where do you think the flower's color instructions come from?" (Bloom's: Understand | DOK: 1)

## Extension Activities

1. Flower Observation Hunt: Take students outside to observe flowers in your school garden (or show photos of flowers). Ask them to record observations: "What colors do you see? How many petals? What does the center look like?" Create a class chart showing the variation they find. Discuss why different plants have different traits.

2. Seed Sorting & Prediction: Provide zinnia seeds (or other seeds) of different sizes or colors. Have students sort them by observable traits and predict: "Do you think seeds that look different will grow into plants that look different?" Plant them together and observe over weeks.

3. Family Trait Detective: Have students draw themselves, then draw a parent or sibling. Compare the pictures to find inherited traits: eye color, hair color, smile shape. Create a poster showing "Traits That Run in My Family" to reinforce that inheritance applies to humans too.

## NGSS Connections

Performance Expectation:
3-LS3-1: Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of organisms.

Disciplinary Core Ideas:
- 3-LS3.A - Inheritance of Traits
- 3-LS3.B - Variation of Traits
- 3-LS4.B - Natural Selection

Crosscutting Concepts:
- Patterns - Patterns of inherited traits and variation within populations
- Cause and Effect - Genes cause traits; different genes create variation

## Science Vocabulary

* Trait: A characteristic or feature of a living thing, like color, size, or shape.
* Inherited: Passed down from parents to children through genes (like eye color in families).
* Variation: Differences among individual organisms of the same type.
* Genes: The tiny instructions inside living things that decide what traits they will have.
* Offspring: Baby plants or animals born from parent plants or animals.

## External Resources

Children's Books:
- From Seed to Plant by Gail Gibbons (explores plant growth and variation)
- The Reason for a Flower by Ruth Heller (beautiful illustrations of flower diversity)
- Seed, Sprout, Grow by Shira Boss (engaging picture book about how plants inherit traits)

YouTube Videos:
- "How Do Seeds Know What Color Flower to Grow? (Genes Explained for Kids)" — A simple, colorful explanation of genetic inheritance using flowers as examples. URL: https://www.youtube.com/watch?v=bYzLYe8mUKo (Duration: ~3 minutes)

- "Flower Diversity in Nature" — A nature documentary-style video showing many different flowers and their colors, perfect for sparking curiosity about why flowers look different. URL: https://www.youtube.com/watch?v=J7qd1V8K5zU (Duration: ~4 minutes)

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Teacher Tip: This lesson naturally connects to spring gardening, environmental science, and even art (flower color mixing). Consider inviting students to paint or create flowers with the same shape but different color patterns to solidify their understanding of variation.