Reflection

Physical Science | Lesson Guide

Kindergarten

Photo Description

Red flowers sit in a clear glass with water. The flowers have long green stems. You can see the flowers in a mirror too.

Scientific Phenomena

This image demonstrates reflection as an anchoring phenomenon. Light bounces off the mirror's smooth surface, creating an image that appears to be behind the mirror. The mirror reflects light rays at the same angle they hit it, which is why we can see a reversed copy of the flowers and vase. This happens because mirrors have a very smooth, shiny surface that doesn't absorb light but sends it back to our eyes.

Core Science Concepts

1. Light and Reflection - Light travels in straight lines and bounces off smooth surfaces like mirrors
2. Properties of Materials - Different materials interact with light differently (glass is transparent, mirrors are reflective)
3. Observable Properties - We can use our sense of sight to observe how objects look the same and different in mirrors
4. Living vs. Non-living - Flowers are living things that need water, while mirrors and glass are non-living objects

Pedagogical Tip:

Use hand mirrors during the lesson so every student can explore reflection firsthand. Have them hold objects up to mirrors and describe what they see - this builds observation skills and vocabulary simultaneously.

UDL Suggestions:

Provide multiple ways for students to demonstrate understanding: drawing what they see in mirrors, using body movements to show how light bounces, or creating simple charts comparing real objects to their reflections.

Zoom In / Zoom Out

1. Zoom In: At the microscopic level, the mirror's surface is made of tiny particles arranged in a very flat, smooth pattern. Light particles (photons) hit these smooth surfaces and bounce back without scattering.

2. Zoom Out: Reflection is everywhere in nature - we see ourselves in calm water, animals use reflection in lakes to drink, and reflection helps us see the moon because it bounces sunlight back to Earth.

Discussion Questions

1. What do you notice that's the same between the real flowers and the flowers in the mirror? (Bloom's: Analyze | DOK: 2)

2. Why do you think we can see the flowers in the mirror? (Bloom's: Apply | DOK: 2)

3. What would happen if we used a different kind of surface instead of a mirror? (Bloom's: Evaluate | DOK: 3)

4. How are the flowers in the mirror different from the real flowers? (Bloom's: Compare | DOK: 2)

Potential Student Misconceptions

1. Misconception: "There's another flower living inside the mirror"
   Reality: The mirror creates an image by bouncing light - nothing actually exists behind the mirror

2. Misconception: "Mirrors make things backwards"
   Reality: Mirrors show things exactly as they are, but from the opposite direction - like looking at the back of your hand vs. your palm

3. Misconception: "Only mirrors can show reflections"
   Reality: Any smooth, shiny surface can create reflections including water, metal, and glass

Cross-Curricular Ideas

1. Math + Science: Count the flowers in the real vase and count them in the mirror reflection. Are the numbers the same? Create a simple graph showing "Real Flowers" vs. "Mirror Flowers" using pictures or tallies. This builds one-to-one correspondence and introduces the concept of equal groups.

2. ELA + Science: Read a mirror-themed story like "Me and My Mirror" and have students describe what they see using descriptive words (red, bright, tall, shiny). Students can draw their own mirror image and label it with color and position words, building vocabulary while reinforcing the science concept.

3. Art + Science: Create a symmetry art project where students fold paper in half, draw on one side, and fold to see their reflection. They can paint or color one side of a butterfly or flower and fold to create a matching mirror image, making the abstract concept of reflection concrete and creative.

4. Social Studies + Science: Discuss how people use mirrors in their homes and communities (bathrooms, stores, cars). Talk about how mirrors help us and make us safer. Connect to community helpers like hairdressers or dentists who use mirrors in their jobs.

STEM Career Connection

1. Optometrist/Eye Doctor - These scientists help people see better by using special mirrors and tools to look at eyes. They study how light works and how our eyes see reflections and images. They make glasses that help people see clearly, just like mirrors help us see reflections. Average Annual Salary: $120,000 USD

2. Lighting Designer - Lighting designers work with light and reflective surfaces to make spaces bright and beautiful. They use mirrors and shiny materials in theaters, homes, and stores to bounce light around and create cool effects. They study how light bounces and travels. Average Annual Salary: $58,000 USD

3. Physicist - Physicists study how light works, including reflection, refraction, and how mirrors bounce light rays. They do experiments with mirrors, prisms, and other materials to understand the science of light and energy. Some physicists even design new types of mirrors for telescopes that help us see stars! Average Annual Salary: $128,000 USD

NGSS Connections

Performance Expectation: K-2-ETS1-1 - Ask questions, make observations, and gather information about a situation people want to change

Disciplinary Core Ideas:
- K.PS2.A - Pushes and pulls can have different strengths and directions (light "pushes" against surfaces)
- K-ESS3.A - Living things need water, air, and resources from the land (flowers need water)

Crosscutting Concepts:
- Patterns - Objects can be observed and described in terms of their similarities and differences
- Cause and Effect - Events have causes that generate observable patterns

Science Vocabulary

* Reflection: When light bounces off a surface back to your eyes
* Mirror: A very smooth, shiny surface that shows reflections
* Transparent: You can see through it, like glass or water
* Surface: The outside or top part of something
* Image: A picture or copy of something you can see

External Resources

Children's Books:
- Mirrors and Reflections by David Dreier
- What Is Reflection? by Robin Johnson
- Light by David Dreier