

## Photo Description



Red flowers sit in a clear glass vase on a shiny round table. The flowers have bright red petals and green stems. You can see the same flowers reflected in the table's smooth surface like a mirror.

## Scientific Phenomena

The Anchoring Phenomenon is reflection - the bouncing of light off smooth surfaces. The polished table acts like a mirror because its smooth surface bounces light rays back at the same angle they hit it. This creates a clear image of the flowers that appears to be underneath the table. Reflection happens when light cannot pass through a material and instead bounces back to our eyes.

## Core Science Concepts

1. Light travels in straight lines - Light rays move from the flowers to the table surface in straight paths
2. Smooth surfaces reflect light clearly - The polished table creates a mirror-like reflection because it has no bumps or scratches
3. Rough surfaces scatter light - Unlike the smooth table, the textured wall behind doesn't show clear reflections
4. We see objects when light bounces off them - The flowers are visible because light reflects off their petals to our eyes

**Pedagogical Tip:**

Use a flashlight and various materials (mirror, aluminum foil, sandpaper, fabric) to let students discover which surfaces create the clearest reflections. This hands-on exploration builds understanding before introducing vocabulary.

**UDL Suggestions:**

Provide multiple ways to explore reflection: tactile experiences with different textured materials, visual demonstrations with flashlights, and kinesthetic activities where students act as "light rays" bouncing off different "surfaces" (classmates).

**Zoom In / Zoom Out**

1. Zoom In: At the microscopic level, smooth surfaces have tiny particles arranged in orderly, flat patterns that bounce light rays back evenly. Rough surfaces have particles that stick out in different directions, scattering light rays everywhere.
2. Zoom Out: Reflection is essential in nature's larger systems - calm lake surfaces reflect mountains and sky, animals use reflection for camouflage, and solar panels position themselves to reflect sunlight efficiently for clean energy.

## Discussion Questions

1. What would happen to the reflection if we made the table surface rough with sandpaper? (Bloom's: Predict | DOK: 2)
2. Why can you see the flowers clearly in the table but not in the wall behind them? (Bloom's: Analyze | DOK: 2)
3. How is the reflection the same as the real flowers? How is it different? (Bloom's: Compare | DOK: 1)
4. What other places in our classroom or school show reflections like this table? (Bloom's: Apply | DOK: 2)

## Potential Student Misconceptions

1. Misconception: "The reflection is another set of real flowers under the table."  
Clarification: Reflections are images created by bouncing light, not real objects in a different location.
2. Misconception: "Only mirrors can show reflections."  
Clarification: Any smooth, shiny surface can create reflections - water, polished metal, glass, or glossy tables.
3. Misconception: "Dark objects don't reflect light."  
Clarification: All objects reflect some light (that's how we see them), but lighter and shinier objects reflect more light.

## Cross-Curricular Ideas

1. Math - Symmetry and Patterns: Use the reflection photo to explore symmetry. Have students draw the flowers and their reflections, noticing how the reflection is a mirror image. Count the petals on the real flowers and compare to the reflected flowers (they're the same!). Create symmetrical designs using markers and fold paper to show how reflections create matching patterns.
2. ELA - Descriptive Writing: Read poetry or short texts about reflections and mirrors. Have students write their own simple poems or sentences describing what they see in the photo using sensory words (shiny, smooth, bright red, clear). Create an anchor chart of "reflection words" (mirror, bounce, shine, reflect) to build vocabulary across content areas.
3. Art - Mixed Media Exploration: Create a collaborative classroom art project where students make their own "reflection art." Fold paper in half and paint on one side, then fold to create a mirror image. Use aluminum foil, shiny paper, and other reflective materials to create a bulletin board display about things that reflect light.
4. Social Studies - Community Helpers: Connect to optometrists and eyeglass makers who use reflection and light principles in their work. Discuss how understanding light and reflection helps people see better. Talk about how windows and mirrors in homes and buildings help us see and live safely.

## STEM Career Connection

1. Optometrist/Eye Doctor: These scientists help people see better by understanding how light enters our eyes and bounces off things. They use special tools with mirrors and lights to check if our eyes are working properly. They might design new glasses or contact lenses. Average Salary: \$120,000/year
2. Lighting Designer: These creative engineers design lights for theaters, homes, and buildings. They understand how light bounces off surfaces and creates beautiful or useful lighting effects. They might design stage lights for a school play or the lighting in a museum. Average Salary: \$55,000/year

3. Solar Panel Engineer: These scientists use reflection and light to create clean energy for homes and businesses. They design special shiny surfaces that catch sunlight and turn it into electricity. Understanding how light bounces helps them position panels to collect the most energy. Average Salary: \$105,000/year

### NGSS Connections

Performance Expectation: 1-PS4-3 Plan and conduct investigations to determine the effect of placing objects made with different materials in the path of a beam of light.

Disciplinary Core Ideas:

- 1-PS4.B - Objects can be seen if light is available to illuminate them or if they give off their own light

Crosscutting Concepts:

- Cause and Effect - Simple tests can be designed to gather evidence to support or refute student ideas about causes

### Science Vocabulary

- \* Reflection: When light bounces off an object back to your eyes
- \* Smooth: Having a flat surface with no bumps or scratches
- \* Light ray: A straight line that shows the path light travels
- \* Surface: The outside or top part of something you can touch
- \* Scatter: To spread out in many different directions

### External Resources

Children's Books:

- Mirrors by Marion Dane Bauer
- Light: Shadows, Mirrors, and Rainbows by Natalie M. Rosinsky
- What Is Light? by Robin Johnson