

## Photo Description



The picture shows tall buildings with lots of glass windows. One building looks like it is inside another building's windows. The glass acts like a mirror and shows the building behind it.

## Scientific Phenomena

This image demonstrates reflection as an anchoring phenomenon. Light rays from the building behind bounce off the smooth glass surface of the front building and travel to our eyes, creating a mirror-like image. This happens because glass surfaces are smooth and shiny, causing light to bounce back at predictable angles rather than scattering in all directions like rough surfaces do.

## Core Science Concepts

1. Light Reflection - Light bounces off smooth, shiny surfaces like mirrors and glass windows
2. Properties of Materials - Different materials interact with light differently (glass reflects and lets light through, while concrete absorbs light)
3. Observable Properties - We can see and describe how materials look shiny, dull, smooth, or rough

### Pedagogical Tip:

Use a flashlight and various materials (mirror, aluminum foil, sandpaper, fabric) to let students discover which surfaces reflect light best. This hands-on exploration helps them understand that smooth, shiny materials are the best reflectors.

### UDL Suggestions:

Provide multiple ways for students to demonstrate understanding by having them draw what they see, act out light bouncing with their bodies, or use hand gestures to show light traveling and reflecting.

## Zoom In / Zoom Out

1. Zoom In: At the tiny level, light is made of particles called photons that bounce off the smooth glass surface like balls bouncing off a wall
2. Zoom Out: Reflection happens everywhere in our world - in puddles, car windows, phone screens, and even helps animals like cats see better at night

## Discussion Questions

1. What do you notice about how the building looks in the glass? (Bloom's: Observe | DOK: 1)
2. Why do you think some windows show reflections while others don't? (Bloom's: Analyze | DOK: 2)

3. How is this glass window similar to a mirror in your bathroom? (Bloom's: Compare | DOK: 2)
4. What would happen if the glass was rough instead of smooth? (Bloom's: Predict | DOK: 3)

### Potential Student Misconceptions

1. Misconception: "The building is actually inside the glass"

Clarification: The building image is reflected on the glass surface, like looking in a mirror

2. Misconception: "Only mirrors can show reflections"

Clarification: Any smooth, shiny surface can create reflections including water, metal, and glass

### Cross-Curricular Ideas

1. Math - Symmetry and Patterns: Have students draw the reflected building and the real building side-by-side, then identify matching shapes and patterns. Count the windows in the reflection and compare them to the real building to practice one-to-one correspondence.
2. ELA - Descriptive Writing: Read books about reflections together, then have students write or dictate sentences describing what they see in the photo using words like "shiny," "bright," "clear," and "mirror-like." Create a class word bank of reflection-related descriptive words.
3. Art - Mirror Drawings: Students create their own "reflection art" by folding paper in half, drawing on one side, and then folding to see the symmetrical reflection. They can also use small mirrors to explore reflections while drawing objects, discovering how reflections appear backwards.
4. Social Studies - Community Helpers: Connect to architects and construction workers who design and build tall buildings with glass windows. Discuss how these workers use reflection and light to make buildings beautiful and comfortable for people who work inside.

### STEM Career Connection

1. Architect - Architects are people who design buildings and decide what materials to use, like glass and metal. They think about how light and reflections will make buildings look beautiful and help people see clearly inside. They draw plans that builders use to construct the buildings. Average Salary: \$82,000 USD per year
2. Window Maker/Glass Technician - These workers cut, shape, and install glass in buildings. They choose special types of glass that reflect light in different ways and keep buildings warm or cool. They make sure the glass is smooth and shiny so reflections work perfectly. Average Salary: \$36,000 USD per year
3. Light Designer (Lighting Engineer) - Light designers figure out how to use mirrors, glass, and special lights to make spaces bright and beautiful. They understand how light bounces off different materials and use this knowledge to light up buildings, stages, and homes in creative ways. Average Salary: \$65,000 USD per 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
- Crosscutting Concepts: Cause and Effect

## Science Vocabulary

- \* Reflection: When light bounces off a surface back to your eyes
- \* Smooth: A surface that feels flat with no bumps or rough spots
- \* Shiny: A surface that reflects light and looks bright or glossy
- \* Material: What something is made of, like glass, wood, or metal
- \* Property: How something looks, feels, or acts

## External Resources

Children's Books:

- Mirrors and Reflections by David Dreier
- Light by David Dreier
- What Is Light? by Robin Johnson