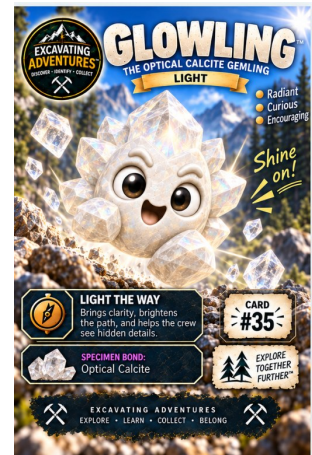


# Shadows & Material Transparency

Shadow Court with Glowling

## Learning target

Predict shadows and compare how materials transmit light.



## Before you begin

Use the reference page and discussion prompts on their own, or open the optional browser adventure. No earlier lesson or physical kit is required.

For online play: use an internet-connected current browser with local storage enabled. Read the three-part Gemling briefing, answer the quick check, and apply the evidence at three checkpoints. Retry feedback supports review; results are not a secure test or gradebook.

Use for teacher-led review, science centers or partner practice. Independent readers may need support with the vocabulary below. The design target is grades 3-5; choose support based on the learner.

## Vocabulary and concepts to discuss

Opaque, translucent and transparent; blocking light; shadow changes

## Open Shadow Court - direct lesson link

Scan the QR code or use the clickable link. This guide is usable offline; the adventure runs on an external educational website.



# Shadows & Material Transparency - key ideas

## 1. The first clues

Transparent materials pass much visible light clearly; translucent materials pass light but scatter it; opaque materials block it.

## 2. How the clues connect

A shadow forms where an object blocks light. Shadow size can change with the positions of source, object and screen.

## 3. Our evidence record

Our fixed lamp-and-screen model moves an opaque card closer to the lamp. Its shadow grows larger in this arrangement. A clear sheet would let much more light pass.

## Keep the science accurate

No wavelength calculations, Snell's law or looking at the Sun/lasers. Refraction and dispersion remain clear qualitative extensions.

## Apply the evidence

Use a specific observation from this lesson to explain one choice. Point to a clue, then connect that clue to a scientific idea.

Curriculum reference:

<https://www.nextgenscience.org/dci-arrangement/4-ps4-waves-and-their-applications-technologies-information-transfer>

# Talk through the evidence

## 1. Which material blocks light?

Expected answer: Opaque

Reasoning: Transparent materials pass much visible light clearly; translucent materials pass light but scatter it; opaque materials block it.

## 2. Which scatters transmitted light?

Expected answer: Translucent

Reasoning: Transparent materials pass much visible light clearly; translucent materials pass light but scatter it; opaque materials block it.

## 3. What happens to this shadow when the card approaches the lamp?

Expected answer: It grows larger

Reasoning: Our fixed lamp-and-screen model moves an opaque card closer to the lamp. Its shadow grows larger in this arrangement. A clear sheet would let much more light pass.

## 4. Why state the model arrangement?

Expected answer: Position relationships determine the result

Reasoning: A shadow forms where an object blocks light. Shadow size can change with the positions of source, object and screen.

## Guide the discussion

Ask learners to name the evidence that supports their answer. If an answer differs, revisit the matching key idea on page 2 and invite a revised explanation.

Online rewards: this lesson grants one fixed digital Expedition Discovery. Five saved digital Gemling friends become available only after all six distinct subject lessons are complete, in any order. Digital rewards do not establish physical ownership.