

# Nova's Night-time Optics

*Learning objective: To understand how light travels and how we see objects.*

Read the passage carefully and answer the questions below. Use your scientific knowledge to support your explanations.

Nova the owl perches silently in the ancient oak tree, her large eyes scanning the forest floor. She knows that light is essential for her to navigate the night. Light travels in straight lines from a source, such as the moon or a distant star. When light strikes an object, it bounces off the surface and enters our eyes; this process is called reflection. If an object is opaque, like a thick tree trunk, light cannot pass through it, creating a dark silhouette known as a shadow. However, not all surfaces reflect light in the same way. A polished pond acts like a mirror, creating a clear reflection, whereas rough bark scatters light in many directions. Nova observes that when light hits a glass-like surface, it can change direction, a phenomenon known as refraction. By studying how light interacts with the world, Nova can identify prey even in dim conditions. She reminds us that without a light source, our eyes would remain in total darkness, unable to perceive the intricate patterns and colours of the natural world.

*Word bank: transparent · reflection · luminous · opaque · spectrum · refraction*

**1. Identify two examples of light sources mentioned in the text. (2 marks)**

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**2. What happens to light when it hits an opaque object like a tree trunk? (2 marks)**

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**3. Explain why Nova might struggle to see in a room with no windows and no light sources. (3 marks)**

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**4. Compare how light interacts with a polished pond versus rough tree bark. Why is there a difference? (3 marks)**

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**5. Justify why it is important for scientists to understand the way light behaves when it hits different surfaces. (4 marks)**

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**Draw:** Draw a diagram showing a ray of light travelling from a moon, hitting a shiny metal bucket, and reflecting into Nova the owl's eyes. Label your light source and the reflected ray.



*Extension challenge: Research and explain what might happen if light were unable to travel in straight lines. How would this change the way we see shadows and reflections? Write a short paragraph justifying your scientific theory.*