

Nova's Nocturnal Light Lab: Investigating Reflection and Shadows

Learning objective: To understand how light travels in straight lines and how reflection occurs, and to apply this knowledge to explain the formation of shadows.

Join Nova the owl in her observatory! Read the scenarios below. For each one, decide if the statement is True or False. If False, you must provide a scientific justification for why it is incorrect, using your knowledge of light travelling in straight lines.

Word bank: straight lines · reflection · opaque · transparent · light source · angle of incidence · shadow · periscope

1. Nova says: 'When I shine my torch at a mirror, the light reflects off at a random angle.' Is she correct? Explain your reasoning. (2 marks)

2. Max the monkey claims: 'If I stand behind a large, opaque oak tree, the light from the sun will bend around the trunk to reach my eyes.' Justify why this is scientifically inaccurate. (2 marks)

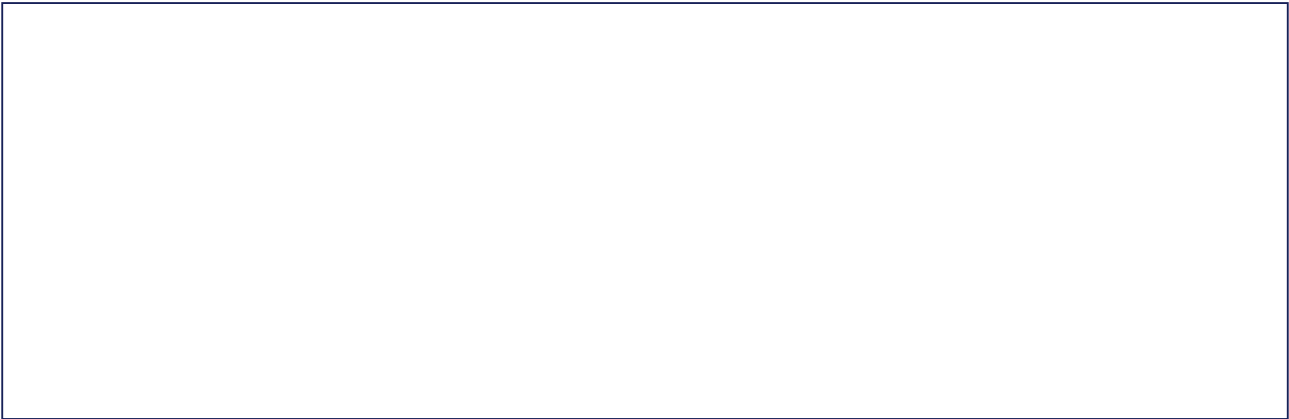
3. True or False: A shadow is created because an object absorbs all light, meaning no light can travel past it. Explain your answer. (2 marks)

4. If you were designing a device to see over a garden wall, how would you position two mirrors to ensure the light reaches your eyes in a straight path? (2 marks)

5. Compare and contrast: How does the shadow cast by a translucent piece of tracing paper differ from the shadow cast by an opaque metal ruler? (2 marks)

6. What might happen to the size of a shadow if a light source is moved closer to an object? Justify your prediction. (2 marks)

Draw: Draw a scientific diagram showing a beam of light hitting a flat mirror at an angle and reflecting away. Label the 'incident ray', the 'reflected ray', and the 'mirror surface'.



Extension challenge: Design a 'Light Maze' for Kit the fox. Create a plan for a box where light must enter, hit three mirrors at specific angles, and exit through a small hole on the opposite side. Use arrows to show the path of the light rays.