

Unit of work
Light

Year group
6

Prior learning

- Certain things produce light, usually by burning (e.g. the Sun) or electricity (e.g. street lights)
- Shiny materials do not make light but do reflect it.
- Shadows are caused when certain materials block light. Light travels in straight lines. When light is blocked by an opaque object, a dark shadow is formed.
- The further away the light source is, the smaller the shadow is. The closer the source of the light, the bigger the shadow.
- The terms transparent, translucent and opaque

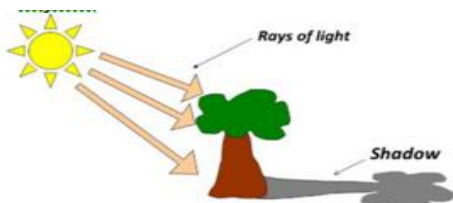
Knowledge/ Skills

How does light travel?

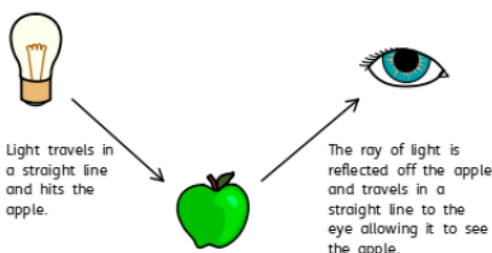
- Light travels in a straight line.
- When you place a torch on a table in a **dark** room, the beam travels in a straight line.
- **Reflection** is when **light** bounces off a surface - this changes the direction in which the light travels.

What is the relationship between light sources and shadow s?

- Because **light** travels in straight lines, when there is an **opaque** object blocking the **light**, a **shadow** is formed.
- These **shadows** have the same shape as the objects that cast them.
- The size of a shadow changes as the light source moves.



How do we see?



National Curriculum

Pupils should be taught to:

- Recognise that light appears to travel in straight lines
- Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye
- Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes
- Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.

Vocabulary and definitions

| Word | Definition |
|-------------|---|
| angle | the direction from which you look at something |
| dark | the absence of light |
| dim | light that is not bright |
| electricity | a form of energy that can be carried by wires and is used for heating and lighting, and to provide power for machines |
| emits | to emit a sound or light means to produce it |
| light | a brightness that lets you see things. |
| mirror | a flat piece of glass which reflects light , so that when you look at it you can see yourself reflected in it |
| opaque | if an object or substance is opaque , you cannot see through it |
| reflects | sent back from the surface and not pass through it |
| shadows | a dark shape on a surface that is made when something stands between a light and the surface |
| source | where something comes from |
| surface | the flat top part of something or the outside of it |
| torches | a small electric light which is powered by batteries and which you can carry |
| translucent | if a material is translucent , some light can pass through it |
| transparent | If an object or substance is transparent , you can see through it |

Investigate

- What happens when light is **reflected** from different **surfaces**? What happens when light is **reflected** from a **mirror**? What happens when the **angle** of the **mirror** (or **light source** changes?)
- Draw diagrams to show how **light** travels and what happens when **light** is **reflected** from a **mirror**.
- Draw diagrams to show how we see.
- Design an experiment to measure **shadow** length by changing a variable. Show your results in a line graph to show the relationship between distance of **light source** and **shadow** length. Explain your findings using scientific vocabulary.
- Create **shadow** puppets to show how **light** travels and to demonstrate that a **shadow** has the same shape as the object that casts them.
- Make a periscope and explain how it works using diagrams and scientific vocabulary. Use the idea that **light** appears to travel in straight lines to explain how it works.
- Research how **mirrors** are used in different contexts (e.g. rear view mirrors, on a dangerous bend) and explain why and how they work.
- Explain why objects look bent in water.
- Explore different contexts in which **light** travels including rainbows, colours on soap bubbles and coloured filters.

Significant people

**Abu Ali al-Hasan
(Alhazen)
(965-1040)**



Alhazan was an Iranian mathematician, astronomer and physicist. He was the pioneer of modern optics. He carried out experiments with pinhole cameras and candles and explained how the image is formed by rays of light travelling in straight lines.

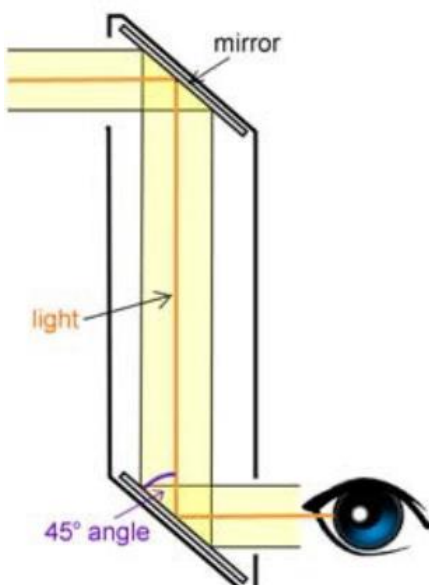
| Question 1: When light bounces off a surface, it is.. | Start of unit: | End of unit: |
|---|----------------|--------------|
| absorbed | | |
| dissolved | | |
| reflected | | |
| bounced | | |

| Question 2: Shadows are formed when... | Start of unit: | End of unit: |
|--|----------------|--------------|
| light is let through an object | | |
| light reflects off an object | | |
| it is dark | | |
| light cannot travel through an object | | |

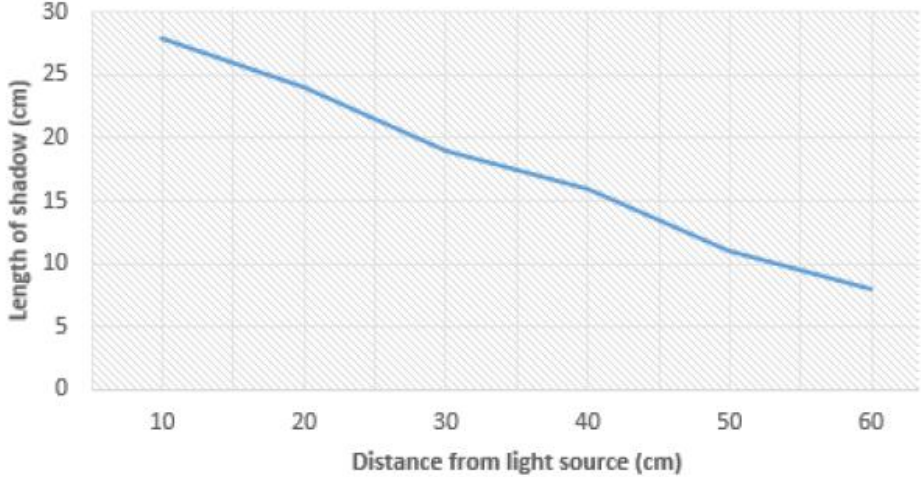
| Question 3: The word that best describes an object that does not allow light to travel through it is..... | Start of unit: | End of unit: |
|---|----------------|--------------|
| transparent | | |
| translucent | | |
| opaque | | |

| Question 4: How do we see an object? | Start of unit: | End of unit: |
|---|----------------|--------------|
| Light reflects off the object and enters our eyes | | |
| Light travels from our eyes and reflects off the object | | |
| Light reflects off our eyes and enters the object | | |
| Light reflects off the object and enters our eyes | | |

| Question 5: A child says that a shadow takes the shape of the light source. Is this true or false? Explain your reasoning. | Start of unit: | End of unit: |
|--|----------------|--------------|
| | | |

| Question 6: Describe how the mirrors in a periscope allow us to see. | Start of unit: | End of unit: |
|---|----------------|--------------|
|  | | |

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| Question 7: You design an experiment to test the size of a shadow that is cast by a light source. Name one thing you will keep the same. Name one thing you will change. | Start of unit: | End of unit: |
| | | |

| <p style="text-align: center;">Shadow Investigation</p>  <table border="1" style="display: none;"> <caption>Data points from the Shadow Investigation graph</caption> <thead> <tr> <th>Distance from light source (cm)</th> <th>Length of shadow (cm)</th> </tr> </thead> <tbody> <tr><td>10</td><td>28</td></tr> <tr><td>20</td><td>24</td></tr> <tr><td>30</td><td>19</td></tr> <tr><td>40</td><td>16</td></tr> <tr><td>50</td><td>11</td></tr> <tr><td>60</td><td>8</td></tr> </tbody> </table> | Distance from light source (cm) | Length of shadow (cm) | 10 | 28 | 20 | 24 | 30 | 19 | 40 | 16 | 50 | 11 | 60 | 8 | Start of unit: | End of unit: |
|--|---------------------------------|-----------------------|----|----|----|----|----|----|----|----|----|----|----|---|----------------|--------------|
| Distance from light source (cm) | Length of shadow (cm) | | | | | | | | | | | | | | | |
| 10 | 28 | | | | | | | | | | | | | | | |
| 20 | 24 | | | | | | | | | | | | | | | |
| 30 | 19 | | | | | | | | | | | | | | | |
| 40 | 16 | | | | | | | | | | | | | | | |
| 50 | 11 | | | | | | | | | | | | | | | |
| 60 | 8 | | | | | | | | | | | | | | | |

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| Question 8: Look at the graph above. What was the approximate length of the shadow when the object was 35cm away from the light source? | | |
|---|--|--|

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|--|--|--|
| Question 9: Look at the graph above. Approximately, how far away from the light source was the object when the length of the shadow was 25cm long? | | |
|--|--|--|

| | | |
|---|--|--|
| Question 10: Write a conclusion about what the line graph is showing using scientific vocabulary. | | |
|---|--|--|