

What should I already know?

- 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**.

What will I know by the end of the unit?

What is a **light source**?

- A **light source** is something that **emits light** by burning, electricity or **chemical reactions**.
- Burning **light sources** include the Sun, flames from a fire and stars.
- We must never look directly at the Sun as the **light** produced is very **bright** and can be harmful to our eyes.
- **Electric lights** include lamps, car headlights and street **light**.
- **Lights** that are caused by **chemical reactions** are much less common. This happens when different chemicals react and **light** is a **product** of that reaction. Examples can include glow sticks and fire flies.



Why do we need **light**?

- We need **light** so that we are able to see in the **dark**.
- This is because the **dark** is the absence of **light**. The Sun and stars always give us **light** but we can only see the stars when it is **dark**. At night time we cannot see the Sun's **light** as the Earth turns and our part of the Earth is not lit up by the Sun at night.
- When we are driving, we need car headlights or street **lights** to help us.
- If we are walking or out in the dark, we would need **torches** to help us see. You should not look directly into the **torch** as this is dangerous.



What are not **sources of light**?

- The Moon is not a **source of light** even though we can see it in the **dark**.
- This is because the Sun's **light reflects** on the **surface** of the Moon making it appear as though the Moon **emits light**.
- Shiny things are not **light sources** - they appear to be **sources of light** as they are **bright**.

How does **light travel**?

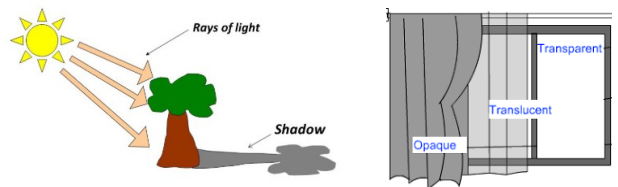
- **Light** travels in straight lines.
- When **light** is blocked by an **opaque** object, a **dark shadow** is formed.

Investigate!

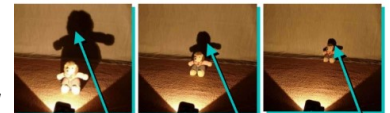
- The **brightness** of torches - can you put torches in order from **brightest to dimmest**? What would make it a **fair test**?
- Why do lights seem **brighter** in the **dark**?
- Explore which objects form shadows when light is shone on them.
- How can you change the size and shape of **shadows** by using the same object?
- 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?)

Diagrams

How are **shadows** formed?



- When **light** is blocked by an **opaque** object, a **dark shadow** is formed. An **opaque** material blocks **light** so we can't see through it and shine a **light** through it.
- When **light** is shone onto a **transparent** object, the **light** travels through it, we can see through it and it makes a very faint **shadow**.
- When **light** is shone onto a **translucent** object, some of the **light** travels through it, we can see **bright light sources** through it and it makes a fairly **dark shadow**.
- The size of a **shadow** changes as the **light source** moves. The further away the **light source** is, the smaller the **shadow** is. The closer the **source** of the light, the bigger the shadow.



**LARGE SHADOW** when the toy is close to the light  
**SMALLER SHADOW** when the toy is further from the light  
**TINY SHADOW** when the toy is a long way from the light

Vocabulary

angle	the direction from which you look at something
bright	a colour that is strong and noticeable, and not <b>dark</b>
chemical reactions	a process that involves changes in the structure of something
dark	the absence of <b>light</b>
dim	<b>light</b> that is not <b>bright</b>
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 <b>emit</b> a sound or <b>light</b> means to produce it
light	a <b>brightness</b> that lets you see things.
mirror	a flat piece of glass which <b>reflects light</b> , so that when you look at it you can see yourself <b>reflected</b> in it
opaque	if an object or substance is <b>opaque</b> , you cannot see through it
product	something that is produced
reflects	sent back from the <b>surface</b> and not pass through it
shadows	a dark shape on a <b>surface</b> that is made when something stands between a <b>light</b> and the <b>surface</b>
source	where something comes from
surface	the flat top part of something or the outside of it
torches	a small <b>electric light</b> which is powered by batteries and which you can carry
translucent	if a material is <b>translucent</b> , some <b>light</b> can pass through it
transparent	If an object or substance is <b>transparent</b> , you can see through it