

Green Lane Primary School - Science

Topic: Light

Year: 3 and 4

Strand: Physics

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.

Vocabulary

| | |
|---------------------------|---|
| angle | the direction from which you look at something |
| bright | a colour that is strong and noticeable, and not dark |
| chemical reactions | a process that involves changes in the structure of 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 |
| product | something that is produced |
| 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 |
| sunglasses | glasses with dark lenses which you wear to protect your eyes from bright sunlight |
| 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!

- The **brightness** of torches - can you put torches in order from **brightest** to **dimpest**? 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?)

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. This is why we wear **sunglasses**.
- **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.

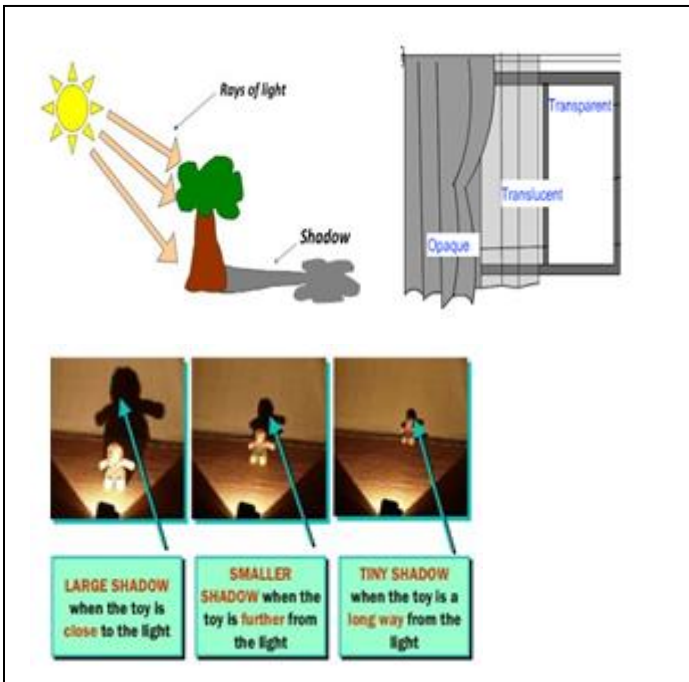
What are NOT sources of light?

- 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.

Diagram



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 light, the bigger the **shadow**.

Question 1 – Match the words to their description.

Start of unit

End of unit

translucent

you cannot see through it and a dark shadow is formed

transparent

you can see a little through it and a fairly dark shadow is formed

opaque

you can see through it completely and a faint shadow is formed

Question 2 – How does light travel?

Start
of
unit

End
of
unit

in a straight line

in a curvy line

light is everywhere

light does not travel

Question 3 – Dark means...

Start
of
unit

End
of
unit

when there is a little bit of light so you can see

the absence of light

you have to eat carrots so you can see

| Question 4 – When light bounces of a surface, it is... | Start of unit | End of unit |
|---|----------------------|--------------------|
| absorbed | | |
| reflected | | |
| bounced | | |
| dissolved | | |

| Question 5 – Sources of light include (tick three)... | Start of unit | End of unit |
|--|----------------------|--------------------|
| the sun | | |
| the moon | | |
| street lights | | |
| a torch | | |

| Question 6 – Shadows are formed when... | Start of unit | End of unit |
|--|----------------------|--------------------|
| light is let though an object | | |
| light reflects off an object | | |
| it is dark | | |
| light cannot travel through an object | | |

| Question 7 – The size of a shadow becomes smaller... | Start of unit | End of unit |
|---|----------------------|--------------------|
| when the object is close to the light source | | |
| when the object is far from the light source | | |
| The distance between the light source and the object stays the same | | |

| Question 8 – 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 | | |

| Question 9 – Mirrors work by... | Start of unit | End of unit |
|--|----------------------|--------------------|
| letting light through that hits them | | |
| absorbing light that hits them | | |