West Borough Primary School – Science

Topic: Light | **Year: 4** | **Strand: Physics**

What I should 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 I will 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 fireflies.

Why do we opaque object 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?

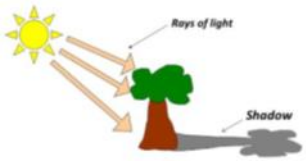
- The Moon is not a **source** of **light** even though we can see it in the **dark**.
- This is because the Sun's **light reflects** on the surface of the Moon making it appear as though the Moon **emits light**.
- Shiny things are not **light sources** - they appear to be **sources** of **light** as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

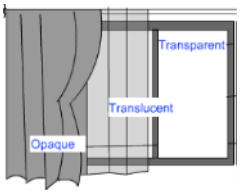
How does light travel?

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

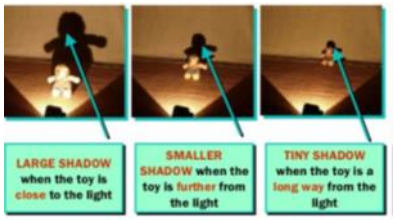
Diagram

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 the light, the bigger the shadow.



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 lookat 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 batter-ies 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 **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?)

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Question 1: 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 2: 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 3: When light bounced off a surface it is….	Start of unit:	End of unit:
absorbed		
dissolved		
reflected		
bounced		

Question 4: Sources of light include (tick 3)	Start of unit:	End of unit:
the sun		
the moon		
street lights		
torches		

Question 5: Looking directly at the sun is…	Start of unit:	End of unit:
safe		
dangerous		
ok if there are clouds		
ok if the sun is rising or setting		

Question 6: 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 7: Mirrors work by	Start of unit:	End of unit:
letting light through that hits them		
absorbing light that hits them		
reflecting light that hits them		

Question 8: The size of the 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 9: 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 10: Match the word 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**		