Willerby Carr Lane Primary School - Science

Topic: Light	Year: 3	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. • 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. • 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 should we not look at the sun directly?	• The sun is very bright. • Sunlight contains UV rays (ultra violet). • UV rays can damage and burn our skin. • We can protect ourselves from the sun by wearing a hat, clothes to cover our skin and by using a sun cream with a high UV rating (spf50 or higher) • Sunlight and UV rays can damage our eyes. • We must never look directly at the Sun as it can damage our eyes • Wearing sunglasses with a high UV rating can help protect our eyes when it is very bright.
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. And reflective.
How does light travel?	• Light travels in straight lines. • When light is blocked by an opaque object, a dark shadow is formed.
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 transluscent 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 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

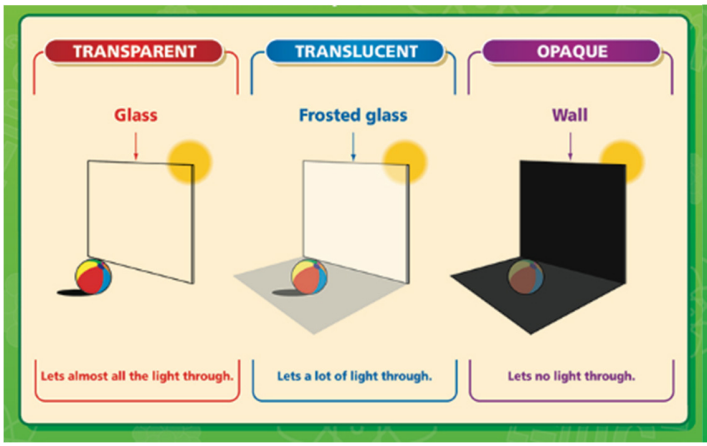
Investigate!

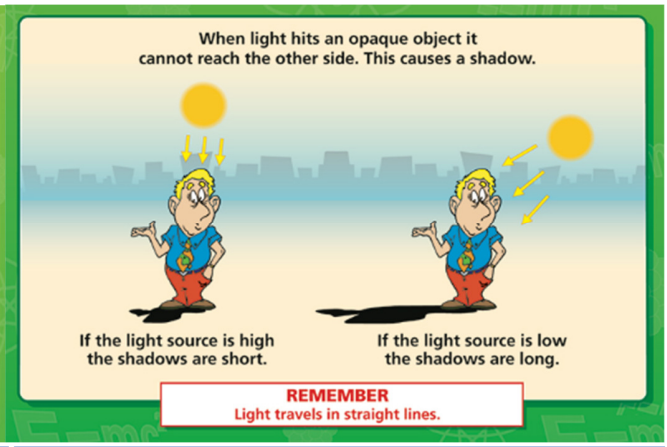
- The brightness of torches - can you put torches in order from brightest to dimmest? What would make it a fair test?
- Why do lights seem brighter in the dark?
- Explore which objects form shadows when light is shone on them.
- How can you change the size and shape of shadows by using the same object?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

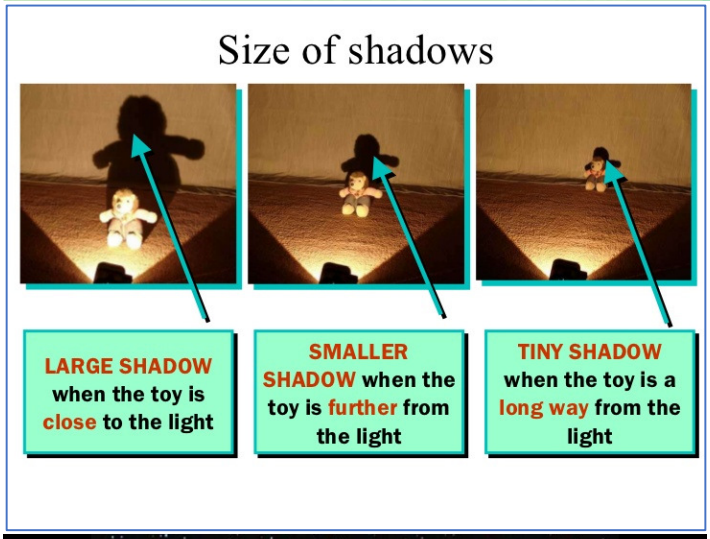
Common misconceptions

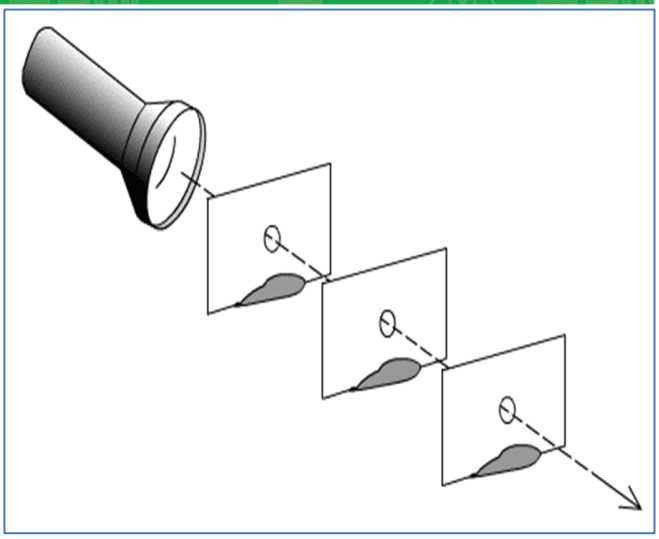
Some children may think:

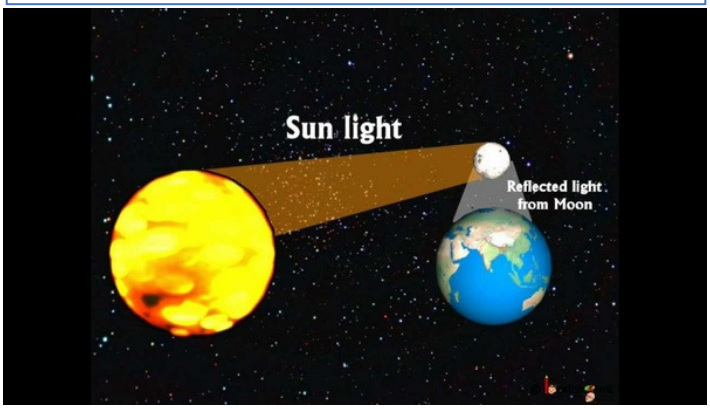
- we can still see even where there is an absence of any light
- our eyes 'get used to' the dark
- the moon and reflective surfaces are light sources
- a transparent object is a light source
- shadows contain details of the object, such as facial features on their own shadow
- shadows result from objects giving off darkness.


TRANSPARENT
TRANSLUCENT
OPAQUE
Glass
Frosted glass
Wall
Lets almost all the light through.
Lets a lot of light through.
Lets no light through.


When light hits an opaque object it
cannot reach the other side. This causes a shadow.
If the light source is high
the shadows are short.
If the light source is low
the shadows are long.
REMEMBER
Light travels in straight lines.


Size of shadows
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




Sun light
Reflected light from Moon