

<b>Subject: Science</b>		<b>Year Group: 6</b>			<b>Unit: WW1</b>	
<b>First- hand experience: Use of torches, light sources, slits, filters, prisms, lenses, water in pencils, periscopes, mirrors</b>						
<b>NC Objectives to be addressed:</b>				<b>Prior Learning required:</b>		
<ul style="list-style-type: none"> <li>recognise that light appears to travel in straight lines</li> <li>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</li> <li>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</li> <li>use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.</li> </ul>				<p><b>The pupils learned about opaque, translucent and transparent materials when they studied Victorians – year 5, term 3 and 4</b></p> <ul style="list-style-type: none"> <li>recognise that light appears to travel in straight lines</li> <li>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</li> <li>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</li> <li>use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.</li> </ul> <p><b>Pupils will have completed light and lenses unit in year 4</b></p> <ul style="list-style-type: none"> <li>recognise that they need light in order to see things and that dark is the absence of light</li> <li>notice that light is reflected from surfaces</li> <li>recognise that light from the sun can be dangerous and that there are ways to protect their eyes</li> <li>recognise that shadows are formed when the light from a light source is blocked by an opaque object</li> <li>find patterns in the way that the size of shadows change</li> </ul>		
<b>Biology</b>		<b>Chemistry</b>		<b>Physics</b>		
<b>Working scientifically</b>				<b>Where next?</b>		
<b>Comparative and fair testing</b>	<b>Pattern seeking</b>	<b>Observing over time</b>	<b>Secondary sources</b>	<b>Classifying and grouping</b>		
<b>Key Vocabulary:</b>						
<b>Light</b>	A form of energy that can travel through a vacuum (no particles)			<b>dark</b>	absence of light	
<b>Transparent</b>	A material that light can travel through, which does not distort it			<b>Opaque</b>	An object through which light cannot get through	
<b>Matt</b>	A surface that absorbs light			<b>shadow</b>	Caused when light's path is blocked, causing a dark patch	
<b>mirror</b>	A smooth surface that reflects light so that you see a perfect reflection			<b>dangerous</b>	Something that can cause harm to life	

<b>Rays</b>	The straight line along which light travels		
<b>vacuum</b>	A region of space with no particles	<b>Shiny</b>	An object that reflects light
<b>light source</b>	An object that produces light	<b>Reflect</b>	When light or sound bounces off an object
<b>translucent</b>	An object that allows light through, but scatters it so that it goes in all directions so the light is distorted (bathroom window)	<b>Refraction</b>	When light, or another wave, goes through a different material, changes speed, and therefore changes direction
<b>Surface</b>	The outside of an object		
<b>sunlight</b>	The light produces from the sun		
<b>Dispersion</b>	When white light is split into its 7 colours, sometimes called a rainbow		
<b>Energy</b>	What is needed for an object to feel a force and move		

## Sequence of learning:

Assessment: [Light Assessment](#)

### Lesson 1

#### A source of light produces light

Some objects are sources of light (the sun, tvs, lights) some are not (the moon, wood)

Darkness is the absence of light

**Light** is a type of **energy** (*electromagnetic radiation*). Unlike **sound**, it **doesn't** need **matter** to **travel through** – it can travel through **empty space** (a *vacuum*) - which is how **sunlight** is able to reach us **from outer space**

Light travels in **straight lines** (*rays* or *beams of light*) from a **source** and in **all directions**

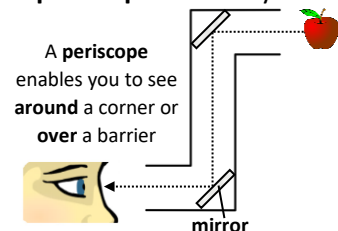
It **can't bend around** objects and if it hits an **opaque** (*not see-through*) **object** it is **blocked**

1. **Rays of light** travel from a source and **hit objects** around us
2. Rays of light **bounce** (*reflect*) **off** an object and **travel** into our **eyes** – we **see** the object

### Lesson 2

**Reflections** occur when rays of light **hit** a **surface** and **bounce off**. The **angle** the rays hit the surface is **equal** to the **angle** at which they **bounce off**. If the surface is **smooth** and **shiny** (like a *mirror*), **ALL** the rays of light will be **reflected** (unlike a *dull* or *dark* surface)

A **periscope** enables you to see **around** a corner or **over** a barrier



Pupils will know the structure of a periscope, and how light reflects off the mirrors inside  
Soldiers used periscopes in WW1 to look over trenches

Reflections on rippling water or curved metal (like a spoon) can look distorted. That is because the light reflects off them at different angles

### Lesson 3

**Light** travels at a speed of **186,282 miles per second**. Even at this speed, it takes **8 minutes and 20 seconds** for **light** from the **sun** to reach **Earth**

It is possible to see more stars in the sky in the countryside because there is less light pollution from nearby street lamps

Card lets no light through because it is opaque

Tracing paper lets some light through because it is translucent

Acetate lets a lot of light pass through because it is transparent

A **shadow** is formed when an **object blocks light**. An object must be **opaque** (*dark shadow*) or **translucent** (*faint shadow*), but **not transparent** (*lets all light through*), to make a **shadow**.

The **shape** of a **shadow** can be **changed** by altering the **angle** of the **light source**

**OR** by **moving** the **light source closer** or **further away** from the object

Children should appreciate that the way to make a Science experiment controlled and fair, is to keep all variables the same except the ones you are testing.

Children should be able to look and think about the ways in which their experiment was conducted, and decide which variables were, and were not controlled well, and so should be able to suggest suitable improvements to the test

### Lesson 5



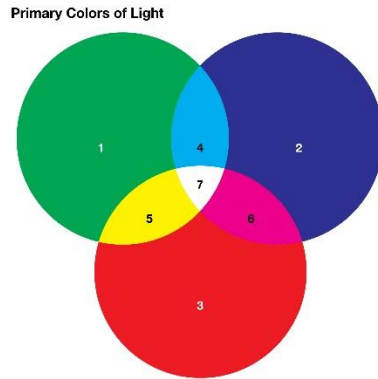
The **iris** (*coloured part of the eye*) **widens** or **narrows** to **change** the **size** of the **pupil** (*the black opening in the centre*). It does this to either let in **more/less light** depending on how **dark/bright** it is

Light waves travel at **different speeds** when they travel through **materials** such as **glass** or **water**. This causes the rays of light to **change direction and refract** (*bend*) creating some amazing effects

Sometimes, when **rays** of **sunlight** hit **raindrops**, a **rainbow** is formed, because white light is made up of all of the colours, and the rain refracts the different colours different amounts

## Lesson 6

In light, there are 3 primary colours: green blue and red



They mix together like: © Encyclopedia Britannica, Inc.

An object appears red because it absorbs all light except for red, which it reflects

Likewise for blue or green

All colours of light added together make white

If you look at a red object under a blue filter, it will appear black, as blue

If you look at a yellow object under a green filter, it appears green because only the green light can get through the green filter

## Lesson 7

### Test

Resources and teacher subject knowledge: