Science: Light	Red Kites Class Autumn 1	

Key Vocabulary and **Definitions**

Light source - anything that makes and **emits** (shoots out) its own light (for example: the Sun or a torch).

Ray - a narrow beam or line of light travelling in a straight line.

Incident ray is the ray of light travelling **towards** a surface or mirror.

Reflected ray is the ray of light that **bounces off** a surface or mirror.

Normal is an imaginary line drawn at a right angle (90 degrees) to a reflective surface, used to measure light angles.

Angle of incidence is the angle measured in degrees between the incident ray and the normal line.

Angle of reflection is the angle measured in degrees between the reflected ray and the normal line. *(Law of Reflection: Angle of Incidence = Angle of Reflection)*.

Reflection happens when light bounces off a surface, changing direction. Smooth, shiny surfaces reflect light evenly; rough surfaces scatter light.

Refraction is when light changes speed and direction as it moves from one transparent material (medium) into another (for example: from air into water).

A material that is **opaque** does **not** let any light pass through it. It blocks light and creates a dark shadow.

A material that is **transparent** lets light pass through easily, allowing objects behind it to be seen clearly (for example: clear glass).

A material that is **translucent** lets *some* light through, but scatters it so objects on the other side look blurry (for example: frosted glass, tracing paper).

A **shadow** is a dark area formed on a surface when an opaque object blocks light from a source.

Absorb means to take in or soak up light energy, rather than reflecting or transmitting it.

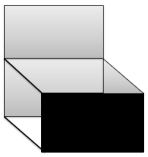
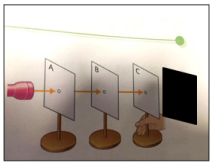
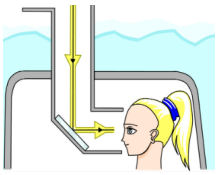
Spectrum relates to the range of rainbow colours (red, orange, yellow, green, blue, indigo, violet) produced when white light is split, such as through a glass prism.

Natural light is light produced by nature, such as light from the Sun, stars, or lightning.

Artificial light is man-made light produced by human technology, such as electric bulbs, screens, or candles.

Diffraction describes spreading out of light waves as they pass through a small gap or around an obstacle.

The **cornea** is the clear outer layer at the front of the eye that protects it and helps focus incoming light.
The **iris** is the coloured part of the eye that contracts or relaxes to control how much light enters the pupil.
The **pupil** is the dark opening in the centre of the iris through which light enters the eye.
Dilate is when the pupil gets **wider** in dim light to let more light into the eye.
Constrict is when the pupil gets **smaller** in bright light to protect the eye from damage.
The **retina** is the layer at the back of the eye containing light-sensitive cells that turn light into signals for the brain.
Optic nerve is the nerve that carries visual signals from the retina straight to the brain so you can see the image.


Key Substantive Knowledge

Light from the Sun contains harmful ultraviolet (UV) rays. Looking directly at the Sun causes eye damage. There are several ways to protect the eyes from sun damage: UV-filtered sunglasses, brimmed hats, staying in the shade etc.

Light is needed in order to see things and that dark is the absence of light. **Light sources** (luminous objects like the Sun or a bulb) send light straight into our eyes. **Objects** that **do not emit light**, like a book or a table, are seen because light reflects (bounces) off the object and into our eyes, enabling the object to be seen.

Light travels in straight lines. When someone looks into a mirror, they see an image of themselves. The mirror image shows precise details, including colour, and is the same size as the person viewing themselves. **It might look like left and right are switched, but a mirror actually flips things front-to-back.** This happens because the light from a light source hits the person first and bounces off their body. The light then travels in straight lines toward the mirror. Because a mirror is flat, shiny, and smooth, light bounces off it at the exact same angle it hit. The reflected light enters the person's eyes, allowing their brain to form the image seen.

Mirrors reflect light rays back at the same angle. Therefore, altering the angle of a mirror or mirrors, enables someone to see **around objects** or **around corners** without moving position.

Light travels fastest through air, but slows down when it enters dense materials like glass and water. As light rays pass from the air into a curved glass jar filled with water, the rays appear to bend inward (refract). Because the jar is round, it acts like a magnifying glass lens. It ***bends*** (changes direction) all the incoming light rays inward toward a **single central spot** called the **focal point**. Once the light rays cross over each other at the **focal point**, they continue travelling onward.The light coming from the **left side** crosses over to the **right**. The light coming from the **right side** crosses over to the **left**.

Because light travels in straight lines, a shadow takes on the **outline** of the object blocking the light although the shadow can **stretch** if light hits it from an angle. The **closer** an object is to a light source, the **larger** the shadow it casts because it blocks a bigger area of spreading light rays. The **farther** an object is from a light source, the **smaller** its shadow becomes. Moving an object **closer** to the **surface** where the shadow falls makes the shadow **smaller** and **sharper,** while moving it **farther** from the **surface** makes the shadow **larger** and **less defined**.

Key Disciplinary Knowledge
Working scientifically

I can make plausible predictions before investigating how we see things.

I can explain how we see things.

I can draw a light ray diagram using arrows to show the direction light travels from a light source to an object and then to the eye.

I can predict whether light travels in straight lines or can *bend.*

I can investigate if light travels in straight lines or can *bend*.

I can make and explain how a periscope works.

I can investigate how light can change speed and direction.

I can predict whether a shadow will increase or decrease in size depending on how close or far away it is from a light source.

I can investigate and explain why shadows increase and decrease in size and become more or less defined.

I can research what Sir Isaac Newton discovered about white light and test his idea.

I can select from a range of practical resources to carry out investigations, gathering evidence to answer enquiry questions.