

# Year 6 – Seeing light.

## Y6 – Seeing Light

Children will recognise that light appears to travel in straight lines; know that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye; 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 and use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.

### Prior learning

#### Light and shadows LKS2

- recognise that they need light in order to see things and that dark is the absence of light
- notice that light is reflected from surfaces
- recognise that light from the sun can be dangerous and that there are ways to protect their eyes
- recognise that shadows are formed when the light from a light source is blocked by an opaque object
- find patterns in the way that the size of shadows change

### Future learning

#### Light waves KS3

- The similarities and differences between light waves and waves in matter.
- Light waves travelling through a vacuum; speed of light.
- The transmission of light through materials: absorption, diffuse scattering and specular reflection at a surface.
- Use of ray model to explain imaging in mirrors, the pinhole camera, the refraction of light and action of convex lens in focusing (qualitative); the human eye.
- Light transferring energy from source to absorber, leading to chemical and electrical effects; photosensitive material in the retina and in cameras.
- Colours and the different frequencies of light, white light and prisms (qualitative only); differential colour effects in absorption and diffuse reflection.

## Key Vocabulary

Light – a form of energy that travels in a wave from a source.

Light source – an object that makes its own light.

Reflection – is when light bounces off a surface, changing the direction of the ray of light.

Incident ray – a ray of light that hits a surface.

Reflected ray – a ray of light that has bounced back after hitting a surface.

The law of reflection – The law states that the angle of the incident ray is equal to the angle of the reflected ray.

Refraction – is when light bends as it passes from medium to another.

Visible spectrum – light that is visible to the human eye. Made up of a colour spectrum.

Shadow – an area of darkness where light is blocked.

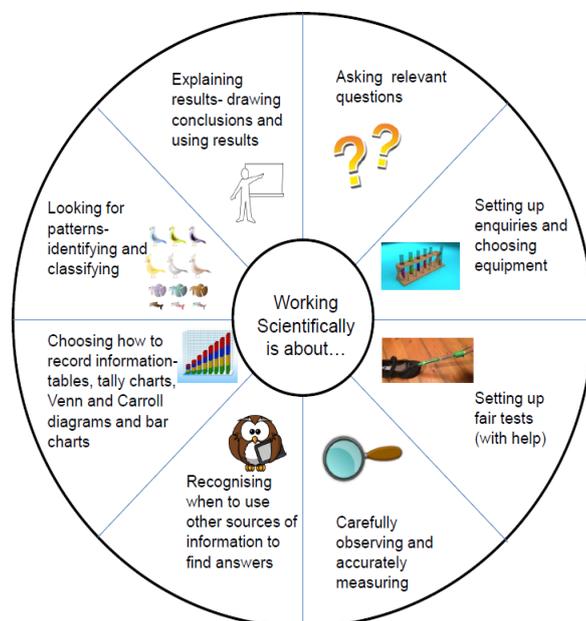
Transparent – describes objects that let light travel through them easily, meaning you can see through the object.

Translucent – describes objects that let some light through, but scatters the light so we can't see through them properly.

Opaque – describes objects that do not let any light pass through them.

## Key Knowledge.

- We need light to be able to see things.
- Light waves travel out from sources of light in straight lines.
- These lines are often called rays or beams of light.
- A shadow is always the same shape as the object that casts it.
- This is because when an opaque object is in the path of light travelling from a light source, it will block the light rays that hit it, whilst the rest of the light can continue travelling.
- Shadows can be elongated or shortened depending on the angle of the light source.
- A shadow is also larger when the object is closer to the light source, this is because it blocks more of the light.





The spoon in this water looks as if it is bent. This is because **light** bends when it moves from air to water. When **light** bends in this way, it is called **refraction**.

Isaac Newton shone a **light** through a transparent **prism**, separating out **light** into the colours of the rainbow (red, orange, yellow, green, blue, indigo and violet) - the colours of the **spectrum**. All the colours together merge and make visible **light**.



**The law of reflection** states that the angle of **incidence** is equal to the angle of **reflection**. Whenever **light** is **reflected** from a surface, it obeys this law.

The angle of **reflection** is the angle between the normal line and the **reflected ray** of **light**.

The angle of **incidence** is the angle between the normal line and the **incident ray** of **light**.

angle of **reflection**

**reflected ray**

normal line

**incident ray**

angle of **incidence**

**Light** travels as a wave. But unlike waves of water or sound waves, it does not need a medium to travel through. This means **light** can travel through a vacuum - a completely airless space.

