Science Knowledge Organiser

Light – Year 3

Sticky Learning

What you may already know…	What you are going to know by the end of this learning…
• 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.	• Know that dark is the absence of light • Know that light is needed in order to see and is reflected from a surface • Know and demonstrate how a shadow is formed and explain how a shadow changes shape • Know about the danger of direct sunlight and describe how to keep protected

Key Vocab

1	**Opaque**	Opaque materials do not let any light through. They block the light. E.g. wood
2	Warning	Something that is said or written to tell people of danger
3	Source	A thing from which something starts
4	Electricity	A form of energy that provides power to devices
5	Reflection	When light bounces off a surface
6	Shadow	A dark are which is formed when light from a light source is blocked by an opaque object
7	Transparent	Transparent materials let light through them in straight lines, so that you can see clearly through them (e.g. glass)
8	Translucent	Translucent materials let some light through, but they scatter the light in all directions so you cannot see clearly through them (e.g. tissue paper)

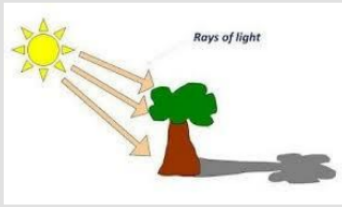
What will I know by the end of the unit?

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.
- 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 fire flies.

How a shadow is made

Shadows are made when there is an object blocking the light from hitting the surface. This means that the shadow will always be on the opposite side of an object to the sun or light.

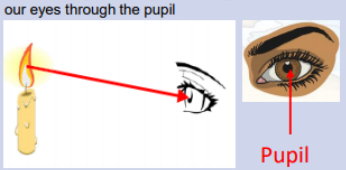


The object needs to be a solid object. If it is clear then the light will pass through it, whereas a solid object will block it.

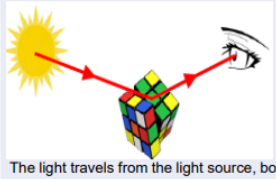
Some light passes through translucent objects. Although some light is blocked, some gets through and so a shadow is formed. These shadows are not as dark.

How we see things

We see things when light from a light source enters our eyes through the pupil



Light travels from the light source and into the eye



The light travels from the light source, bounces off the object and into the eye

The Sun

If too much light comes through the pupil, it can damage the retina.

It causes pain, so that you instantly close your eyes, or turn away from a bright light.

It is very important that you never look directly at the sun, as the light can damage your eyes very quickly.

It's never safe to look directly at the sun, even when wearing sun glasses

Bright lights indoors can also damage your eyes, so you should never look at them, or shine lights into anyone's eyes.

Key facts

1	Light travels in a straight line
2	Light travels faster than sound.
3	A light year is a unit of measurement for distance. It is the distance light can travel in a year.
4	The size and shape of a shadow changes based on the distance and angle compared to the light source.
5	Darkness is caused by the absence of light.
6	The moon does **not** emit its own light – it reflects the sun.
7	Ultraviolet (UV) light is a type of radiation which you can't see but can be dangerous. UV rays can come from the sun.

Science Knowledge Organiser
Light – Year 6

What you may already know…	What you are going to know by the end of this learning…
• Know that dark is the absence of light • Know that light is needed in order to see and is reflected from a surface • Know and demonstrate how a shadow is formed and explain how a shadow changes shape • Know about the danger of direct sunlight and describe how to keep protected	• Know how light travels • Know and demonstrate how we see objects • Know why shadows have the same shape as the object that casts them • Know how simple optical instruments work e.g. periscope, telescope, binoculars, mirror, magnifying glass etc.

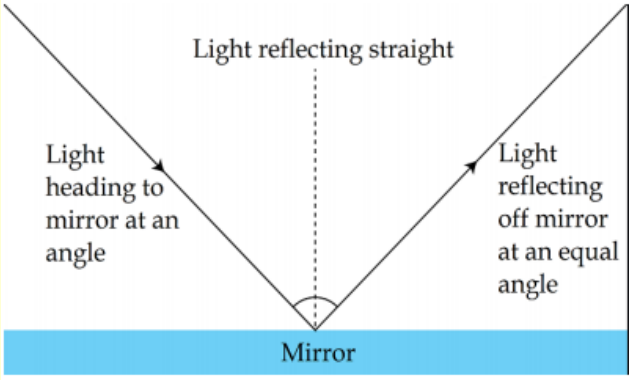
Vocabulary	
angle	the direction from which you look at something
dark	the absence of **light**
dim	**light** that is not **bright**
electricity	a form of energy that can be carried by wires and is used for heating and lighting, and to provide power for machines
emits	to **emit** a sound or **light** 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
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
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

How does **light** travel?	• **Light** travels in a straight line. • When you place a torch on a table in a **dark** room, the beam travels in a straight line. • **Reflection** is when **light** bounces off a surface - this changes the direction in which the **light** travels.

How is light reflected?

We see objects because light rays enter our eyes after bouncing off rough surfaces

When light rays hit a smooth surface the light is reflected at equal angles.



What are shadows?

When an object passes in front of a beam of light, the light can be blocked, making a shadow.

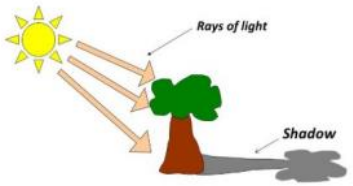
Opaque objects let no light through.

Translucent objects let some light through.

Transparent objects let all light through

The closer an object is to the source of light the bigger the shadow.

Shadows from the sun can be used to tell the time in a sundial.



What is refraction?

Light waves travel at a different speed when they go through other **transparent** materials, such as water or glass. This causes the rays of light to change direction and bend. This is known as **refraction**.

Refraction creates illusions. Because light bends when it travels between air and water or glass, objects seen through these materials look bent or distorted.