Science Year 6 Autumn 2 Light up your world

Key Facts

Shadows

The shape of a shadow is defined by the shape of the object causing it. If you move the object creating a shadow towards the light source, the shadow gets bigger. If you move the object towards the screen then the shadow gets smaller. In both cases the shape of the shadow remains the same.

The behaviour of light

A ray diagram is a model of looking at the behaviour of light that can help predict phenomena such as the size and shape of shadows. The rays are straight lines that travel from the object to the image or the eye, with arrows showing the direction of the light. When light travels from one medium to another its speed changes. Unless the light travels into the object at right angles to the surface there is also a change in direction. This is called refraction.

White light

White light that comes from the sun and other sources, such as a torch, is made up of a number of colours (red, orange, yellow, green, blue, indigo, violet) but we cannot see these because they are mixed together. The light can be split into the separate colours with a prism (dispersion).

White light can be split into its constituent colours in other ways, including using water, and this is how a rainbow is formed. The white light is split by the water drop (rain or mist) but bounces back in the direction it came from, so you can only see a rainbow if the sun is behind you and the rain/mist is in front of you.

Vocabulary

Word	Definition
Beam	a narrow ray of light.
Dim	not well lighted.
Dispersion	the separation of light into colored rays, as by a prism.
Inverted	to reverse the order, position, or direction of.
Ray	a thin beam of light or some other radi-
Reflect	To throw back heat, light, or sound without absorbing it.
Spectrum	a band of colors that is formed when light is passed through a prism, or in some other way. The six colors of a spectrum are red, orange, yellow, green, blue, and purple.
Translucent	allows light to pass through, but not detailed shapes, to pass through.
Ultra violet	beyond the violet end of the spectrum of visible light and having a wavelength between that of visible light and x-rays.

Common misconceptions:

- light is only found in bright areas. If you can see a lit candle from a dark corner of the room, light must be reaching the dark areas of the room for it to have entered your eyes.
- we see things because light travels from our eyes towards an object; the reverse is true - we see because our eyes absorb light rays travelling from the object, reflected from a source.
- objects give out their own light (they actually reflect light from a light source).
- the Moon is a light source (the Moon actually reflects light from the Sun).
- shadows are real 'things' rather than the absence of light (or less light than the surrounding area).

Knowledge and Understanding:

Children will learn:

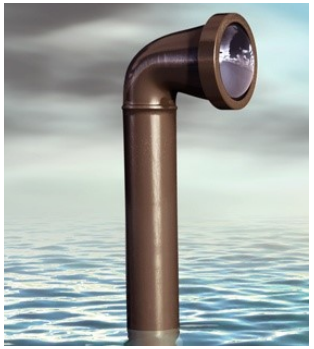
- build on the work that they have done in Year 3 where they learned about light sources, how light enables us to see by reflecting from objects and how different objects reflect different amounts of light and shadows.
- develop a more detailed understanding of mirrors and the reflections that they form, and apply this understanding to make a periscope.
- use ray diagrams to represent the behaviour of light
- explain the formation of shadows and how their size and shape can be affected
- explore refraction in a number of contexts to see how light does not always appear to travel in straight lines.
- investigate how white light is made up of many colours of light and how these can be split apart by a prism or in a rainbow, as well as how the colours can be joined together to make white again

Key skills and concepts:

Children will be able to:

- ask and propose answers to their own questions about shadow formation
- explore the formation of shadows.
- explain and support the points they make with data and evidence
- draw conclusions and relate them back to predictions that they have made earlier.
- carry out illustrative practicals to explore ideas.

Key Questions



What is light?

How can we see things?

How does light travel?

Explain how shadows are formed.

Why do shadows form the shapes they do?

What affects the size of a shadow?

How are rainbows made?