

Sithney C.P. School Knowledge Organisers



Science: Physics - Light and Sound

What you should already know:

- Observe and name a variety of sources of light, including electric lights, flames and the Sun, explaining that we see things because light travels from them to our eyes.
- Observe and name a variety of sources of sound, noticing that we hear with our ears.

Key learning:

Light

We see objects because our eyes can sense light. Dark is the absence of light. We cannot see anything in complete darkness. Some objects, for example, the sun, light bulbs and candles are sources of light. Objects are easier to see if there is more light. Some surfaces reflect light. Objects are easier to see when there is less light if they are reflective.

The light from the sun can damage our eyes and therefore we should not look directly at the sun and can protect our eyes by wearing sunglasses or sunhats in bright light.

Shadows are formed on a surface when an opaque or translucent object is between a light source and the surface and blocks some of the light. The size of the shadow depends on the position of the source, object and surface.

Sound

A sound produces vibrations which travel through a medium from the source to our ears. Different mediums such as solids, liquids and gases can carry sound, but sound cannot travel through a vacuum (an area empty of matter). The vibrations cause parts of our body inside our ears to vibrate, allowing us to hear (sense) the sound.

The loudness (volume) of the sound depends on the strength (size) of vibrations which decreases as they travel through the medium. Therefore, sounds decrease in volume as you move away from the source. A sound insulator is a material which blocks sound effectively.

Pitch is the highness or lowness of a sound and is affected by features of objects producing the sounds. For example, smaller objects usually produce higher pitched sounds.

Key Vocabulary:

Opaque

Opaque materials do not let any light through. They block the light (e.g. wood).

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).

Transparent

Transparent materials let light through them in straight lines, so that you can see clearly through them (e.g. glass).

Source

A thing from which something starts.

Shadow

A dark area which is formed when light from a light source is blocked by an opaque object.

Vibration

A movement backwards and forwards.

Sound Wave

Vibrations travelling from a sound source.

Volume

The loudness of a sound.

Amplitude

The size of a vibration. A larger amplitude = a louder sound.

Pitch

How high or low a sound is.

What is a light source? *Something that makes its own light.*

Common sources of light

The sun



The stars



Flames



Electric lights



Some animals (fireflies and glow worms make their own light)



Things you may think are light sources but aren't!

The moon, a mirror and shiny objects.

Shadows

A **shadow** is formed when an object does not allow the light to pass through it.



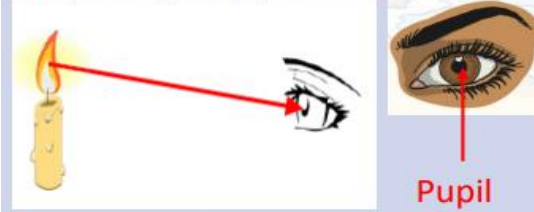
LARGE SHADOW
when the toy is close to the light

SMALLER SHADOW
when the toy is further from the light

TINY SHADOW
when the toy is a long way from the light

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

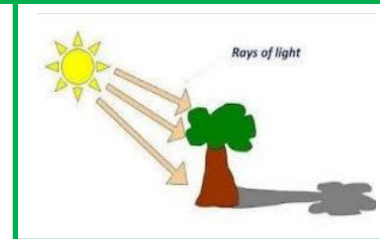


The light travels from the light source, bounces off the object and into the eye

How does light travel?

In straight lines It travels very, very fast – 300,000km per second. That's like travelling around the world over 7 times in a second!

How is a shadow 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 an opaque object. If it is transparent 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.

Sound waves can travel through solids (such as metal, stone and wood), liquids (such as water) and gases (such as air).



How do we hear sounds?

Sounds are made when objects **vibrate**. When an object vibrates, the air around it vibrates too. This vibrating air can also be known as sound waves. The sound waves travel to the **ear** and make the **eardrums** vibrate. Messages are sent to the brain which recognises the vibrations as sounds



Sound is a type of energy. Sounds are made when objects vibrate. The vibration makes the air around the object vibrate and the air vibrations enter your ear. You hear them as sounds. You cannot always see the vibrations, but if something is making a sound, some part of it is always vibrating.

The size of the **vibration** is called the **amplitude**. Louder sounds have a larger **amplitude**, and quieter sounds have a smaller **amplitude**.

