



Knowledge

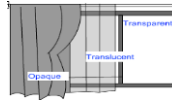
How would you organise these light sources into natural and artificial sources?

Identifying and Classifying

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. Electric lights include lamps, car headlights and street lights. 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 much light gets through different objects? How can we arrange them?

Comparative Testing



The amount of light that passes through an object depends on the type of material that it's made from. An opaque material blocks light so we can neither see through it nor shine a light through it, whilst a translucent material allows some light to travel through it, in particular from bright light sources. Materials that are transparent allow light to travel through them freely.

How does light travel?

Comparative Testing

We need light so that we are able to see in the dark. This is because darkness is the absence of light. Light travels in straight lines and is the fastest thing known to us. Any object that we can see must at least partially reflect light into our eyes. Now that we know this, how does light reach our eyes if we are not standing in front of a light source? For example, how can we see the pages of a book? What equipment and materials might help us investigate this? Is there anything else we need to consider? If you had to draw what you think will happen, how would it look? Why?



What material would be best for making sunglasses lenses?

Pattern Seeking

We must never look directly at the Sun as the light that is produced is very bright and can be harmful to our eyes. This is why we wear sunglasses. If you think about how much light gets through different objects, which type of material would be best to use in sunglasses lenses? Which material would be worst? Why?

Is there a link between the angle that a ray of light enters a mirror and the reflective ray out of the mirror?

Comparative Testing

Shiny things, like mirrors, are not light sources: because they are bright, they can appear to be sources of light. Similarly, although we can see it in the dark, the Moon is not a source of light – this is because the Sun's light reflects on the surface of the Moon, making it appear as though it emits light. How could we investigate this question using a mirror and a single light source? Are there any other variables we would we have to think about? We know that light travels in straight lines, so how would you expect a ray of light to reflect if it entered a mirror straight compared with at an angle? Why do you think this?

What pioneering work did Sir Isaac Newton carry out relating to light?

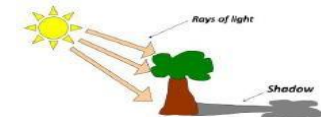
Research

Sir Isaac Newton (1642-1727)
<https://www.bbc.co.uk/programmes/p01jdfw4>
English mathematician, physicist, astronomer, theologian and author.

How do shadows form?

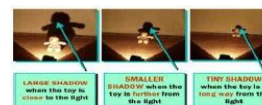
Pattern Seeking

When light is blocked by an opaque object, a dark shadow is formed. When light is shone onto a translucent object, some of the light travels through it and creates a fairly dark shadow, whilst a very faint shadow is formed when light is shone onto a transparent object.



Is there a link between the size of the shadow and the distance the object is moved away from the light source?

Pattern Seeking



The size of a shadow changes as the light source moves. The further away the light source is, the smaller the shadow is. The closer the source of the light, the bigger the shadow.



Hurst Hill Primary School Knowledge Organiser

Science

Light

Year 3

Summer 2

Physics

Physics is the science that understands the nature and properties of energy and matter.

Statutory requirements

Pupils should be taught to:

- 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.

Vocabulary

Angle	The direction from which you look at something.
Bright	A colour that is strong, noticeable and not dark .
Chemical reactions	A process that involves changes in the structure of 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, lighting and to provide power for machines.
Emits	To produce a sound or light .
Light	A brightness that lets you see things.
Mirror	A flat piece of glass that reflects light , so that when you look at it you can see yourself reflected in it.
Opaque	An object or substance that can't be seen through.
Product	Something that is produced.
Reflects	Sent back from the surface of an object or substance without passing through it.
Shadows	Dark shapes that are made on a surface when something stands between the surface and a light .
Source	Where something comes from.
Sunglasses	Glasses with dark lenses which are worn to protect your eyes from bright sunlight.
Surface	The flat, top part, or the outside of an object or substance.
Torches	Small electric lights that can be carried and are powered by batteries.
Translucent	A material that allows some light to pass through it.
Transparent	An object or substance that can be seen through.