Knowledge Organiser for Year 6 Science- Light

Key Vocabulary	
Light	Light is a form of energy made from photons. Light enables us to see things
Photon	The basic unit that makes up all light
Ray	The straight line in which light travels
White light	Visible light made up of the colours of the spectrum
Opaque	A material that cannot be seen through and light cannot pass through
Transparent	A material that can be seen through and allows light to pass through
Translucent	A material that allows some light through and cannot be seen through clearly
Periscope	An apparatus consisting of a tube attached to a set of mirrors or prism used to see things that are otherwise out of sight (e.g. submarines)
Spectrum	The group of colours that a ray of light can be separated into including red, orange, yellow, green, blue, indigo, and violet: the colours that can be seen in a rainbow
Wave	An electromagnetic wave by which light travels
Wavelength	The distance between two peaks of a wave
Shadow	A dark area or shape produced by an opaque object coming between rays of light and a surface
Reflection	Throwing back of light by a surface. A mirror reflects an image the same as the original because, due to the smooth and shiny surface, the light rays bounce back in parallel lines
Refraction	The bending of light as it passes from one substance to another due to a change in wavelength 
Pupil	The part of the eye where light enters. It can change size depending on how bright the light is
Iris	A muscle that controls the size of the pupil to protect the eye or let more light in
Retina	At the back of the eye. Cells called rods and cones help turn light rays into signals the brain understands
Lens	Helps the brain to focus enabling an image to be seen clearly
Optic nerve	Takes signals from the rods and cones (in the retina) to the brain

Key numbers, dates and facts	
186,000	The number of miles light travels per second (nothing travels faster than light!)
1668	The year Isaac Newton invented the reflecting telescope
1672	The year Isaac Newton discovered that white light is made up of many different colours
1879	The year Thomas Edison invented the light bulb
1905	The year Albert Einstein came up with the idea that light is made up of photons

When light from the sun passes through raindrops, it bends by different amounts, splitting into different colours. Violet bends most so is on the inside of the rainbow.

What is light and how does it behave?

Light is a form of energy made up of photons, which allows us to see things. We can see things because light is reflected. Light travels very quickly, in waves and in straight lines. Light behaves differently depending on what it comes in to contact with. Opaque objects reflect all light and make clear dark shadows. Transparent objects allow light to pass through and so do not create much shadow. Translucent objects scatter light and can create faint shadows. Light normally travels in straight lines (rays) but when passing through transparent materials such as water and glass, light bends or turns- known as refraction. This is because different materials have different qualities and cause the wavelength of light to change.

How do we see?

We see through our eyes, which are organs that take in light and images and turn them into electrical impulses that our brain can understand. Light rays bounce off objects and into our eyes, allowing us to see. The amount of light reflected from an object depends on the surface and the colour of the object (smooth, shiny and light colour reflect light best). Light enters the eye through the pupil. The iris helps the pupil change size depending on how bright the light is. Light then hits the retina at the back of the eye. The retina turns light into signals the brain understands. Light sensitive cells called rods and cones help with this. The optic nerve takes signals from the rods and cones to the brain. The brain sends feedback signals to the lens telling it how to focus so we can see clearly. Light is made up of many different colours (white light), known as the spectrum. When light hits an object, some of the colours are absorbed by the object and some are reflected. This enables us to see objects in different colours. Light of different wavelengths looks like different colours to us.

Who is Isaac Newton and what did he discover?

In 1672 Isaac Newton became the first person to show that white light was made up of many different colours. He used glass prisms to separate white light into colours and combine them back into white light again. He conducted these experiments in his room at Cambridge University.