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| Year 3 - **Light** and Sound  |
| **National Curriculum Objectives:**\* Recognise that they need light in order to see thigs 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 sizes of shadows change. |
| **Prior Learning:**  | **Working Scientifically Links:** | **Opportunities for working Scientifically:** | **Story / Book Opportunities:** | **Maths Opportunities:** | **Vocabulary:** |
| **In Year 1: Animals Including Humans:**\* Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. | \* Look for patterns in what happens to shadows when the light source moves.\* Look for patterns in what happens to shadows when the distance between the light source and the object changes. | \* Which is the best material for a mirror?\* Which is the best material for sunglasses?\* Do cats’ eyes light up in the dark? (Link to luminous and non-luminous)\* Why can we see fireworks better in the dark?\* When is our classroom the darkest?\* How does the distance between the shadow puppet and screen affect the shadow?\* How can you sort these different light sources?\* Are you more likely to need glasses as you get older? | The Dark (Lemony Snicket)Barnaby BearCat StoryThe Firework-maker’s daughter (Phillip Pullman)The Owl Who was Afraid of the Dark (Jill Tomlinson) | Data handlingData Measuring | Light, light source, dark, absence of light, transparent, translucent, opaque, shiny, matt, surface, shadow, reflect, mirror, sunlight, dangerous, visible, beam,(luminous,non-luminous) |
| **Types of scientific Enquiry:**Fair & Comparative testingResearch using secondary sourcesIdentifying, classifying & groupingPattern seekingObserving over time | **Famous Scientists:****James Clerk Maxwell**(Visible and Invisible Waves of Light) |
| **In Year 6:** \* Recognise that light appears to travel in straight lines.\* Use the idea that light travels in straight lines to explain that objects are seen because they give out light or reflect light into the eye.\* Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to or eyes.\* Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them. |





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| Year 4 - Light and **Sound**  |
| **National Curriculum Objectives:**\* Identify how sound are made, associating some of them with something vibrating.\* Recognise that vibrations from sounds travel through a medium to the ear.\* Find patterns between the pitch of a sound and features of the object that produced it.\* Find patterns between the volume of a sound and the strength of the vibrations that produced it.\* Recognise that sounds get fainter as the distance from the sound source increases. |
| **Prior Learning:**  | **Working Scientifically Links:** | **Opportunities for working Scientifically:** | **Story / Book Opportunities:** | **Maths Opportunities:** | **Vocabulary:** |
| **In Year 1: Animals Including Humans:**\* Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. | \* Find patterns in the sounds that are made by different objects such as saucepan lids of different sizes or elastic bands of different thicknesses.\* Make earmuffs from different materials to investigate which provides the best insulation from sound.\* Make their own instruments by using what they have found out about pitch and volume. | \* Cups and string – children to ask their own questions to investigate.\* Can you make a guitar that makes 4 different pitches?\* What is the effect of the distance from the source on the volume / amplitude of a sound?\* How does the length of a guitar string / tuning fork affect the pitch of the sound?\* Sort the materials according to the sound they make when struck. | Horrid Henry Rocks(Francesca Simon)Moonbird(Joyce Dunbar)The Pied Piper of Hamelin(Natalia Vasquez) | Measuring -length of string / elastic bandData logger – record decibels | sound, source, vibrate, vibration, travel, pitch (high, low), volume, faint, loud, insulation, amplitude, sound wave |
| **Types of scientific Enquiry:**Fair & Comparative testingResearch using secondary sourcesIdentifying, classifying & groupingPattern seekingObserving over time | **Famous Scientists:****Aristotle**(Sound Waves)**Gailileo Galilei**(Frequency and Pitch of Sound Waves)**Alexander Graham Bell**(Telephone) |
| **In KS3:**\* Waves on water as undulations which travel through water with transverse motion; these waves can be reflected, and add or cancel – superposition.\* Frequencies of sound waves, measured in Hertz; echoes, reflection and absorption of sound.\* Sound needs a medium to travel, the speed of sound in air, in water, in solids.\* Sound produced by vibrations of objects, in loud speakers, detected by their effects on microphone diaphragm and the eardrum; sound waves are longitudinal.\* Auditory range of humans and animals.\* Pressure waves transferring energy; use for cleaning and physiotherapy by ultra-sound.\* Waves transferring information for conversion to electrical signals by microphone. |



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| Year 6 - **Light** and Sound  |
| **National Curriculum Objectives:**\* Recognise that light appears to travel in straight lines.\* Use the idea that light travels in straight lines to explain that objects are seen because they give out light or reflect light into the eye.\* Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes.\* Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them. |
| **Prior Learning:**  | **Working Scientifically Links:** | **Opportunities for working Scientifically:** | **Story / Book Opportunities:** | **Maths Opportunities:** | **Vocabulary:** |
| **In Year 3:**\* Recognise that they need light in order to see thigs 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 sizes of shadows change. | \* Decide where to place rear-view mirrors on cars, design and make a periscope and explain how these work.\* Investigate the relationship between light sources, objects and shadows.\* Extend their experience of light by looking at a range of phenomena; rainbows, colours in bubbles, objects looking bent in water and coloured filters. | \* How does the angle that a light ray hits a plane mirror affect the angle at which it reflects off the surface? Apply this to periscopes and rear-view mirrors.\* Which material is most reflective? | **Letters from the Lighthouse**(Emma Carroll)**The Gruffalo’s Child**(Julia Donaldson)**The King Who Banned the Dark**(Emily Haworth-Booth) | Angles – use of a protractorConverting units of measure | **As for Year 3 plus:**straight lines, light rays, scattered, refraction |
| **Types of scientific Enquiry:**Fair & Comparative testingResearch using secondary sourcesIdentifying, classifying & groupingPattern seekingObserving over time | **Famous Scientists:****Thomas Young**(Wave Theory of Light)**Ibn al-Haytham (Alhazen)**(Light and our Eyes)**Percy Shaw** (The Cats Eye) |
| **In KS3:**\* The similarities and differences in light waves and waves in matter.\* Light waves travelling through a vacuum; speed of light.\* The transmission of light waves through materials; absorption, diffuse scattering and specular reflection at a surface.\* Use of a ray model to explain imaging in mirrors, the pinhole camera, the refraction of light and action of convex lens in focusing; the human eye.\* Light transferring energy from source to absorber leading to chemical and electrical effects; photo-sensitive in the retina and in cameras.\* Colour and the different frequencies of light, white light and prisms; differential colour effects in absorption and diffuse reflection. |



