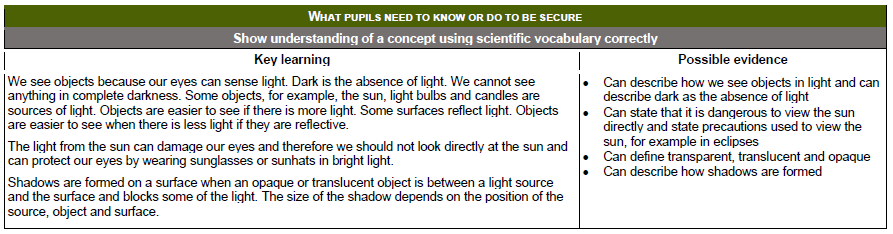
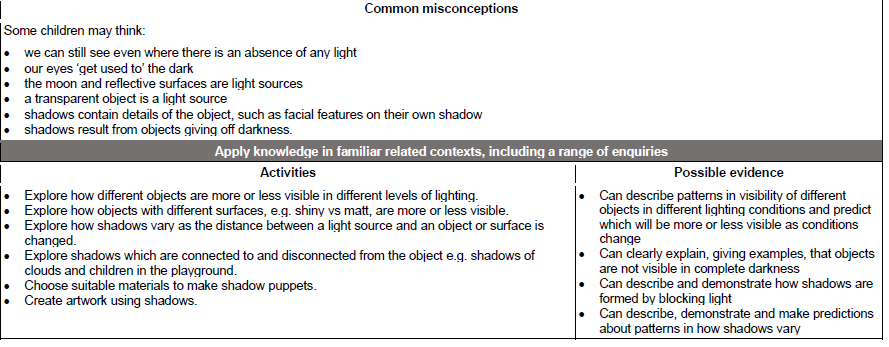
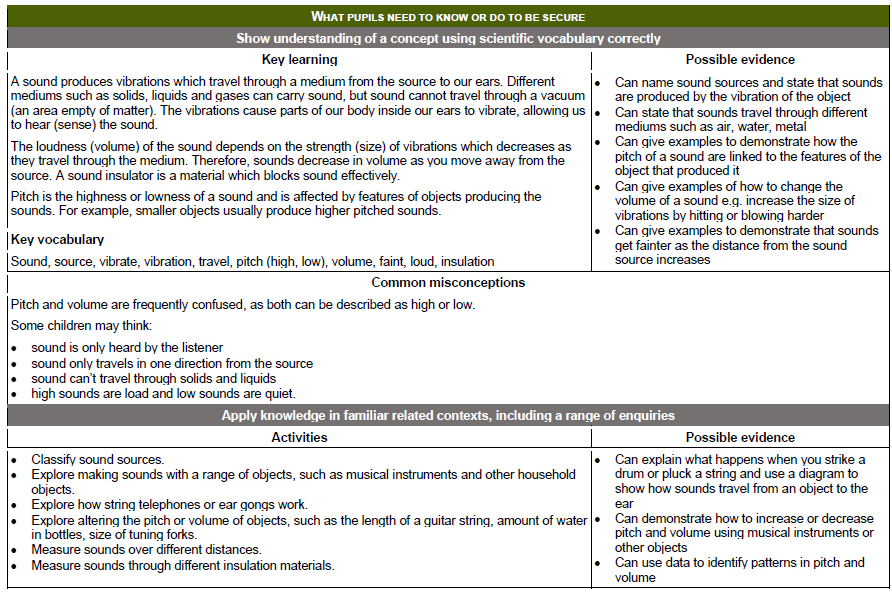
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| Year 3 - **Light** and Sound | | | | | |
| **National Curriculum Objectives:**  \* Recognise that they need light in order to see thigs and that dark is the absence of light.  \* Notice that light is reflected from surfaces.  \* Recognise that light 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 Bear  Cat Story  The Firework-maker’s daughter (Phillip Pullman)  The Owl Who was Afraid of the Dark (Jill Tomlinson) | Data handling  Data 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 testing  Research using secondary sources  Identifying, classifying & grouping  Pattern seeking  Observing 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 band  Data logger – record decibels | sound, source, vibrate, vibration, travel, pitch (high, low), volume, faint, loud, insulation, amplitude, sound wave |
| **Types of scientific Enquiry:**  Fair & Comparative testing  Research using secondary sources  Identifying, classifying & grouping  Pattern seeking  Observing 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 protractor  Converting units of measure | **As for Year 3 plus:**  straight lines, light rays, scattered, refraction |
| **Types of scientific Enquiry:**  Fair & Comparative testing  Research using secondary sources  Identifying, classifying & grouping  Pattern seeking  Observing 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. | | | | | |

