Year 6 – Light



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| National Curriculum Outcomes: Knowledge   * 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 or reflect light into the eye * Explain that we see things because light travels from light sources to our eyes of 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 | | | | | | National Curriculum Outcomes: Working Scientifically   * Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. * Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. * Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. * Using test results to make predictions and to set up further comparative and fair tests * Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations. * Identifying scientific evidence that has been used to support or refute ideas or arguments. | | | | | |
| Children might work scientifically by:  Deciding where to place rear-view mirrors on cars. Designing and making a periscope using the idea that light appears to travel in straight lines to explain how it works. They might investigate the relationship between light sources, objects and shadows by using shadow puppets. They could extend their experience of light by looking at a range of phenomena including rainbows, colours on soap bubbles, objects looking bent in water and coloured filters (they do not need to explain why these phenomena occur). (Taken from the National Curriculum) | | | | | |
| Links to prior learning  **Year 1:** identify, name, draw and label the basic parts of the human body and say which part of the body is associated with which sense.  **Year 3:** 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 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. | | | | | | | | | | Links to future learning  **Key Stage 3:** Colours and different frequencies of light, white light and prisms. Light waves travelling through a vacuum. The speed of light. | |
| Key Vocabulary  Light, light source, reflect, reflection, shadow, ray(s) of light, eye | Common Misconceptions   * Children can think that light comes out of their eyes and travels to the object, allowing us to see. * Often, children have not experienced complete darkness and so think that they are able to see in the dark. * Due to the old wives’ tale, children often think eating carrots can help them to see in the dark | | | | | | | | | | |
| Key knowledge/facts that the children need to know   * Light travels from light sources to our eyes or from light sources to objects and then to our eyes. * Light travels in straight lines. * We see objects when light is reflected off of an object into the eye. * Shadows are formed when light cannot pass through an object. * Shadows are formed in the shape of the object casting them. * The size of a shadow increases as it moves closer to the light source. | | | | | | | | Links to real life   * How can lights help to keep us safe? * When are highly-reflective materials useful to our lives? * Why are mirrors used in cars and on bends in country lanes? * How do we create a dark space when we go to bed in summertime and it’s still light outside? (link to WW2 blackout curtains) | | | |
| Important scientists  **Thomas Edison –** American business man who is credited with inventing the light bulb  **Ibn Al-Haytham –** Iraqi scientist who made important contributions to the understanding of vision, optics and light  **Percy Shaw –** English inventor who invented ‘cats eyes’ for roads. | | | | | STEM Career Links  **Astronomer** (studies space)  **Opthalmologist** (a doctor specialising in vision and eye health)  **Optician** (a doctor specialising in vision and eye health) | | | | | | |
| Suggested Enquiry Activities | | | | | | | | | | | |
| Identifying and Classifying | | Comparative and Fair Testing   * What is the best position for a car’s rear-view mirror? | | Observation over Time   * How does the amount of light in the classroom change over the course of a day? How does this differ to the playground? What do you predict will be different about this in a different season? | | | Pattern Seeking   * How does the position of a light source affect the size of a shadow? * How does a periscope work? How does changing the angle/position of the mirrors change what we can see? | | | | Research using Secondary Sources   * How can a submarine see where it is going? * Why do we see the Moon? |
| Wow Factor Experiences   * Visit the National Science & Media Museum’s Wonderlab (Bradford) * Build a periscope or kaleidoscope * Create a shadow puppet show, using understanding of how to change the size of shadows, inspired by shadow theatre group Attraction (see weblinks below) * Apply learning about electricity to build a torch using card tubes and foil pie cases | | | | | | | | | | | |
| Maths Links   * Use a data logger to gather information on light levels in the classroom and playground over the course of a day, then plot both on a line graph and talk about the differences | | | Literacy Links   * Create a poem describing light and/or dark * Write a shadow puppet theatre script based on a text currently being studied | | | | | | Broader Curriculum Links  **History:** How did people in the second world war disguise all the light from cities during night-time bombings? | | |
| Story Links  The Dark – Lemony Snickett  Goodnight Mr Tom – Michelle Morgan  The Firework Maker’s Daughter – Philip Pullman  The Darkest Dark – Chris Hadfield | | | | | | | | | | | |
| Helpful Weblinks  Assessment exemplification (could also be useful with planning ideas) – <https://www.planassessment.com/product-page/examples-of-work-light-y6-muharem>  Teacher CPD on teaching light (free) – <https://www.reachoutcpd.com/courses/upper-primary/light/>  BBC Class Clips (useful videos) – <https://www.bbc.co.uk/bitesize/topics/zbssgk7/resources/1>  STEM Learning collection of resources for this unit– <https://www.stem.org.uk/resources/community/collection/12741/year-6-light>  Attraction Shadow Theatre Dancers - <https://www.youtube.com/watch?v=XrhDN-bm0rk> | | | | | | | | | | | |

NB: It would be useful to teach this unit **in the summer term** when it is more likely that there will be sunny weather to allow shadow investigations outdoors. This is not vital though, as investigations can still be carried out inside with torches.