Science Progression of Skills and Knowledge Light.

Key to understanding this document: Black = National Curriculum objectives Red = Knowledge/Skills to be taught Green = Resources to be used

Area of Learning	Year 3	Year 6
Light	Working scientifically: Setting up simple practical enquiries. Recording findings using a labelled diagram. L1: recognise that they need light in order to see things and that dark is the absence of light. Create a dark den from desks and blankets. Challenge children to work out which objects you have hidden in it. Now allow the children to do the same activity with a torch. Provide groups of children with a box. In one end of the box make a small viewing hole. The children can place objects in the end of the box, which the other child must describe when looking through the viewing hole. Try to prevent any light from entering the box. The children can then add holes in the top of the box so that light can enter the box. Children can record by drawing a diagram of the investigation. Working scientifically: Using straightforward evidence to answer questions or to support their findings. L2: notice that light is reflected from surfaces. Take the children on a 'shadow search' around the school. Every time a shadow is discovered, encourage the children to indicate the light source/s and the object that is blocking the light from that source/s.	Working scientifically: Using simple models to describe scientific ideas. L1:To understand that light appears to travel in straight lines. Ask the children how then think light travels. You may wish to record the answers. Then ask one of the children to stand in the classroom holding a torch up and ask another child to stand around the corner. Discuss why the child cannot see the light. (revision from YR3) Record answers. Explain to class or use video clip that light travels in straight line. In groups complete investigation using three cards on stands with holes in and shining a torch through to prove light travels in a straight line. Working scientifically: Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. L2: To be able to 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. Recap from Year 3 light that we see because the light is reflected into our eyes. Challenge the children to make the inside of a shoe box as dark as possible. They then must devise a viewing hole in one end that will let through hardly any light. They must invent some form of slit into the box so they can vary the amount of light that can travel inside when opened. Once children have explored viewing objects in their boxes with varying amounts of light, encourage them to use cut out arrows to show the direction and journey of the light.

	Provide children with the opportunity to make shadows with torches. Try to establish with children that dark shadows indicate that there is very little light bouncing off of that place (maybe none). Conversely, where there are no shadows, this is where light is being bounced off of objects (reflected). **Class/ teacher demonstration** The teacher holds a torch and uses spaghetti to represent a ray of light. The children make a human ray of light by holding a piece of spaghetti to create a straight line. The class aim for an object e.g. a chair. The person who is at the end of the line (closest to the object) must break their piece of spaghetti to show some of the light has been absorbed. The children then discuss how the light cannot pass through the object. Some can be absorbed, and some can bounce off (reflected). Discuss that as light cannot pass through the object a shadow is formed behind it. Working Scientifically: Using straightforward scientific evidence to answer questions and support findings. L3:Recognise that light from the sun can be dangerous and that there are ways to protect their eyes. Children learn about different ways in which exposure to the Sun can be dangerous to humans. Children explain, and illustrate, ways in which the Sun can damage our eyes and skin and ways that this damage can be minimised.	Working scientifically: Recording data of increasing complexity using a labelled diagram. L3:To be able to 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. Children use toys, mirror, torch, ribbon to model how light travels from light source to our eyes. Keeping the ribbon straight as a reminder or how light travels. Record this in their books. Then test which material is best for reflecting light using a torch. Children record answers. Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them. In pairs, one of the children can hold a small opaque square shape a few centimetres above a piece of white paper on a table surface. The other child can hold a torch above the square so that it shines down at it. The children can then use spaghetti to show the path of the light from the torch and around the square. They could draw the shape created by where the spaghetti has touched the paper (i.e. a square). To increase the challenge, ask the child to make another drawing on the paper of a square when the square shape is moved a particular distance towards the torch. Working scientifically: Using simple models to describe scientific ideas. L4:To be able to 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. Children make a periscope.

	Working scientifically: To make a prediction. Asking relevant questions and using different types of scientific enquiry to answer them. L4: Recognise that shadows are formed when the light from a light source is blocked by an opaque object. Children understand and investigate that light cannot pass through opaque objects. Children try to find out how much light will pass through different materials. They will have to think about how they will reduce the amount of interfering light. It could be that make a hole in the end of a shoe box in which to shine their torch. Children make a prediction of which objects they think light will pass through/not. Working scientifically: Reporting on findings from enquiries. L5: Find patterns in the way that the size of shadows change. Children to make their own puppets and create shadows using these. Children set up an investigation to see how they can change the size of the shadow of the puppet. Challenge children to model what happens to the length of shadow of a person as they approach a street lamp, walk under it and then walk further away. Take the class outside and choose a volunteer. Draw around their shadow with chalk and measure it. Using different colour chalks ask the ch to turn around, take steps forward etc to see how the shadow changes. They might be able to do this with a shoe box, by shining their torch (the street light) through a hole in the lid. A Plasticine person	

	could pass through the box; going under the 'lamp'. Children draw simple conclusions from their investigation.	
Key Vocabulary	Light source Opaque Translucent Transparent Shadow Reflect Protection	**Simple comparisons**: dark, dull, bright, very bright **Comparative vocabulary**: brighter, duller, and darker **Superlative vocabulary**: brightest, dullest, and darkest Opaque, translucent, transparent **Shadow** – block, absence of light Reflect – bounce, mirror, reflection See – light source Sun – sunset, sunrise, position
Key Resources	Torches Shoe boxes Sheets/blankets Puppet making materials (e.g. lolly sticks) Spaghetti	• A range of equipment used for observing and measuring • Index cards • Plasticene • Torches • Hole puncher • Ruler • Square shapes • Materials for making a screen. • Spaghetti • Shoe boxes • Small mirrors

		• Torches • Post-its