SBSP PROGRESSION OF COMPONENT KNOWLEDGE THROUGH SCIENCE UNITS

PHYSICS – LIGHT

Year 3 NC links:

- 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 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 the size of shadows change

Year 3 Component Knowledge

- Identify light sources
- Understand the difference between natural and artificial sources of light
- Explain why certain objects are sources of light and why others are not
- Understand that sunlight can damage our skin and our eyes
- Observe the effectiveness of sun cream as protection against the sunlight
- Using scientific evidence, explain the effectiveness of sun cream as protection against the sunlight
- Understand that some objects are a light source and some are reflectors
- Identify materials that are good reflectors
- Explain why some materials are better reflectors than others
- Understand that a shadow is formed when an object blocks the light
- Explain how a shadow is formed when an opaque object blocks the light
- Understand that the size of a shadow changes when it is moved further from
- the light
- Understand that shadows change throughout the day
- Explain how shadows change throughout the day
- Explain how and why shadows change throughout the day
- Understand that the size and shape of a shadow can change
- Know how to change the size and shape of a shadow
- Explain why the size and shape of a shadow can change

Working Scientifically Component Knowledge

- Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions
- Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables
- Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
- Identifying differences, similarities or changes related to simple scientific ideas and processes

Key Vocabulary

- natural, artificial, source, light, reflect
- ultraviolet rays, sunburn, vitamin D, protection, exposure
- high visibility, reflective, surface, materials, fluorescent
- sundial, ray, block, shadow, opaque
- opposite, position, direction, cast, length
- size, puppet, shape, closer, further

Year 6 NC links:

- 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 or from light sources to objects and then to our eye
- use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them

Year 6 Component Knowledge

- Understand that light appears to travel in straight lines
- Understand how to draw a scientific diagram
- Understand how to draw a scientific diagram that helps support what you have found out
- Understand that light is reflected off of surfaces so that we can see it
- Understand how to set up a fair test and carry it out
- Understand how to draw conclusions based on findings
- Understand that light can be reflected off multiple surfaces so that we can see it
- Understand how to make a periscope to reflect an image
- Understand how to explain how an unseen image can be seen using a scientific diagram
- Understand that shadows change length depending on how far away they are from a light source
- Understand how to collect data
- Understand how to display data to support findings
- Understand how to create a shadow
- Understand where to position the sun shades to create the most shade
- Understand how to feedback information based on findings
- Understand the basics behind how light is refracted, how a rainbow is made and what happens when light hits a bubble
- Understand how light is used other than for us to see
- Understand how our eyes respond to light

Working Scientifically Component Knowledge

- Identifying scientific evidence that has been used to support or refute ideas or arguments
- Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
- Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs and bar and line graphs
- Reporting and presenting findings from enquiries - including conclusions, causal relationships and explanations of and a degree of trust in results - in oral and written forms such as displays and other presentations

Key Vocabulary

- symbol, light, eye, light source, scientific diagram
- surface, bounce, direction, mirror, reflected
- periscope, line of sight, angle, utilise
- shadow, block, opaque, transparent, translucent
- real-life problem, direction, rotate, plan, sun shade
- phenomena, optical, disperse, spectrum, refraction

KS3 NC links:

The similarities and differences between light waves and waves in matter. Light waves travelling through a vacuum; speed of light. The transmission of light through materials: absorption, diffuse scattering and specular reflection at a surface. Use of ray model to explain imaging in mirrors, the pinhole camera, the refraction of light and action of convex lens in focusing (qualitative); the human eye. Light transferring energy from source to absorber leading to chemical and electrical effects; photo-sensitive material in the retina and in cameras. Colours and the different frequencies of light, white light and prisms (qualitative only); differential colour effects in absorption and diffuse reflection.