DOWN AMPNEY PRIMARY SCHOOL

Term 3
Unit Overview: UKS2 Science
Light

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 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.

Working Scientifically Skills

- 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 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

Possible misconceptions

Some children may think:

- ..of seeing as an active process, i.e. that we see objects because light comes out of our eyes rather than enters them.

Substantive knowledge

- Know that light appears to travel in straight lines, and we see objects when light from them goes into our eyes.
- Know that light may come directly from light sources, but for other objects some light must be reflected from the object into our eyes for the object to be seen.
- Know that objects that block light (are not fully transparent) will cause shadows.
- Know that because light travels in straight lines the shape of the shadow will be the same as the outline shape of the object.

Disciplinary knowledge

- Draw diagrams or create models to demonstrate how light travels in straight lines either from sources or reflected from other objects into our eyes.
- Draw diagrams or create models to demonstrate how light travels in straight lines past translucent or opaque objects to form a shadow of the same shape.
- Collect data and prepare graphs to show how the size of a shadow is affected by the distance from the light source.
- Predict and explain, with diagrams or models how the path of light rays can be directed by reflection to be seen, e.g. the reflection in car rear view mirrors or in a periscope

Vocabulary

light, ray, beam, light source, Lux, opaque, transparent, translucent, shadow, reflection, straight lines, light rays

Phonics / polysyllabic words

translucent

Reading support

- Word mats
- Scaffolded recording / choice of recording
- Pre teaching of vocab

Extension deeper thinking

- How would you tell the difference between a light source and reflected light?
- How do reflections change with different surfaces and different shapes of surface?
- What useful applications of reflecting light are there?

Term 3
Unit Overview: UKS2 Science
Light

<table>
<tr>
<td>❖ Children sometimes confuse shadows and reflections.</td>
<td></td>
<td></td>
</tr>
<tr>
<td rowspan="2">Prior learning
❖ Recognise that they need light in order to see things and that dark is the absence of light. (Y3 - Light)
❖ Notice that light is reflected from surfaces. (Y3 - Light)
❖ Recognise that light from the sun can be dangerous and that there are ways to protect their eyes. (Y3 - Light)
❖ Recognise that shadows are formed when the light from a light source is blocked by an opaque object. (Y3 - Light)
❖ Find patterns in the way that the size of shadows change. (Y3 - Light)
❖ Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets. (Y5 - Properties and changes of materials)

Future learning
❖ The similarities and differences between light waves and waves in matter. (KS3)
❖ Light waves travelling through a vacuum; speed of light. (KS3)
❖ The transmission of light through materials: absorption, diffuse scattering and specular reflection at a surface. (KS3)</td>
<td rowspan="2">British Values
❖ Democracy Take the views and opinions of others into account. Take turns and instructions from others.
❖ The rule of law Understand the importance of safety rules when working scientifically make choices when planning an investigation as others may have different points of view as to where to start.
❖ Tolerance Scientific discoveries have come from other cultures and religious beliefs often compete with scientific understanding.
❖ Mutual respect Work as a team, discuss findings and 0ffer support and advice to others.</td>
<td>Key People
❖ Professor Robert Pal
❖ CV Ramen</td>
</tr>
<tr>
<td>Christian Values
Courage
❖ Ask our own questions to support our own understanding of the world and understand that sharing ideas, data, and results (for further testing and development by others) is a key principle of the scientific method.

Respect
❖ Supporting other’s ideas, even if they differ to our own.
❖ Explore and celebrate research and developments that take place in many different cultures, both past and present.
❖ Explore how scientific discoveries have shaped the beliefs, cultures and politics of the modern world.

Trust
❖ Celebrate everyone’s unique ideas and working together collaboratively.</td>
</tr>
</table>

DOWN AMPNEY PRIMARY SCHOOL

Term 3
Unit Overview: UKS2 Science
Light

❖ 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. (KS3) ❖ Light transferring energy from source to absorber leading to chemical and electrical effects; photo-sensitive material in the retina and in cameras. (KS3) ❖ Colours and the different frequencies of light, white light and prisms (qualitative only); differential colour effects in absorption and diffuse reflection. (KS3)		