

NC Purpose of Study

A high-quality science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. Science has changed our lives and is vital to the world's future prosperity, and all pupils should be taught essential aspects of the knowledge, methods, processes and uses of science. Through building up a body of key foundational knowledge and concepts, pupils should be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They should be encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes.

Intent	Implementation	Impact
At Broadway Junior School we believe that a high quality science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. Science has changed our lives and is vital to the world's future prosperity, and all pupils should be taught essential aspects of the knowledge, methods, processes and uses of science. Through building up a body of key foundational 'Big Ideas', pupils should be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They should be encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes. Science in our school is about developing children's ideas and ways of working that enable them to make sense of the world in which they live through investigation, as well as using and applying process skills. The staff here ensure that all children are exposed to high quality teaching and learning experiences, which allow children to explore their outdoor environment and locality, thus developing their scientific enquiry and investigative skills. They are immersed in scientific vocabulary, which aids children's knowledge and understanding not only of the topic they are studying, but of the world around them. We intend to provide all children regardless of ethnic origin, gender, class, aptitude or disability, with a broad and balanced science curriculum.	Teachers create a positive attitude to science learning within their classrooms and reinforce an expectation that all children are capable of achieving high standards in science. Our whole school approach to the teaching and learning of science involves the following: Science will be taught in planned and arranged blocks by the class teacher, to have a subject specific approach. This is a strategy to enable the achievement of a greater depth of knowledge. Through our planning, we involve problem solving opportunities that allow children to find out for themselves. Children are encouraged to ask their own questions and be given opportunities to use their scientific skills and research to discover the answers. This curiosity is celebrated within the classroom. Planning involves teachers creating engaging lessons, often involving high-quality resources to aid understanding of conceptual knowledge. Teachers use precise questioning in class to test conceptual knowledge and skills, and assess children regularly to identify those children with gaps in learning, so that all children keep up Teachers build upon the learning and skill development of the previous years. As the children's knowledge and understanding increases, and they become more proficient in selecting, using scientific equipment, collating and interpreting results, they become increasingly confident in their growing ability to come to conclusions based on real evidence. Working Scientifically skills are embedded into lessons to ensure these skills are being developed throughout the children's school career and new vocabulary and challenging concepts are introduced through direct teaching. This is developed through the years, in-keeping with the topics.	The impact and measure of this is to ensure children not only acquire the appropriate age related knowledge linked to the science curriculum, but also skills which equip them to progress from their starting points, and within their everyday lives. All children will have: - A wider variety of skills linked to both scientific knowledge and understanding, and scientific enquiry/investigative skills - A richer vocabulary which will enable to articulate their understanding of taught concepts - High aspirations, which will see them through to further study, work and a successful adult life.

Key Vocabulary

Light Light source Natural Artificial Reflect Reflection Reflective Transparent Translucent Opaque Shadow Block Absorb Surface Sun Sunlight Sundial UV Protect

Knowledge	Skills
- Know that we need light in order to see things. - Recognise that darkness is the absence of light. - Identify natural and artificial sources of light. - Understand that light travels from a light source. - Know that light reflects from surfaces into our eyes. - Recognise that some surfaces are more reflective than others. - Identify transparent, translucent and opaque materials. - Understand that shadows are formed when light is blocked by an opaque object. - Recognise that the size and shape of shadows change depending on the position of the light source. - Understand that the Sun is our main natural source of light and that it can be dangerous to look at directly.	- Observe and identify different light sources. - Classify objects according to how they let light pass through them. - Carry out comparative investigations. - Make predictions before testing. - Observe how shadows change. - Record results using tables, labelled diagrams and simple graphs where appropriate. - Explain observations using scientific vocabulary. - Draw conclusions from evidence collected.

Enrichment Opportunities

- Light source hunt around the school.
- Reflection investigation using mirrors.
- Create shadow puppets.
- Build and test simple sundials outdoors.
- Visit the playground to observe changing shadows throughout the day.
- Sun Safety poster campaign linked to PSHE.

Learning Objectives/End Points

Pupils will be able to:

- Identify natural and artificial light sources.
- Explain that we see because light reflects from objects into our eyes.
- Describe reflective surfaces.
- Classify materials as transparent, translucent or opaque.
- Explain how shadows are formed.
- Describe how shadows change when the position of the light source changes.
- Explain how a sundial uses shadows to tell the time.
- Describe ways to stay safe in the Sun.

Key Questions/Learning Objectives/End Points

What is a light source? Identify natural and artificial light sources.	How does light help us see? Explore reflection and reflective surfaces.	Which materials let light through? Classify materials. Identify transparent, translucent and opaque materials.	TAPS Focused Assessment – Shadows. How are shadows formed? Investigate shadow formation. Explain that shadows are formed when light is blocked.	How do sundials work? Observe changing shadows throughout the day. Explain how the movement of the Sun changes shadows.	How can we stay safe in the Sun? Learn about sun safety. Describe ways to protect ourselves from harmful sunlight.
Identify natural and artificial light sources and understand that we need light to see. Carry out a Light Source Hunt around the classroom and school. Sort objects into natural light sources, artificial light sources and objects that do not produce light.	Explore how light reflects from different surfaces and why some objects appear shiny. Show objects that help us to see things and stay safe at night. Cut them out carefully. Identify whether they are light sources or reflectors. Paste them into the right place on the Venn diagram	Investigate how different materials allow light to pass through. Classify a range of everyday materials by shining a torch through them. Sort materials and justify decisions using scientific vocabulary.	Investigate how shadows are formed and how they change when the position of the light source changes. TAPS Focused Assessment: Children plan and carry out an investigation to answer the question "How does moving a light source affect the size and position of a shadow?" They make predictions, identify variables, record observations and explain conclusions.	Explore how the Sun's position changes throughout the day and how shadows can be used to tell the time. Create and use a simple sundial outdoors. Observe and record how the shadow changes over several points during the day.	Learn about the benefits and dangers of sunlight and how to stay safe outdoors Design a Sun Safety campaign including posters, leaflets or presentations explaining how to protect ourselves from harmful UV rays.

Substantive Knowledge

- We need light to be able to see objects.
- Darkness is the absence of light.
- Some objects produce their own light; these are called light sources.
- Light sources can be natural (e.g. the Sun) or artificial (e.g. a torch or lamp).
- We see objects because light reflects from them into our eyes.
- Smooth, shiny surfaces reflect light better than rough surfaces.
- Transparent materials allow most light to pass through them.
- Translucent materials allow some light to pass through them.
- Opaque materials block light.
- Shadows are formed when an opaque object blocks light.
- The size and position of a shadow change when the light source or object moves.
- The Sun is the Earth's main natural source of light.

Careers

Linking Curriculum Learning to Careers

Discuss how the skills developed in this unit are used in a range of careers, including:

- Scientist
- Physicist
- Optician
- Optometrist
- Ophthalmologist
- Photographer
- Film maker
- Lighting technician
- Theatre lighting designer
- Electrical engineer
- Electronics engineer
- Architect
- Product designer
- Graphic designer
- Artist
- Interior designer
- Laboratory technician
- Safety officer
- Solar energy engineer
- Astronomer
- Inventor
- Technology developer

Transferable skills such as Curiosity Observation Investigation Problem solving Teamwork Communication
Research Organisation Attention to detail Classification Data handling Critical thinking Decision making
Creativity Resilience Responsibility Confidence Accuracy

Learning from Career and Labour Market Information

- Children will explore different careers linked to science, technology, design, photography, healthcare and engineering. They will begin to understand how different jobs use knowledge of light.
- Addressing the Needs of Each Pupil**
- Children will be encouraged to recognise their own strengths and interests, particularly in practical investigation, creativity, problem solving and scientific thinking.
- Linking Curriculum Learning to Careers**
Children will make direct links between their learning about light and careers such as scientist, photographer, lighting designer, engineer, optician and architect.
- Encounters with Employers and Employees**
- Where possible, children can hear from people who work with light through visitors, interviews, videos or virtual encounters.
- Experiences of Workplaces**
- Children can explore workplaces where light is important, such as hospitals, photography studios, theatres, laboratories, engineering companies and design studios.