Brockwell Junior School

Science Policy

STATEMENT OF INTENT

In partnership with parents, the whole school will deliver excellence in science at all levels with a clear mission to be Safe, Smile & Succeed. It is vital that children develop a love and respect for a subject that constantly seeks to discover the truth in its findings, and adapts and moulds as new evidence is uncovered, adding to or replacing older knowledge and wisdom. We want our children to develop a sense of curiosity and excitement as they take their own steps on this journey. We want our pupils to develop rigorous skills – predictions based on prior knowledge, using these in a systematic way, and seeking an explanation for their results. We want our children to take these skills on to the next stage of their education (and beyond, into their adult life) so they are able to seek and identify truth, clarity and validity.

1. INTRODUCTION

Science is a core subject and a vital part of each child's education. At Brockwell, we recognise 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 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. We aim to provide a quality science education that is differentiated for all abilities. It will use a wide range of learning materials and resources and be adapted to suit the range of learning styles. We aim to make science as inclusive as possible for children of all abilities and backgrounds. We aspire to use inquisitive enquiry–based learning to help in this process, supported by acquisitive knowledge–based activities / lessons, whenever appropriate.

2. AIMS

The national curriculum for science aims to ensure that all pupils:

♣ develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics;

♣ develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them;

♣ are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future.

3. SUBJECT CONTENT

At Brockwell, we follow the National Curriculum, teaching two strands to Science:

1. Scientific knowledge and conceptual understanding

This involves following a sequence of knowledge and concepts. Each pupil develops secure understanding of each key block of knowledge and concepts [such as electricity] in order to progress to the next stage.

2. Working Scientifically

'Working scientifically' focuses on the key features of scientific enquiry, so that pupils learn to use a variety of approaches to answer relevant scientific questions. Types of scientific enquiry should include: observing over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing (controlled investigations); and researching using secondary sources. Pupils should seek answers to questions through collecting, analysing and presenting data.

For all key stages, 'Working scientifically' is always taught through and clearly related to the teaching of substantive science content in the programme of study. All pupils should read and spell scientific vocabulary at a level consistent with their increasing word reading and spelling knowledge at their key stage. By the end of each key stage, pupils are expected to know, apply and understand the matters, skills and processes specified in the relevant programme of study.

Key Stage 1 (Brockwell Nursery and Infant School)

The principal focus of science teaching in key stage 1 is to enable pupils to experience and observe phenomena, looking more closely at the natural and humanly-constructed world around them. They should be encouraged to be curious and ask questions about what they notice. They should be helped to develop their understanding of scientific ideas by using different types of scientific enquiry to answer their own questions, including observing changes over a period of time, noticing patterns, grouping and classifying things, carrying out simple comparative tests, and finding things out using secondary sources of information. They should begin to use simple scientific language to talk about what they have found out and communicate their ideas to a range of audiences in a variety of ways. Most of the learning about science should be done through the use of first-hand practical experiences, but there should also be some use of appropriate secondary sources, such as books, photographs and videos.

Lower Key Stage 2

The principal focus of science teaching in lower key stage 2 is to enable pupils to broaden their scientific view of the world around them. They should do this through exploring, talking about, testing and developing ideas about everyday phenomena and the relationships between living things and familiar environments, and by beginning to develop their ideas about functions, relationships and interactions. They should ask their own questions about what they observe and make some decisions about which types of scientific enquiry are likely to be the best ways of answering them; including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative and fair tests and finding things out using secondary sources of information. They should draw simple conclusions and use some scientific language, first, to talk about and, later, to write about what they have found out.

Upper Key Stage 2

The principal focus of science teaching in upper key stage 2 is to enable pupils to develop a deeper understanding of a wide range of scientific ideas. They should do this through exploring and talking about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically. At upper key stage 2, they should encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. They should

also begin to recognise that scientific ideas change and develop over time. They should select the most appropriate ways to answer science questions using different types of scientific enquiry, including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information. Pupils should draw conclusions based on their data and observations, use evidence to justify their ideas, and use their scientific knowledge and understanding to explain their findings.

4. TEACHING AND LEARNING

Our science teaching will be based on Snap Science (Collins) and will be embedded in the development of a learning challenge curriculum. Opportunities for children to develop the required knowledge and understanding will be provided in a range of question and challenge approaches, although often the topic will be driven by the scientific content. On occasion, it will be necessary to teach science discretely in order to introduce and consolidate key concepts and skills. The children will also broaden their understanding of science through visits to places of interest, visitors into school and an annual 'STEM Focus'.

5. CONTINUITY AND PROGRESSION

Close monitoring of each year groups' planned Snap Science (Collins) objectives will ensure continuity and progression throughout the year groups and across the Key Stage. Each teacher works hard to ensure their pupils are developing skills, knowledge and understanding each year by expanding the range and depth of work.

National Curriculum Program of Study

Year Group	Year 3			Year 4		
Term	Sep - Dec	Jan - Apr	May - July	Sep - Dec	Jan - Apr	May - July
Module 1	<u>Rocks, soils and fossils</u> compare and group together different kinds of rocks on the basis of their appearance and simple physical properties recognise that soils are made from rocks and organic material describe in simple terms how fossils are formed when things that have lived are trapped within rock	<u>Forces, friction and magnets</u> compare how things move on different surfaces notice that some forces need contact between two objects, but magnetic forces can act at a distance observe how magnets attract or repel each other and attract some materials and not others compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials describe magnets as having two poles predict whether two magnets will attract or repel each other, depending on which poles are facing	<u>Flowering plants and plant growth</u> identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant investigate the way in which water is transported within plants	<u>Changes of state</u> compare and group materials together, according to whether they are solids, liquids or gases observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (° C) identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature	<u>Human impact on the environment</u> recognise that environments can change and that this can sometimes pose dangers to living things	<u>Sound</u> identify how sounds are made, associating some of them with something vibrating recognise that vibrations from sounds travel through a medium to the ear find patterns between the pitch of a sound and features of the object that produced it find patterns between the volume of a sound and the strength of the vibrations that produced it recognise that sounds get fainter as the distance from the sound source increases

Module 2	**Light and shadows** 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 a solid object find patterns in the way that the size of shadows change	**Movement and nutrition for the human body** identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat identify that humans and some other animals have skeletons and muscles for support, protection and movement	**Flowering plants life cycle** explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal	**Electricity: circuits** identify common appliances that run on electricity construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit recognise some common conductors and insulators, and associate metals with being good conductors	**Digestion and food chains** describe the simple functions of the basic parts of the digestive system in human identify the different types of teeth in humans and their simple functions construct and interpret a variety of food chains, identifying producers, predators and prey	**Classification of plants and animals** recognise that living things can be grouped in a variety of ways explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment

National Curriculum Program of Study

Year Group	Year 5			Year 6		
Term	Sep - Dec	Jan - Apr	May - July	Sep - Dec	Jan - Apr	May - July
Module 1	<u>Forces and mechanisms</u> explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object identify the effects of air resistance, water resistance and friction, that act between moving surfaces recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect	<u>Earth and space</u> describe the movement of the Earth, and other planets, relative to the Sun in the solar system describe the movement of the Moon relative to the Earth describe the Sun, Earth and Moon as approximately spherical bodies use the idea of the Earths rotation to explain day and night and the apparent movement of the sun across the sky	<u>Separating mixtures and changing materials</u> know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating demonstrate that dissolving, mixing and changes of state are reversible changes explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda	<u>Classification of living thing</u> describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals give reasons for classifying plants and animals based on specific characteristics	<u>What light does</u> 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	<u>Electricity: changing circuits</u> associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches use recognised symbols when representing a simple circuit in a diagram

Module 2	**Properties and uses of materials** 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 give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic	**Plant and animal life cycles** describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird describe the life process of reproduction in some plants and animals	**Human growth** describe the changes as humans develop to old age	**Evolution and inheritance** recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution	**Human circulation** identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood describe the ways in which nutrients and water are transported within animals, including humans	**Body health** recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function

6. DIFFERENTIATION and RESOURCES

Snap Science (Collins) uses differentiated tasks and activities according to ability and by appropriate expectations of the outcome. We also take a mastery approach in which we expect pupils to develop and widen their understanding of a concept, exploring it in different ways, before moving onto the next objective.

7. ASSESSMENT

Scientific knowledge and conceptual understanding

This is an on-going part of teaching and learning, involving observing pupils at work and talking and listening to them. Online assessment tools such as Kahoot will be used to assess understanding in a fun, child centred way. At the end of the year, class teachers will make comments on the annual report to parents.

Working Scientifically

High quality investigations form an intrinsic part of enquiry. Science data for every child is recorded electronically on Brockwell's assessment tracker, iTRACK, as each area is assessed or at the end of the cycle.

Beyond the National Curriculum and STEM Links

STEM via University
Stem Ambassadors into school
Magna
3D printing
Digital Embroidery
Robotics
VEX GO

8. MONITORING

This will include termly plans, children's work and children interviews. The Science Coordinator will have regular discussion with colleagues and will, where possible, observe class teaching and displays. The Science Coordinator will ensure that children at Brockwell

make the appropriate progression in the subject and make judgements regarding standards in the subject. These reports will be given to the Headteacher, the SLT and the Governors of the school.

9. RESOURCES

Snap Science (Collins) can be accessed via https://connect.collins.co.uk/. Resources are centrally located in the Science cupboard as well as in individual class areas.
The range includes books, posters, a variety of equipment and ICT software. The school library also has appropriate resources for children to use.

10. HEALTH AND SAFETY

At all times, children will be taught how to care for and handle equipment and media safely and with respect. When working with tools, equipment and materials, in practical and in different environments, including those that are unfamiliar, pupils will be taught:

- about hazards, risks and risk control
- to recognise hazards, assess consequent risks and take steps to control the risks to themselves and others
- to manage their environment to ensure the health and safety of themselves and others
- to explain the steps they take to control risk

Further information can be found on the ASE website as well as in their publication, 'Be Safe!'

11. INCLUSION

We teach Science to all children, whatever their ability and individual needs. Our teachers provide learning opportunities that are matched to the needs of children with learning difficulties. We strive to meet the needs of all pupils with special educational needs, disabilities, special gifts and talents, and of those learning English as an additional language. We encourage children to communicate their scientific learning in a variety of ways including written, verbal and pictorial.

We enable all pupils to have access to the full range of activities while studying Science. Where children participate in activities outside the classroom (a visit to a local pond, for example) we carry out a risk assessment beforehand, to ensure that the activity is safe and appropriate for all pupils, including those with additional needs.

12. CELEBRATION AND DISPLAY

Display is a valuable tool for sharing science work and should be a vehicle for celebrating the child's work within this subject. Science work will be displayed within classrooms and throughout the school.

13. SCHOOL AND COMMUNITY

We recognise that the local area and the local people offer a wealth of stimuli for science work. Some opportunities to explore science outside the school building include exploring forces through a trip to the park; exploring plants through a trip to the garden centre or exploring different types of rocks through a trip to Castleton. We encourage parents and community members with Science-related hobbies or jobs to share their experiences with the children. These visitors to school include local allotment owners, a representative from the Chesterfield Association from the blind and a local veterinary nurse.

14. POLICY REVIEW

This policy will be reviewed as part of the school's annual policy review system.
W.Baker (STEM)
Science Coordinator
September 2025

To be reviewed: September 2027