Brockwell Junior School

Science Policy

June 2021

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'.

- KS2 will teach, on average, 2hrs of science a week. This can be 'stored up' throughout the term and taught as part of a larger block.

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.

Year Group	Year 3			Year 4		
Term	**Sep - Dec**	**Jan - Apr**	**May - July**	**Sep - Dec**	**Jan - Apr**	**May – July**
Module 1	<u>Amazing bodies</u> In this module children will build on their knowledge of the human body developed in Key Stage 1.	<u>The power of forces</u> During this topic children will explore how forces can make objects start to move, speed up, slow down or change direction.	<u>How does your garden grow?</u> In this module children will build on their experiences of identifying and growing plants in Key Stage 1.	<u>Where does all that food go?</u> In this module children will build on knowledge of the human body that they developed in Key Stage 1 and also during the Amazing Bodies unit in Year 3.	<u>In a state</u> This module introduces the concept of states of matter. Children will learn the characteristic properties of solids, liquids and gases, first through physically exploring typical materials and then by classifying examples, such as powders and very viscous liquids, which are harder to classify.	<u>Where does all that food go?</u> <u>Who am I?</u> In this module children will further develop the understanding of keys they gained in the Year 3 rocks module, using them to identify animals from a range of habitats.
Module 2	<u>Can you see me?</u> In this module children start their formal look at light, and whilst they will have some prior experience at home, this has not been covered in school before.	<u>How does your garden grow?</u> In this module children will build on their experiences of identifying and growing plants in Key Stage 1.	<u>Rock detectives</u> In this module children will work as 'Rock Detectives' establishing core knowledge and understanding of rocks, their relationship to soils and how fossils have formed over time.	<u>Good vibrations</u> In this module children will build on their understanding of hearing, which was covered in Year 1 during work around the senses.	<u>Switched on</u> In this module children will identify electrical appliances, distinguishing between those which are powered by mains and battery (including those with integral rechargeable batteries) and recognising that electricity can be used to produce light, sound, heat and movement. Children will explore the production of light, sound and movement by making simple series circuits with cells, wires, bulbs, buzzers and motors, learning the names of the components.	<u>Human impact</u> In this module children will learn about some of the positive and negative ways that humans change the environment, locally and globally, with a particular focus on how this affects other living things. <u>In a state</u>
Our Changing World modules	Lessons 1, 2 and 3 twice this term all together in one lesson Lesson 4 once this term Lesson 5 in early September	Lessons 1, 2 and 3 twice this term all together in one lesson Lesson 4 once this term Lesson 5 in early Spring	Lessons 1, 2 and 3 twice this term all together in one lesson Lesson 4 once this term Lesson 5 twice in Summer	Lesson 1	Lesson 2 Do in early January	Lesson 3

Year Group	Year 5			Year 6		
Term	Sep - Dec	Jan - Apr	May - July	Sep - Dec	Jan - Apr	May - July
Module 1	<u>The Earth and beyond</u> In this module children develop their knowledge of the Earth's (and other planets') place in the solar system, and their relationships with other bodies in space, in particular with the Sun.	<u>Feel the force</u> In Year 3 children learned about how contact and non-contact forces make things start and stop moving. This module builds on these ideas and develops an understanding of how forces including gravitational attraction and drag forces – friction, air resistance, water resistance, and upthrust in water – affect movement.	<u>Reproduction in plants and animals</u> In this module children learn about reproduction in some types of plants and animals, including humans	<u>Everything changes</u> This is a challenging module in which children build on their knowledge of living things and how they are adapted to particular environments.	<u>Body pump</u> This module builds on learning about the human body from Key Stage 1, when they learned that humans and other animals need water, food and air in order to survive, and also during lower Key Stage 2, when they investigated the muscular, skeletal and digestive systems.	<u>The nature library</u> This is a challenging module in which children will build on their knowledge of living things from previous years and deepen their understanding of why and how organisms are classified.
Module 2	<u>Get sorted</u> In this module children identify, compare and classify a variety of materials according to both their properties and their uses. <u>Everyday materials</u> In this module children further develop their knowledge and understanding of materials, achieving an in-depth knowledge of the properties of certain materials and how and why those specific properties make them suitable for particular uses	<u>Circle of life</u> In this module children build on earlier work from Key Stage 1 and from Year 3, where they learned about the life cycles of plants. <u>Reproduction in plants and animals</u> In this module children learn about reproduction in some types of plants and animals, including humans.	<u>Marvellous mixtures</u> In this module children further develop their conceptual knowledge and understanding of how different mixtures of solids and liquids might be separated. <u>Materials: All change!</u> In this module children develop their knowledge and understanding of changes to materials.	<u>Light up your world</u> In this module children build on the work that they have done in Year 3 where they learned about light sources, how light enables us to see by reflecting from objects and how different objects reflect different amounts of light and shadows	<u>Danger! low voltage</u> In this module children develop their understanding of electrical circuits and build on the work in the Year 4 module.	<u>Body health</u> In this module children learn about how to keep their bodies healthy and how their bodies might be damaged. The focus is on lifestyle choices that humans make, including diet, exercise and drug use, and how these are informed by scientific evidence.
Our Changing World modules			Lesson 1	Lessons 1 and 2 (more than once) Lesson 4 (more than once) Lesson 5 (more than once)	Lessons 1 and 2 (more than once) Lesson 4 (more than once) Lesson 5 (more than once)	Lessons 1 and 2 (more than once) Lesson 4 (more than once) Lesson 5 (more than once)

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, Quizizz or Blooket 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

Science Fair Y4
STEM via University
Stem Ambassadors into school
Magna
3D printing
Digital Embroidery
Robotics

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
June 2021

To be reviewed: June 2022