Egerton Primary School Science Policy

(September 2021)

Science at Egerton

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.
(National Curriculum 2014)

Introduction

This document is a statement of aims, principles and strategies for the teaching and learning of Science at Egerton Primary School. It was developed and is updated through consultation with all teaching staff. The learning and teaching of Science at Egerton Primary School aims to promote Science as a core subject which is taught on a weekly basis across the foundation stage and key stages 1 and 2. It is seen as a practical subject that needs to be taught in a practical way (where appropriate) to stimulate curiosity, discussion and investigation. The teaching and learning of Science should be linked to real world experience to encourage children to develop an understanding and enquiring mind. Our vision is to inspire enquiring minds for the future.

Intent

The 2014 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 skills** required to understand the **uses and implications** of Science, today and for the future. We understand that it is important for lessons to have a skills-based focus, and that the knowledge can be taught through this

At Egerton, we encourage children to be inquisitive throughout their time at the school and beyond. The Science curriculum fosters a healthy curiosity in children about our universe and promotes respect for the living and non-living. We believe Science encompasses the acquisition of knowledge, concepts, skills and positive attitudes. Throughout the programmes of study, the children will acquire and develop the key knowledge that has been identified within each unit and across each year group - all learning is accessible for all children regardless of their ability or background The key knowledge identified by each year group is informed by the national curriculum and builds towards identified phase 'end points' in accordance with NC expectations. Key skills are also mapped for each year group and are progressive throughout the school (Appendix 1). These too ensure systematic progression to identified skills end points which are in accordance with the Working Scientifically skills expectations of the national curriculum.
The curriculum is designed to ensure that children are able to acquire key scientific knowledge through practical experiences; using equipment, conducting experiments, building arguments and explaining concepts confidently. The school's approach to Science takes account of the school's own context, ensuring access to people with specialist expertise and places of scientific interest as part of the school's commitment to learning outside the classroom. Cross curricular opportunities are also identified, mapped and planned to ensure contextual relevance (Appendix 2). Children are encouraged to ask questions and be curious about their surroundings and a love of Science is nurtured through a whole school ethos and a varied Science curriculum.

Implementation

Teachers create a positive attitude to Science learning within their classrooms and reinforce an expectation that all pupils 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 topic blocks by the class teacher, to have a project-based approach. This is a strategy to enable the achievement of a greater depth of knowledge.
- Existing knowledge is checked at the beginning of each topic, as part of the KWL strategy (What I know, What I would like to Know and What I have Learned) or a quiz. This ensures that teaching is informed by the children's starting points and that it takes account of pupil voice, incorporating children's interests.
- Through our planning, we involve problem solving opportunities that allow children to apply their knowledge, and find out answers 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 pupils regularly to identify those children with gaps in learning, so that all pupils keep up. Tasks are selected and designed to provide appropriate challenge to all learners, in line with the school's commitment to inclusion.
- We build upon the knowledge and skill development of the previous years. As the children's knowledge and understanding increases, 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 that skills are systematically 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.
- Teachers demonstrate how to use scientific equipment, and the various Working Scientifically skills in order to embed scientific understanding. Teachers find opportunities to develop children's understanding of their surroundings by accessing outdoor learning and workshops with experts.
- Children are offered a wide range of extra-curricular activities, visits, trips and visitors to complement and broaden the curriculum. These are purposeful and link with the knowledge being taught in class.
- Regular events, such as Science Week, allow all pupils to come off-timetable, to provide broader provision and the acquisition and application of knowledge and skills. These events often involve families and the wider community.
- At the end of each topic, key knowledge is reviewed by the children and rigorously checked by the teacher and consolidated as necessary.

Impact

The successful approach at Egerton Primary School results in a fun, engaging, high-quality Science education, that provides children with the foundations and knowledge for understanding the world. Our engagement with the local environment ensures that children learn through varied and first hand experiences of the world around them. Frequent, continuous and progressive learning outside the classroom is embedded throughout the Science curriculum. Through various workshops, trips and interactions with experts children have the understanding that Science has changed our lives and that it is vital to the world's future prosperity. Children learn the possibilities for careers in Science, as a result of our community links and connection with national agencies including the STEM association. They learn

from and work with professionals, ensuring access to positive role models within the field of Science from the immediate and wider local community. From this exposure to a range of different scientists from various backgrounds, all children feel they are scientists and capable of achieving. Children at Egerton Primary overwhelmingly enjoy Science and this results in motivated learners with sound scientific understanding.

Teaching and Learning

The Science curriculum is mapped to ensure alignment with the national curriculum content and programme of study. Key knowledge relates directly and builds towards the achievement of end of phase (KS1, Lower KS2 and upper KS2) 'end points', informed by the National Curriculum statements. Key skills are also mapped so that these are developed systematically and align directly to the specified working scientifically statements as outlined in the NC for each phase. (Appendix 1)
In each lesson, children are guided towards the learning intention through the use of success criteria. The LO (Learning Objective) and success criteria are shared at the beginning of the lesson and reviewed by children at the end. They are subsequently used by the teacher during the assessment and review work of children's work and are used to identify individual target areas. A working wall will be used to support and celebrate learning throughout each unit of work. This will also be used to support the acquisition of key knowledge and will support the accurate use of an extended specialist vocabulary.

Science is taught in a cross curricular manner, where possible, and integrated into classes ongoing 'theme' work to provide more contextual and meaningful learning experiences.

- English – opportunities to write for varied purposes, with the characteristics of different kinds of writing. For example, chronological reports, recounts, balance arguments and note taking
- Mathematics – developing skills in data handling, measurements and mathematical relationships
- Art – understanding of materials and their properties, designing and creating own inventions
- Geography – exploring physical processes
- History – researching Scientist, their discoveries and the impact in today's society
- Computing – data handling and research
- PSHE – health and safety education

Planning and Resources

Key knowledge and skills, in line with the National Curriculum are mapped on the whole school 'Science Knowledge and Skills Progression Map' and this shows the key knowledge and skills of each unit and how they build through the school. The school's own context is also considered and opportunities for learning outside the classroom, including the use of specific school resources (such as the pond, garden and school field) and relevant educational visits, are included on the map and are planned by teachers. Cross curricular links are also mapped to further support the contextual relevance of the Science curriculum. (Appendix 2)
High-quality Science resources to support the teaching of all units and topics from EYFS to Y6, are used consistently and maintained by the subject leader. These are kept in a central store and are labelled and easily accessible to all staff. As well as these, the EYFS classes have a range of resources for easy access to children during exploration. The school library contains a rich and varied supply of Science topic books to support children's individual research and all classes have access to these during their weekly allocated library slot. Teachers also use Cheshire Library Service for Science books.

Investigations

It is essential that children experience and understand the full cycle of experimental science. Specific skill elements of investigations are to be covered discretely across the curriculum however all children should have the opportunity to work through the full process at least once a term this could be as part of the lessons mapped out or as a distinct separate block. The investigation should link closely with the lesson plans. Working scientifically We recognise that it is important our pupils are taught a variety of approaches to answer relevant scientific questions. Over the course of six year, pupils will develop greater understanding of how to working scientifically.

These types of scientific enquiry should include:

- observing over time
- pattern seeking
- identifying, classifying and grouping
- comparative and fair testing (controlled investigations)
- researching using secondary sources (pupils should seek answers to questions through collecting, analysing and presenting data)

Health and Safety

Safe working practices are an integral part of all Science activities. All staff are aware of safe and correct handling of tools, materials and equipment. The teaching staff demonstrate to pupils how to work safely and ensures that all children using equipment are properly supervised.

Assessment for Learning

As part of the introduction to each new Science topic, teachers review what the children know already and identify what they would like to learn. This informs the programme of study so that it takes account of children's starting points as well as their specific interests.
Lessons are planned to ensure that key knowledge is developed over time, over the course of each Science block and in the correct sequence. Key knowledge is reviewed by the children and rigorously checked and consolidated by the teacher at the end of each unit of work.

Lessons within each unit are also planned to ensure the systematic development of the key identified skills across the school.
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 as set out in the National Curriculum. These are set out as statutory requirements. We also draw on the non-statutory requirements to extend our children and provide an appropriate level of challenge.
Children receive effective feedback through teacher assessment, both orally and through written feedback in line with the success criteria. Children are guided towards achievement of the main objective through the use of process-based 'success criteria', provided by and explained by the teacher. Children refer to these during the lesson and they precede outcomes of work in children's books. The success criteria are used to identify areas of difficulty by children and teachers when reviewing and assessing work.

Ongoing assessment also includes:

- Observing children at work, individually, in pairs, in a group, and in classes.
- Questioning, talking and listening to children
- Considering work/materials / investigations produced by children together with discussion about this with them.

Children's achievements are shared with parents at Parent Meetings on a termly basis. Parents have access to children's work and individual dialogue with the class teacher via school online platform - **Seesaw**. Parents see Science displays and evidence of the children's work through class led assemblies, school presentations and work in their Science books. **DcPro** is used to record the children's attainment and progress throughout KS1 and KS2. **Tapestry** is used for EYFS.

In EYFS, we assess the children's Understanding of the World according to the Development Matters statements.

As per the national curriculum programme of study, by the end of key stage 1 pupils can:

(Appendix 3)

- Has experienced and observed phenomena, having looked more closely at the natural and humanly constructed world around them.
- Shows curiosity, asking questions about what they have noticed.
- Has developed understanding of scientific ideas through the use of different types of scientific enquiry to answer own questions, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative tests and finding things out using secondary sources of information.
- Is beginning 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.

As per the national curriculum programme of study, by the end of lower key stage 2 pupils can:

- Has broadened their scientific view of the world around them through exploring, talking about, testing and developing ideas about everyday phenomena and the relationships between living and non-living things and familiar environments
- Asks their own questions about what they observe and is able to 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.
- Draws simple conclusions and uses some scientific language, to both and write about what they have found out. Reads and spells scientific vocabulary correctly and with confidence, using their growing word and spelling knowledge.

As per the national curriculum programme of study, by the end of upper key stage 2 pupils can:

- Has developed a deeper understanding of a wide range of scientific ideas through exploring and talking about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically.

- Has encountered more abstract ideas and is beginning to recognise how these help them to understand and predict how the world operates.
- Is beginning to recognise that scientific ideas change over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative fair tests and finding things out using a wide range of secondary sources of information.
- Is able to draw conclusions based on their data and observations, using evidence to justify their ideas and their scientific knowledge and understanding to explain their findings.

Recorded Work

Scientific work is recorded in a variety of ways appropriate to the age of the children and their individual needs in each key stage. This can include teacher observations, photographs, drawings, tables, graphs, written accounts and formal write ups. It is expected that all recorded Science work is to be presented to a high standard but not to the detriment of Science investigations or the teaching and learning aspect of the lesson. The balance of practical activity and length of recording tasks is carefully planned to maintain a scientific emphasis.

Key Stage One

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. At William Patten, children are encouraged to be curious and ask questions about what they notice. Their understanding of scientific ideas is supported through the use of different types of scientific enquiry so that children can 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. Children are supported to 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, including wider school forums such as Science week. Most of the learning about Science is done through first-hand practical experiences, and children are also to begin to use appropriate secondary sources, such as books, photographs and videos.
'Working scientifically' is described separately in the National Curriculum programme of study, but is **always** taught through and clearly related to the teaching of substantive Science content in the programme of study. The knowledge and skills progression maps outline how the specific skills of each unit progressively build between years and towards the overarching 'end point statements'. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content.
Opportunities are provided for the children to read and spell scientific vocabulary at a level consistent with their increasing word reading and spelling knowledge at key stage 1.

Lower Key Stage Two

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 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. Children are encouraged and supported to 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 draw

simple conclusions and use some scientific language, first, to talk about and, later, to write about what they have found out.
As in KS1, 'Working scientifically' is described separately in the National Curriculum programme of study, but is **always** taught through and clearly related to the teaching of substantive Science content in the programme of study. The knowledge and skills progression maps outline how the specific skills of each unit progressively build between years and towards the overarching 'end point statements'. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content.
Opportunities are provided for the children to read and spell scientific vocabulary correctly and with confidence, using their growing word reading and spelling knowledge.

Upper Key Stage Two

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. At William Patten, children 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 encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. Children are also supported to begin to recognise that scientific ideas change and develop over time. The school curriculum provides opportunities for children to 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. Children learn to 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.
'Working and thinking scientifically' is described separately at the beginning of the programme of study, but must **always** be taught through and clearly related to substantive Science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content.
Opportunities are provided for the children to read, spell and pronounce scientific vocabulary correctly.

Marking (see policy)

Much of the work done in Science lessons is of a practical or oral nature and, as such, recording will take many varied forms thus making marking different. It is, however, important that written work is marked regularly and clearly, as an aid to progression and to celebrate achievement. When appropriate, pupils may be asked to self-assess or peer assess their own or other's work.
Marking for improvement comments in a child's book must be relevant to the learning objective to help children to better focus on future targets.

Achievement in Science

Achievement in science is celebrated by:

- Displaying work
- Communicating findings in class to others
- Presenting of achievement certificates in Celebration Assembly every Friday
- Entering the Primary Engineering Competition
- Celebrating the British Science Week

Equal Opportunities

At Egerton Primary School, we are committed to providing a teaching environment which ensures all children are provided with the same learning opportunities regardless of social class, gender, culture, race, special educational need or disability. Teachers use a range of strategies to ensure inclusion and also to maintain a positive ethos where children demonstrate positive attitudes towards others.

Inclusion

Science teaching considers the needs of different individuals and groups for learners and tasks are designed and differentiated as appropriate to ensure an appropriate level of challenge. Supporting adults are also deployed effectively to ensure focussed support where this is necessary.

Teachers use a range of inclusion strategies, including paired work, open questions and direct, differentiated questioning and the activation of prior knowledge and contextual learning. This support the inclusion and motivation of all learners ensuring that optimum progress is made throughout each part of the lesson.

Role of the Subject Leader

The subject leader's responsibilities are:

- To ensure the high profile of the subject and provide a strategic lead and direction for Science in the school.
- To maintain and ensure use of the central supply of Science resources, in accordance with those specific to each year group and topic
- To support colleagues in their teaching of Science and support the CPD of others
- To ensure progression of the key knowledge and skills identified within each unit and that these are integral to the programme of study and secure at the end of each age phase.
- To monitor books and ensure that key knowledge is evidenced in outcomes, alongside and as supported, by SLT
- To monitor planning and oversee the teaching of Science
- To lead further improvement in and development of the subject as informed by effective subject overview
- To ensure that the Science curriculum enables the progress and raises the attainment of all pupils, including those who are disadvantaged or have low attainment
- To ensure that the Science curriculum take account of the school's context, promotes children's pride in the local area and provides access to positive role models from the immediate and wider local area to enhance the Science curriculum.
- To ensure that approaches are informed by and in line with current identified good practice and pedagogy; to attend regular opportunities for CPD.
- To establish and maintain existing links with external agencies and individuals with specialist expertise to enrich teaching and learning in Science.
- To organise an annual whole-school Science week, in accordance with the national theme, ensuring a focus on practical and investigative activities.
- The subject leader has specially-allocated time for fulfilling the task of reviewing samples of children's work, training, liaising with other subject leaders from other schools and organising Science Week.

Working in Partnership - Parents

Parental input is highly valued and parents are regularly invited and welcomed into school to share their own expertise with the children. Enquiries from parents and members of the school community with specialist expertise and knowledge are also encouraged. The school will actively seek to establish collaboration with parents and carers who are able to support the teaching and learning of Science at Egerton.

The support that parents and carers provide in supporting their children at home with topic-based homework is also recognised and valued. When these are set, Science homework tasks will be well communicated and have a clear purpose and will often provide children with the means to consolidate or extend their classroom work.

Specific opportunities for parents to take part in Science activities at the school, including Science Week, will be communicated. Special events will also be organised to involve families in scientific activities.

Subject Leader: Monika Sedgwick

Policy Date: September 2021

Review Date June 2022

Appendix 1

Progression of skills, Egerton Primary School, Science

STRANDS	KS1		LKS2		UKS2	
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
ASKING QUESTIONS	***Ask simple questions, and with help find out the answers to them*** Demonstrate curiosity, e.g. ask 'why?' or 'how?' about the world around them . Begin to understand the concept of 'a question'. Be able to ask a simple question. Begin to suggest one way of finding an answer to a question. Begin to understand that some questions can be answered by testing. With help, identify evidence that can be used to answer questions. With help, present evidence.	***Ask simple questions and recognise that they can be answered in different ways*** Understand the concept of 'a question'. Be able to ask a question Be able to suggest one way of finding an answer to a question. Understand that some questions can be answered by testing. Identify evidence that can be used to answer questions. Present evidence.	***With guidance, ask more relevant questions and become aware of different types of scientific enquiries to answer them*** Begin to raise more relevant questions. Begin to make own decisions about which method of enquiry is best to answer a question. Begin to refine a question.	***Ask relevant questions and use different types of scientific enquiries to answer them*** Raise relevant questions. Make own decisions about which method of enquiry is best to answer a question. Refine a question.	***Plan, with support, different types of scientific enquiries to answer questions, begin to recognise variables and how to control these where necessary*** With support, ask pertinent questions. Begin to, explore ideas and raise different kinds of questions about scientific phenomena. Begin to refine a scientific question so that it can be tested. Understand that some scientific questions cannot be answered by a particular investigation. With guidance, suggest changes to questions following collection/analysis of data.	***Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary*** Ask pertinent questions. Explore ideas and raise different kinds of questions about scientific phenomena. Refine a scientific question so that it can be tested. Understand that some scientific questions cannot be answered by a particular investigation. Be able to suggest changes to questions following collection/analysis of data.
MAKING OBSERVATION AND TAKING MEASUREMENTS	*With support, make careful observations to support identification, comparison and noticing change* Understand that we can gather information through our senses Understand that observation involves all of the senses. Use simple equipment provided, e.g. hand lenses, to make more accurate observations. With support, select appropriate equipment to observe.	***Make careful observations to support identification, comparison and noticing change*** Understand that we can gather information through our senses. Understand that observation involves all of the senses. Select appropriate equipment to observe. Independently, use simple equipment provided, e.g. hand lenses, to make more accurate observations.	***With support, make systematic and careful observations*** Select appropriate equipment to observe and measure. Guided, use a range of equipment for measuring length, time, temperature and capacity. Begin to use standard units for their measurements. With support, use new equipment such as data loggers, appropriately.	***Make systematic and careful observations*** Accurately, select appropriate equipment to observe and measure. Use a range of equipment for measuring length, time, temperature and capacity. Accurately, use standard units for their measurements. Use new equipment such as data loggers, appropriately.	***Begin to take measurements, using a range of scientific equipment*** With support, make decisions about what observations to make, what measurements to use and for how long to make them, and whether to repeat them. Choose the most appropriate equipment to make measurements and explain how to use it Begin to recognise that some measurements or observations may need to be repeated	***Take measurements, using a range of scientific equipment*** Make own decisions about what observations to make, what measurements to use and for how long to make them, and whether to repeat them Choose the most appropriate equipment to make measurements and explain how to use it accurately Recognise that some measurements or observations may need to be repeated Repeat observations or measurements appropriately.

Progression of skills, Egerton Primary School, Science

	Recognise that some observable features may change over time, e.g. the size of a plant.	Recognise that some observable features may change over time, e.g. the size of a plant.				Select appropriate ranges or intervals of measurements. Explain how repeating measurements impacts on data collection. Recognise when measurements or data are unreliable and be able to take steps to improve this.
COMPARATIVE AND FAIR TESTS	***Begin to perform simple tests*** When prompted, say what is happening / has happened to things or events. With help, make changes and say what has changed Begin to suggest a practical way to find something out. Compare features of two objects. With support, identify two variables in an investigation, e.g. water and light when investigating plant growth With support, identify things to measure and things to observe Begin to set up a comparative test.	***Performing simple tests*** Explain what is happening/has happened to things or events. Make changes and explain what has changed Suggest a practical way to find something out. Confidently, compare features of two objects. With support, identify two variables in an investigation, e.g. water and light when investigating plant growth Identify things to measure and things to observe Set up a comparative test. Begin to recognize when a test is not fair and begin to suggest improvements.	***Begin to set up simple practical enquiries, comparative and fair tests*** Begin to make decisions about which practical method is best to find something out. Identify two variables in an investigation, e.g. water and light when investigating plant growth. Set up a comparative test. Recognize when a simple fair test is necessary to answer a scientific question. Be able to identify variables to measure and variables to observe. With others, help to set up a fair test. Start to recognize when a test is not fair and suggest improvements.	***Set up simple practical enquiries, comparative and fair tests*** Make decisions about which practical method is best to find something out. Confidently, identify two variables in an investigation, e.g. water and light when investigating plant growth. Independently, set up a comparative test. Recognize when a simple fair test is necessary to answer a scientific question. Identify variables to measure and variables to observe. Set up a fair test. Start to recognize when a test is not fair and suggest improvements.	***Begin to plan different types of scientific enquiries to answer questions, including recognizing and controlling variables where necessary*** Select and plan a type of scientific enquiry to use to answer scientific questions With support, recognize when and how to set up comparative and fair tests and explain which variables need to be controlled and why. State which is the change variable and which is the measurement variable in a fair test. Identify the effect of changing one variable at a time. Recognize that some variables may be more significant than others in investigations. Begin to justify own choice of method as being appropriate to answer investigative question. Use own results to identify when further tests and observations might be needed. Begin to recognize the limitations of tests.	***Plan different types of scientific enquiries to answer questions, including recognizing and controlling variables where necessary*** Select and plan the most appropriate type of scientific enquiry to use to answer scientific questions Recognize when and how to set up comparative and fair tests and explain which variables need to be controlled and why. State clearly which is the change variable and which is the measurement variable in a fair test. Systematically identify the effect of changing one variable at a time. Recognize that some variables may be more significant than others in investigations. Justify own choice of method as being appropriate to answer their investigative question. Use own results to identify when further tests and observations might be needed. Recognize the limitations of tests.

Appendix 2

Year 6 - South America					
Coverage	**Autumn**		**Spring**		**Summer**
Topic	**Living Things and their Habitats 7 weeks**	**Animals Including Humans 7 weeks**	**Electricity 7 weeks**	**Light – 7 weeks 5 weeks – Spring 2 6 weeks – Sum 1**	**Evolution and Inheritance**
Key Knowledge NC	• Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals. • Give reasons for classifying plants and animals.	• Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. • Recognise the impact of diet, exercise, drugs and lifestyle on the way the body functions • Knows and can describe the way in which nutrients and water are transported within animals, including humans	• 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 • Use recognised symbols when representing a simple circuit in a diagram	• Recognise that light appear 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 source to our eyes or from light source to objects then to our eyes • Use the idea that light travels in straight lines to explain why shadows have the same shape as the object that cast them	• 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.
Types of Enquiry	**Comparative/Fair Test –** How does the temperature affect how much gas is produced by yeast? **Identify and Classify –** How would you make a classification key for vertebras, invertebrates or micro-organisms? **Observation over time –** What happens to a piece of bread if you leave it on the windowsill for two weeks? **Research –** What do different types of micro-organism do? Are they always harmful?	**Comparative/Fair Test –** How does the length of time we exercise for affect our heart rate? **Identify and Classify –** Which organs of the body make up the circulatory system and where are they found? **Research –** How have our ideas about medicine and disease changed over time?	**Comparative/Fair Test –** Static properties of materials **Identify and Classify –** Conductors and Insulators **Research** - William Gilbert (Tudors) **Pattern Seeking and Relationship –** Electricity over time	**Comparative/Fair Test –** Which material is most reflective? **Observation over time –** How does my shadow change over the day? **Research –** How do our eyes adapt to different conditions?	**Comparative/Fair Test –** What is the most common eye colour in our class? **Identify and Classify –** Compare the skeletons of apes, humans, and Neanderthals – how are they similar and different? **Patter Seeking –** Is there a pattern between the size and shape of a bird's beak and the food it will eat? **Observation over time** - How has the skeleton of the horse changed over time?
Cross Curricular Links	**English:** Wanted poster – micro-organisms **History**:	**English Writing:** Non-chronological report on circulatory system, anti-smoking poster **Art**: Draw and label a heart **Maths**: Line Graph, bar chart - amount of sugar in drinks, pulse during exercise **PSHE:** Healthy Eating	**History:** Research William Gilbert, timeline card with electrical inventions **English Writing:** Report on importance of generating a light source in different situations **Reading: Comprehension –** Biography of M. Faraday and B. Franklin	**English Writing:** Explain how a periscope work **D.T:** Build periscopes **Art:** Draw and label an eye **Maths:** **Reading: Comprehension: History:** Light Through time, The Eye – Information Text	**English Writing**: Biography – Mary Anning, Charles Darwin **Art:** Sketch and make fossils using different materials **Reading: Comprehension: Information text** - Evolution, Diary of Darwin
Key Skills	• Independently, discuss reasons why living things are placed in one group and not another. • Suggest reasons for similarities and differences. • Understand that broad groupings, such as micro-organisms, plants and animals can be subdivided • Identify the positive aspects and limitations of some forms of classification. • Use and develop keys and other information records to identify, classify and describe living things and materials. • Create more complex forms of classification tools, e.g. databases, branching keys • Create and use a variety of sources to identify and classify living things, objects and phenomena • Use test results to make predictions to set up further comparative and fair tests • Report on findings from enquiries, including oral and written explanations, displays of results • Discuss how new discoveries change scientific understanding • Recognise which secondary sources will be most useful to research their ideas and begin to separate opinion from fact. • Use secondary sources, e.g. internet links to research objects, events and phenomena that cannot be experienced in the classroom,	• Use scientific language and illustrations to communicate and justify your ideas • Recording data and results of increasing complexity using scientific diagrams and labels, classification keys tables, scatter graphs and / or bar and line graphs • Research and present your findings • Identify scientific evidence that has been used to support or refute ideas or arguments • Plan different types of scientific enquiries to answer questions • Take measurements, using a range of scientific equipment, with increasing accuracy and precision • Make own decisions about what observations to make, what measurements to use and for how long to make them, and whether to repeat them • Choose the most appropriate equipment to make measurements and explain how to use it accurately • Begin to communicate findings in ways that are appropriate to different audiences. • Find out about how scientific ideas have changed and developed over time as new evidence is discovered • Recognize that some variables may be more significa than others in investigations. • Justify own choice of method as being appropriate to answer their investigative question. • Use own results to identify when further tests and observations might be needed.	• Use relevant scientific language to discuss their ideas. • Recording data and results of increasing complexity using scientific diagrams and labels, classification keys tables, scatter graphs and / or bar and line graphs • Begin to communicate findings in ways that are appropriate to different audiences. • With support, identify relevant evidence used to draw conclusions. • Identifying scientific evidence that has been used to support or refute ideas or arguments • Plan different types of scientific enquiries to answer questions, including recognizing and controlling variables where necessary • Communicate findings to an audience using relevant scientific language and illustrations. • Find out about how scientific ideas have changed and developed over time as new evidence is discovered •	• Answer own and others' questions based on observations made, measurements taken or information gained from secondary sources. • Taking measurements, recording data and identifying trends • Recognise that some measurements or observations may need to be repeated • Repeat observations or measurements appropriately. • Making and recording observations • Discuss how their scientific ideas change due to new evidence that they have gathered. • Systematically investigate the relationship between phenomena, e.g. light and shadows. • Look for different causal relationships in their data and identify evidence that refutes or supports their ideas • Analyse functions, relationships and interactions more systematically. • Evaluate, for example, the choice of method used, the control of variables, the precision and accuracy of measurements and the credibility of secondary sources used • Communicate findings to an audience using relevant scientific language and illustrations • Discuss how new discoveries change scientific understanding	• Identify scientific evidence that has been used to support or refute ideas or arguments • Ask pertinent questions. • Understand that some scientific questions cannot be answered by a particular investigation. • Communicate findings to an audience using relevant scientific language and illustrations • Recognise which secondary sources will be most useful to research their ideas and begin to separate opinion from fact. • Use secondary sources, e.g. internet links to research objects, events and phenomena that cannot be experienced in the classroom, e.g. planetary movements, animals from around the world. • Gather and record data to help in answering questions.

Appendix 3

KS1 End Point Assessment NC	Year 1 Africa					
• Has experienced and observed phenomena, having looked more closely at the natural and humanly constructed world around them. • Shows curiosity, asking questions about what they have noticed. • Has developed understanding of scientific ideas through the use of different types of scientific enquiry to answer own questions, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative tests and finding things out using secondary sources of information. • Is beginning 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.	***Autumn 1***	***Autumn 2***	***Spring 1***	***Spring 2***	***Summer 1***	***Summer2***
	My town. My school. My road.	United Kingdom	Toys	Paws, Claws and Whiskers	Kenya	Seaside Holidays
	Chemistry	Physics	Chemistry	Biology	Biology	Biology
	Everyday Materials	Seasonal Changes	Everyday Materials	Animals Including Humans	Animals Including Humans	Plants
	Seasonal Changes and Plants					
	Year 2 Australasia and Oceania					
	Fighting Fit!	Around the World	Fire, fire!	Land Ahoy!	Nightingale and Seacole	Go Wild!
	Biology	Biology	Chemistry	Chemistry	Biology	Biology
	Animals Including Humans	Animals Including Humans	Everyday Materials	Everyday Materials	Living things and their habitats	Living things and their habitats
	Plants					

Lower KS2 End Point Assessment NC	Year 3 Europe					
• Has broadened their scientific view of the world around them through exploring, talking about, testing and developing ideas about everyday phenomena and the relationships between living and non-living things and familiar environments • Asks their own questions about what they observe and is able to 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. • Draws simple conclusions and uses some scientific language, to both and write about what they have found out. Reads and spells scientific vocabulary correctly and with confidence, using their growing word and spelling knowledge.	***Autumn 1***	***Autumn 2***	***Spring 1***	***Spring 2***	***Summer 1***	***Summer2***
	Tribal Tales		Natural Disasters	Plants of the World	Espana	Gods and Mortals
	Biology	Physics	Chemistry	Biology	Physics	Physics
	Animals Including Humans	Forces and Magnets	Rocks	Plants	Light	Light
	Year 4 Asia					
	Egyptians	Electricity	Water World	Romans	India	The sound of music
	Biology	Physics	Chemistry	Biology	Biology	Physics
	Animals Including Humans	Electricity	State of matter	Living things and their habitats	Living things and their habitats	Sound

Upper KS2 End Point Assessment NC	Year 5 North America					
• Has developed a deeper understanding of a wide range of scientific ideas through exploring and talking about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically. • Has encountered more abstract ideas and is beginning to recognise how these help them to understand and predict how the world operates. • Is beginning to recognise that scientific ideas change over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative fair tests and finding things out using a wide range of secondary sources of information. • Is able to draw conclusions based on their data and observations, using evidence to justify their ideas and their scientific knowledge and understanding to explain their findings.	***Autumn 1***	***Autumn 2***	***Spring 1***	***Spring 2***	***Summer 1***	***Summer2***
	Anglo-Saxons and Vikings		Extreme Environments	The Ancient Maya	Natural Resources	Star Gazers
	Chemistry	Chemistry	Biology	Biology	Physics	Physics
	Properties and changes of materials	Properties and changes of materials	Living things and their habitats	Animals Including Humans	Forces	Earth and Space
	Year 6 South America					
	Life in Tudor Times	Heart Beaters	Brazil	Crime and Punishment	Global Trade	Evolution and Inheritance
	Biology	Biology	Physics	Physics	Physics	Biology
	Living things and their habitats	Animals Including Humans	Electricity	Light	Light	Evolution and Inheritance