Science Subject Policy

At Werneth Primary School, we believe in developing the whole child; equipping them with the knowledge, skills and conceptual understanding to succeed in education and in later life.

We believe that all children have an entitlement to a rich, broad curriculum that is well matched to their needs, regardless of any barriers to learning experienced by our children. At Werneth Primary School, we believe that everyone can achieve their potential and our curriculum has been designed to ensure that all of our pupils are given the opportunities to succeed regardless of their starting point or background.

Intent

We endeavour to provide a curriculum which:

- Develop children's understanding of scientific concepts.
- Motivates children to ask their own scientific questions and gives them the tools to conduct their own scientific investigations to find answers.
- Centres around scientific enquiry and provides awe and wonder.
- Prepares children for an increasingly scientific world.
- Develop concern and active care for our environment.
- embed previous learning and deepen understanding.
- encourage children to think both scientifically and creatively to solve problems.

Our approach to teaching Science

Science is taught through a school-designed curriculum, which is supplemented by resources and units from the White Rose Science scheme of work. This is to ensure complete coverage of the Science National Curriculum aims and objectives. Working scientifically is taught discretely through scientific enquiries closely linked to the topics children are studying, which supports them to achieve the attainment targets, as set out in the National Curriculum.

Purpose of study (from National Curriculum)

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.

Aims and Objectives

At Werneth Primary School, our Science curriculum aims to provide all children with:

- **scientific knowledge, skills and conceptual understanding through the specific disciplines of biology, chemistry and physics,**
- **a developed 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,**
- Full entitlement to the aims, objectives and programmes of study National Curriculum for KS1 and KS2,
- A sense of curiosity and interest in the world around them,

- Practical, hands-on, real life experiences that develop children's knowledge, skills and conceptual understanding,
- An interest in STEM subjects and are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future,

Attainment Targets (from National Curriculum)
Please see appendix 2 for the KS1, LKS2 and UKS2 attainment targets.

Planning

Long Term Planning
Long term planning shows a clear progression of key knowledge, skills and/or conceptual understanding that outlines what our pupils will learn in each year group. Progressive knowledge, skills and conceptual understanding provides our children with the building blocks to equip them for the next stage of their education.
(Please see appendix 1 for the LTP)
Prior to teaching a unit, teachers should familiarise themselves with the key knowledge, skills and conceptual understanding that the pupils will be assessed against. This will ensure that learning is sharply focussed on the key learning.

Medium term planning (Appendix 2)
Teachers implement the school's medium-term planning, which provides a clear overview of each unit and outlines specific learning objectives aligned with the National Curriculum. For every unit, the medium-term plan identifies how pupils will develop their working-scientifically skills and details the scientific investigations they will undertake.

Short term planning
Teachers should adapt lessons to suit the needs of their children, using the following guidance:

- Use the medium-term plans, White Rose materials, school-designed resources and previous assessment data to anticipate and address misconceptions.
- All teachers complete planning by adapting the STP document or by creating PowerPoint teaching slides in advance of the lesson being taught. This is to enable teachers to make clear links between previously taught knowledge, skills and conceptual understanding, which will support children to develop strong Scientific schema.
- Where appropriate teachers can separate lesson plans to cover more than one session. For example, 'Lesson 1' may be split into two lessons taught over two different weeks.
- Teachers must ensure that the objectives, as stated in the National Curriculum programme of study, are planned, taught and assessed.
- Children must have an experience of at least one type of science enquiry within each unit of work in order to help them to answer scientific questions about the world around them. Types of inquiry are: For example, comparative and fair testing, observing over time, identifying, classifying and grouping, research using secondary sources or pattern seeking.
- Learning Intentions should be clear and in 'child-speak'. Success criteria need to be clear in order for children to achieve the Learning Intention. It gives teachers the evidence needed to assess whether the children have successfully achieved the planned LI.
- Appropriate adaptations should be made to all lessons to ensure that all groups of children can access the learning objectives. This may include adapted activities, worksheets, success criteria, resources, vocabulary prompts, sentence scaffolds, writing or speaking frames and/or varying levels of adult support. This will also include making adaptations to the school-designed investigation templates by providing children with speaking frames and writing scaffolds using the 'Tower Hamlets' language structures.

- Staff should review learning through ongoing assessment and through triangulated information- talking to children, observing learning and/or evidence in books- and use this information to adapt sequences of lessons.
- Staff should review taught material, so that children are able to make progress (knowing more and remembering more).

Implementation

Overcoming Barriers

At Werneth Primary School, we acknowledge and understand that challenging socio-economic circumstances can create additional barriers to learning for pupils. We also know that multiple factors of deprivation, including language deprivation, can create further barriers for pupils to overcome.
However, we are clear that the impact of these barriers to learning can be reduced through high quality classroom teaching and additional support, where necessary.
e.g. In science, we acknowledge that children may face the barriers to learning outlined in the table below:

Identified Barriers	Strategies to mitigate the impact
Pupils' limited vocabulary upon entry to school	Each science unit contains topic specific vocabulary which will be taught and revisited throughout the unit.
Pupils' varying scientific experiences and limited knowledge of the various strands of scientific enquiry	The curriculum has been reviewed and science is now taught discreetly within each year group. The strands of scientific enquiry have been mapped throughout the curriculum to ensure they are taught and revisited throughout.

Teaching Sequence

In the main, lessons should be planned around the following structure using the Rosenshine's learning principles.

Teaching strategy (linked to Roshenshine's Principles of Instruction)	What this may look like within teaching
A review of previous learning	Each session should start with a review of previous learning. At the start of a unit, this will be a review of learning in the previous terms or, more likely, in previous year groups. e.g. At the beginning of the Year 6 'living things and their habitats' unit, staff should revisit the objectives from the related Year 4 unit (classification) as a starting point to build upon. Each subsequent session should then start with a review of learning from the previous session.
Present new material using small steps	Concepts and procedure will be broken down into small steps, including thorough modelling and scaffolding. For example, short term planning should identify the success criteria which will be shared with pupils. Success Criteria will be in child speak and break down the Learning Intention.
Ask questions	Staff should ensure that they ask questions to assess pupils' knowledge throughout the session to identify where pupils may need further guidance and/or support.
Provide models	Staff should ensure that they clearly model the intended outcome of the session for pupils,

	e.g. if the pupils are completing an experiment, the preparation of equipment and process should be modelled for pupils first. e.g. when pupils are creating a key to classify animals, this process should be modelled first. Throughout the teaching sequence, staff should model the correct use of scientific language and vocabulary.
Guide student practice	Staff should use the 'I do, we do, you do' principle within lessons. To minimise the chance of forming misconceptions/errors staff should guide student practice through modelling, correcting or affirming feedback and aspects of re-teaching where there are misconceptions and/ or gaps.
Obtain a high success rate	Through modelling, scaffolding, questioning and/ or small steps explanations, staff should aim to obtain a high success rate so that what children are doing reinforces error-free, secure learning that improves scientific knowledge and skill.
Provide scaffolds for difficult tasks	The expectation will be for all pupils to access the same learning intention. Scaffolds and supporting resources should be used to enable all pupils to access the learning. e.g. writing frames, vocabulary support for key resources and scientific language (Communication in Print).
Independent practice	Activities should be modelled and pupils then provided with the opportunity to complete this independently with further support as necessary. This is based on the principle of I do it; we do it; you do it. For example, modelling how to record findings, writing a prediction.
Weekly and monthly review	Staff should use plenaries to review the learning that has taken place. Staff may also use an end of unit quiz to inform their end of unit of assessment.

<u>Differentiation Expectations</u>

Teachers will aim to include all pupils fully in their weekly science lessons. Teachers will differentiate to meet the needs of all pupils and use Teaching Assistants to support pupils where appropriate. However, a pupil whose difficulties are severe or complex may need more individualised learning intentions.

Differentiation should be through the degree of support provided to enable all learners to access the lessons. To this end, it is expected that scaffolded support prompts including Communication in Print, word banks, writing frames and speaking frames will be provided for those who need them. This is not to be confused with lowering expectations; more that teaching strategies should support children to develop a secure understanding.

<u>Provision for SEND Learners</u>

Pupils whose difficulties are severe or complex may need more individualised learning intentions. Staff should obtain these Learning Intentions using previous year group objectives. For example, when teaching classification in Year 6, Learning Intentions can be obtained from the Classification unit taught in Year 4.

Further support is provided through prompts including Communication in Print, word banks, writing frames and speaking frames. SEND support plans should be used when planning for children with an EHCP.

<u>Provision for INA/pupils with limited English language</u>

Provisions for INA pupils or pupils with limited English language are supported with Communication in Print, word banks, writing frames and speaking frames. For example, new scientific vocabulary used in each lesson to be

provided using Communication in Print. Pupils whose difficulties are severe or complex may need more individualised learning intentions. Staff should obtain these Learning Intentions using previous year group objectives. For example, when teaching classification in Year 6, Learning Intentions can be obtained from the Classification unit taught in Year 4.

Provision for higher attaining pupils

More-able pupils will be taught within their own class and stretched through work and extra challenges which enrich their learning. When working with the whole class, teachers will direct deeper learning questions towards the more-able and adapt their tasks when relevant.

Recording of Work

Pupils will each have a science book which they will record their work in each session. Graphs should be drawn on the appropriate graph paper and stuck into books.

Presentation expectations Consultation re drawing of tables, axis on graphs

- All work should have the date and Learning Intention recorded in science books
- Graphs and tables to be recorded in pencil
- Rulers to be used to draw lines
- Children to neatly cross out mistakes (do not use rubbers).
- Children to be given tables to record data
- Graphs to be recorded using graph paper
- Investigations to be recorded using the school-designed investigation templates

Feedback and Marking

All work within science lessons should be marked.

When marking work in science, staff should **pick up on English errors if appropriate**, but remember that the focus should be on the learning intention of the lesson. For example, if a child is spelling common words incorrectly and this is a target of theirs, the teacher may choose to circle this for the child to correct, thus reinforcing the feedback given in English lessons.

Assessment

When used effectively, assessment helps pupils to embed knowledge and use it fluently, and assists teachers in producing clear next steps for pupils. At Werneth Primary School, our long-term planning sets out clear end points for individual units of work, for the year group and cumulatively for the key stage. These end points reflect the attainment targets set out in the National Curriculum.

Formative Assessment

Formative assessment strategies are intended to support teachers to identify the knowledge, skills and conceptual understanding which has been secured and to identify misconceptions and less secure knowledge skills and conceptual understanding. Teachers will use this information to adapt and plan sequences of lessons that are well matched to the pupils' needs.

Summative Assessment

At the end of each unit, teachers will assess whether or not the child has met, not met or exceeded each objective on Insight. This must be done at the end of the unit to ensure that the assessments are accurate (based on what the teacher has seen during the unit). At the end of each unit, all teachers will assess all children against the statutory requirement in science for the relevant year group. When a unit is taught over an entire term, only one assessment will be required. For example, Year 6 'Animals including humans' is taught over Autumn 1 and Autumn 2. Only one assessment will need to take place at the end of the unit at the end of Autumn 2.

Assessments will involve the teachers, using evidence from a variety of sources (e.g. evidence in books) to assess the children. At the end of the academic year, a summative assessment will be submitted on Insight, using the objective-by-objective information for each child to show whether they are below, working within, secure or above expected in science within their year group.

Moderation of teacher assessment will be completed by the Science Computing Lead) and/or members of the SLT (details can be found on the monitoring schedule/school calendar) using a range of sources of information, including pupil voice interviews, evidence in books and/or previous assessment data.

Summative assessment

In making summative assessments, teachers will be informed by:
-learning evidenced in pupils' workbooks/learning journeys
-observations and/or learning shown on whiteboards
-verbal explanations/conversations that demonstrate pupils' understanding
-standardised test data, where appropriate

Impact

In order to measure the impact of teaching and learning in Science, subject leaders and/or senior leaders will triangulate evidence from a range of sources. Subject leaders will place greater or lesser emphasis on particular monitoring activities, in line with the above statement about recording pupils' work.

- Books and/or learning journeys,
- Assessment information and/or summative assessment data,
- Lesson observations and/or learning walks,
- Pupil voice,

Environment and Resources

Each class has a science board linking to the current unit being taught. Displays should be used as working walls which provide children with a learning journey and the resources which they need to succeed.
We have a wide range of scientific resources which are audited regularly. Resources encourage practical lessons where children can carry out their own investigations.

EYFS- Planning, Teaching and Assessment

In Early Years science is taught using Development Matters. Understanding the World covers three areas: People and Communities, The World and Technology. This provides the scientific curriculum in Early Years.
Teachers encourage scientific thinking through their open ended questioning. Children are encouraged to ask their own questions and are provided with opportunities where they can test their hypothesis. Evidence is recorded though key worker observations and assessed using Development Matters, this information is passed up to year one in their tracker booklets.

STEM (Appendix 4)

As part of our science and design & technology curriculum, children will learn about at least four STEM individuals each year. These individuals have been chosen to represent a diverse range of backgrounds, disciplines, and achievements. A minimum of one individual each year will have a specific design & technology background, ensuring pupils gain insight into real-world designers, engineers, technologists, inventors, and makers who inspire the subject.

This approach aims to:

- Promote awareness of STEM careers and pathways
- Celebrate diversity and representation within STEM fields
- Inspire pupils through real-life examples connected to science and design & technology
- Strengthen links between curriculum content and practical, real-life applications

Appendix1 – See website for the most up to date curriculum sequence and synopsis

Appendix 2 – Example of school-designed medium term plan

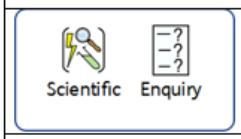
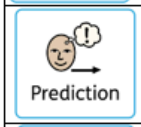
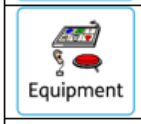
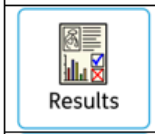
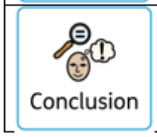
Year 6 Spring 2 – Electricity	
NC Objectives • Associate the brightness of a lamp or the volume of a buzzer with the number of voltage of cells used in the circuit. • Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches. • Use recognised symbols when representing a simple circuit in a diagram.	**Working Scientifically Objectives** • planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary • recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs • using test results to make predictions to set up further comparative and fair tests
Spring 1	
Lesson Objective	**Lesson Overview**
Lesson 1: To draw series circuits using symbols.	In Year 4, children explored the basic concepts of electricity. They made and drew pictorial representations of circuits and components. In this lesson, children build on their understanding of circuits to construct and draw series circuits using circuit symbols. It is essential that children draw circuits accurately. They should use a pencil and ruler, and draw the wires of the circuit as straight lines. In this step, children are introduced to the terms "current" and "voltage". They should understand that current is the flow of electricity and voltage causes the current to flow.
Lesson 2: To understand the differences between complete and incomplete circuits.	Children build on their knowledge from the previous lesson to understand the differences between complete and incomplete circuits. They learn how to look for reasons why a circuit is incomplete (e.g. an open switch, faulty wire or a break in the circuit). Children should talk about and name the difference components in a circuit and explain their reasoning for why a circuit is complete or incomplete. In this lesson, children work practically to create the circuits on the sheet, deciding if they are complete or incomplete and then draw diagrams of each one, using the correct circuit symbols.
Lesson 3: To understand variations within circuits.	In this lesson, children learn the effects of having fewer or more components within a circuit (E.g. 1 battery, 1 bulb vs. 1 battery, 2 bulbs etc.) and they will use this as an opportunity to construct a range of series circuits with a varying amount of components. Children should work methodically to observe any

	changes or differences when adding one component at a time to a circuit. They should record their findings and observations in a table and be able to discuss these at the end of the lesson.
Lesson 4: To plan an investigation. **Enquiry question: Does the voltage in a circuit affect the brightness of a bulb and the loudness of a buzzer?**	Children plan their investigation by considering the independent, dependent and control variables. They need to decide how they will make the investigation and fair test and ensure that the results are reliable. They should make a prediction based on scientific knowledge and evidence from the previous lessons where they observed what happened in a circuit where more than one component shares the same amount of voltage. Children will draw a labelled diagram of how they will set up the investigation. *Children should record their learning on the UKS2 working scientifically proforma.*
Lesson 5: To carry out an investigation. **Enquiry question: Does the voltage in a circuit affect the brightness of a bulb and the loudness of a buzzer?**	Children should follow their investigation plan and method from the previous lesson to set up and carry out their voltage investigation. Children should observe how the number of batteries in a circuit effects the brightness of a bulb and the loudness of a buzzer. Children should record their results in a table as they work through the investigation and carry out 2 attempts of the enquiry to ensure that their results are reliable. *Children should record their learning on the UKS2 working scientifically proforma.*
Lesson 5: To evaluate an investigation. **Enquiry question: Does the voltage in a circuit affect the brightness of a bulb and the loudness of a buzzer?**	Children use their results from the previous lesson to draw conclusions and answer the enquiry question. Children will evaluate their investigation by considering the strengths and how they were able to keep it a fair test and record reliable results. Children will begin to think about using their results to think of a new enquiry question and plan an investigation to show what could be done differently and how they could use their results to make new predictions.

Appendix 3 – Investigation templates

KS1

KS1 working scientifically investigation example

Plan	
	
	What do we want to find out? What is our enquiry question?
	What do you predict will happen? Why do you think this? What scientific knowledge can you use in your prediction?
	What equipment will be needed to carry out the investigation?
Do	
	How will you carry out the investigation? What steps do you need to follow?
Record and Review	
	What have you found out? Record results/observations.
	What do our results tell us? Can we answer our enquiry question?

LKS2

LKS2 working scientifically investigation example

Plan	
Scientific Enquiry	Comparative/ fair testing
Aim	What do we want to find out? What is our enquiry question?
Prediction	What do you predict will happen? Why do you think this? What scientific knowledge can you use in your prediction?
Equipment	What equipment will be needed to carry out the investigation?
Variables	How will we keep it a fair test? What will we change? What will we keep the same?
Do	
Method	How will you carry out the investigation? What steps do you need to follow?
Record	
Results	What have you found out? Record results/observations (using drawings, labelled diagrams, keys, bar charts or tables).

Review	
Conclusion	What do our results tell us? Can we answer our enquiry question? Do our results raise any further questions? Children should be given opportunity to report results from enquiries, including oral and written explanations, displays or presentations of results and conclusions.
Evaluation	What were the strengths and weaknesses of the investigation? Try to suggest improvements. What enquiry question could you investigate next? Can children use results to make further predictions? If you changed _____ can you predict what would happen?

UKS2

UKS2 working scientifically investigation example

Plan	
Scientific Enquiry	Comparative/ fair testing
Aim	What do we want to find out? What is our enquiry question?
Prediction	What do you predict will happen? Why do you think this? What scientific knowledge can you use in your prediction? Use language of hypothesis.
Equipment	What equipment will be needed to carry out the investigation?
Variables	How will we keep it a fair test? Independent Variables – What are you changing? Dependent Variable – What are you measuring? Control Variable – What is staying the same?
Do	
Method	How will you carry out the investigation? What steps do you need to follow? Are you going to repeat the investigation to ensure reliable results?

UKS2 working scientifically investigation example

Record	
Results	What have you found out? Record results/observations (using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs).
Review	
Conclusion	What do our results tell us? Can we answer our enquiry question? Do our results raise any further questions? Children should be given opportunity to report results from enquiries, including oral and written explanations, displays or presentations of results and conclusions.
Evaluation	What were the strengths and weaknesses of the investigation? Can we trust our results?
Improvements	Try to suggest improvements. What enquiry question could you investigate next? Can children use results to make predictions to set up further comparative and fair tests? If you changed _____ can you predict what would happen?

Appendix 4 – People in STEM overview

People in STEM overview

Subject	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Nursery						
DT				**Traditional Tales** – Sheila Sri Prakash – Famous for designing low cost houses		
Science						**Animals** Steve Irwin - zoologist
Reception						
DT		**Celebrations** Ainsley Harriott – Chef.				
Science			**Under the Sea** Sylvia Earle - Marine biologist and Oceanographer.		**Growth** Emma Williams – Botanist.	
Year 1						
DT	**Toys from the past** Arvind Gupta – Indian toy inventor and scientist					
Science		**Seasonal Changes** Charles Macintosh – invented waterproof clothing. Link back to learning on materials.		**Animals Including Humans** Tanesha Allen – Zoologist.		
Year 2						
DT		**Building a space buggy** Katherine Johnson – Mathematician who worked for NASA.		**Making a Kenyan Snake- Textiles.** Cath Kidston- Fashion designer and author.		
Science		**Materials** Dr. Pearl Agyakwa – Materials scientist who studies why some materials wear out and other don't) https://www.youtube.com/watch?v=sfqcHBHn7oY				**Habitats** Prem Singh Gill - Polar Scientist who studies where Antarctic seals live, breed and feed, so we can know more about where they prefer to live.
Year 3						
DT		**Christmas Pastries** Nadiya Hussain – Food scientist. Won Great British Bake Off.				
Science		**Rocks and soils** Anjana Khatwa – Geologist who studies rocks and fossils and she is an award-winning Earth Scientist.		**Animals including humans** Marie Curie - Physicist who invented the first mobile x-ray machine to treat soldiers wounded on the battlefield in WWI.		
Year 4						
DT				**Building a pyramid** STEM Event – The building of the pyramids. Ancient Egyptians. Discuss how they were built (mathematics and technology) and why		

				they are an important form of architecture.		
Science				**Living things and their habitats** Kelsey Archer Barnhill - Deep Sea Ecologist who sends robots to the seafloor to collect samples of different animals to study.		**Electricity** Thomas Edison – The inventor of the lightbulb and power grid.
Year 5						
DT				**Building part of the Globe Theatre** Zaha Hadid - Iraqi-British architect.		
Science		**Forces** Isaac Newton – Mathematician & Physicist who developed theories about gravity. Brian Cox – Physicist from Oldham.				**Earth and Space** Mae Jemison – Astronaut and first black woman in space. Margaret Hamilton – Computer Scientist who was responsible for the software that allowed Neil Armstrong and Buzz Aldrin to land on the moon.
Year 6						
DT					**Torches**	

					Caroline Haslett – Electrical engineer.	
Science			**Light** Ibn al-Haytham (Alhazen) – Physicist and Mathematician who developed a theory that light travels in a straight line, and proved it by carrying out the first scientific experiment.	**Electricity** Lizzie Driscoll – A battery research scientist. Her research looks at making new battery materials for Li-ion batteries, which are found in smart phones and tablets.		**Evolution and inheritance** Charles Darwin – Natural Historian who developed the theory of evolution by natural selection.

Appendix 5 - **Review of learning gaps in Science (including potential gaps caused by inward mobility) and recovery plan**

Missed EYFS- new to Year 1- Few areas that are not revisited in Year 1.

The language of 'Everyday Materials' (hard/soft, weak/strong, dull/shiny etc) may have been missed in Reception. This needs to reviewed and reinforced through the Everyday materials unit (Year 1, Autumn 1) and through Design and Technology unit *Making toys from the past* (Year 1, Autumn 1) and *Make something with a wheel* unit (Year 1, Summer 2).

Missed EYFS and Year 1- new to Year 2

- When revisiting Plants, there is a need to review and reinforce the learning missed in EYFS and Year 1 on plants and seasonal change. When teaching Plants (Year 2, Summer 1), teachers need to review and reinforce the impact of seasonal change on plants (Objective: *That plants change through the seasons with some plants dying and others becoming dormant)*
- When revisiting *Animals, including humans* (Year 2 Spring 1/Spring 2), there is a need to review and reinforce the missed learning and vocabulary taught in Year 1 on animal classification. Teaching should look at the similarities and differences between *birds, fish, amphibians, reptiles, mammals and invertebrates*.
- When teaching *Habitats* (Year 2 Summer 2), there is a need to review and reinforce the missed learning and vocabulary taught in Year 1 on animal classification. Teaching should do this when teaching the objective *Different habitats contain different animals and plants that are suited to their habitats in different ways*

Missed EYFS and Key Stage 1- new to Year 3

- When observing the animal habitat as part of the longitudinal study (this needs to involve a tree or plants), children should also observe seasonal changes to teach that *That plants change through the seasons with some plants dying and others becoming dormant* (missed Year 2 objective).
    - During this longitudinal study teachers need to review and reinforce Year 2 key concepts relating to Habitats: *Different local conditions in nature are called habitats. Different habitats contain different animals and plants that are suited to their habitats in different ways. Plants make their own food. Some animals eat plants and some eat other animals.*
- At the start of the Plants unit (Year 3, Spring 1), teachers will revisit the key concepts from Year 1 and Year 2:
    - Year 1
        - That plants grow from seeds and bulbs
        - That all flowering plants share a basic structure consisting of roots, stem, leaves and flowers.
        - That all trees also have a basic structure consisting of roots, trunk, branches and leaves
    - Year 2
        - That plants need water, warmth and light to grow
        - That the roots of a plant grow first followed by a shoot and then leaves
        - That plants change through the seasons with some plants dying and others becoming dormant
- Both *Rocks and Soils* and *Light* have cross-curricular writing in the Year 3 long term plan.
    - Summer 1 Writing genre- *What causes a shadow?* Explanation text will reinforce key concepts taught in *Light* (Autumn 1). *Only light sources produce light; other bright objects reflect light. Different materials allow different amounts of light through them. Light travels in straight lines. Light cannot travel through all materials and opaque materials block light, causing shadows.*
    - Summer 2 Writing genre- Non-chronological report on Rocks and Soils. Writing will reinforce key concepts taught in *Rocks and Soils* (Year 3, Autumn 2). *That different rocks have different properties. That rocks can be classified as igneous, sedimentary or metamorphic and this classification depends on the method of their formation. That soil is composed of rock particles and organic matter. That fossils are*

imprints of living things from millions of years ago. That we can learn about prehistoric animals from fossils.

- At the start of the *Animals and skeletons* unit (Year 3 Spring 2/Summer 1), teachers should review and reinforce the Year 1 key concept (*Animals look different, live in different places and eat different things*) and the Year 2 key concept (*A good diet, hygiene and exercise are important for maintaining good health*)

Missed EYFS and Key Stage 1- new to Year 4

At the start of unit Living things and their habitats (Yr 4 A1)

- teachers need to review and reinforce missed learning and vocabulary taught in Year 1 (Spring1 and Spring 2) on animal classification. Teaching should look at the similarities and differences between *birds, fish, amphibians, reptiles, mammals and invertebrates*.
- Year 2 key concepts relating to Habitats(Su2): *Different local conditions in nature are called habitats. Different habitats contain different animals and plants that are suited to their habitats in different ways. Plants make their own food. Some animals eat plants and some eat other animals.*

At the start of unit Animals including humans (Yr 4 Autumn 1)

- Year 3 key concepts relating to Animals and skeleton *That what an animal (including a human) eats should be matched to the needs of that animal*
- *That food of the wrong type or too much food makes animals (including humans) unhealthy*
- *That skeletons provide support and protection for the body*
- *That there are two basic types of skeleton – internal skeletons and external skeletons*

Respecting the Environment have cross-curricular writing in the Year 4 long term plan. Writing will reinforce key concepts taught in Respecting the Environment. (Year 4 Su 1) That humans have an impact on the environment, this can sometimes be positive or negative for the flora and fauna in the area, there are moral aspects to the way that we treat our environment, environments can change and that this can sometimes pose dangers to living things.

Missed EYFS and Key Stage 1- new to Year 5

At the start of unit Living things and their habitats (Yr 5 A1) teachers to review and reinforce Year 4 Key concepts from Living things and their habitats (Yr 4 Spring 2).

That the wide variety of living organisms can be sorted into classes that have certain characteristics in common

- That there is a hierarchy for sorting organisms

At the start of unit Forces (Yr 5 A2) teachers to review and reinforce Year 3 Key concepts from Forces and magnets (Y3 Su2)

- A force is a push, a pull or a twist that can change the speed, direction or shape of an object
- Forces are measured using force meters and the unit of measurement is the Newton
- The force between two moving surfaces in contact is called friction and that that friction can be useful
- Magnets attract iron and steel to them
- Magnetism is a force like gravity and that it can operate at a distance.
- Like magnetic poles repel and unlike poles attract

At the start of unit Animals including humans (Yr 5 Sp1) teachers to review and reinforce Year 2 Key concept from Animals including Humans (Y2 Spring 1 and Spring 2)

- Animals grow from juveniles into mature adults.
- Mammals give birth to live young but other animals lay eggs.
- Many immature animals including humans need care in order to mature but others grow up independent of their parents.
- A good diet, hygiene and exercise are important for maintaining good health.

At the start of unit Properties and changes of material (Yr 5 Sp2 and Summer 1) teachers to review and reinforce Year 4 Key concept from States of matter (Y4 Au2)

- Materials can be classified as belonging to one of three states of matter: solid, liquid or gas
- Each state of matter has specific properties
- Many materials can change state between solid, liquid and gas

❖ Teachers to review and reinforce Year 3 Key concept from Forces and Magnets (Y4 Au2)

- Magnets attract iron and steel to them
- Magnetism is a force like gravity and that it can operate at a distance.
- Like magnetic poles repel and unlike poles attract

During Spring 1 Year 5 have cross-curricular writing in the long term plan. Writing will reinforce key concepts taught in Digestion (Year 4, Autumn 1). That animals including humans need to digest (break down) food into chemicals that can be used by the body, this process is carried out by the digestive system, plants make their food using sunlight as an energy source, and all other food is dependent on this

Missed EYFS and Key Stage 1- new to Year 6

At the start of unit Light (Yr 6 Sp1) teachers to review and reinforce Year 3 Key concepts from Light (Yr 3 Autumn 1).

- Only light sources produce light; other bright objects reflect light.
- Different materials allow different amounts of light through them.
- Light travels in straight lines.
- Light cannot travel through all materials and opaque materials block light, causing shadows.

At the start of unit Electricity (Yr6 Sp2) teachers to review and reinforce Year 4 Electricity (Yr 4 Su2)

- That some materials allow electricity to flow through them and others do not.
- That a complete, unbroken circuit is needed for electricity to flow.
- That the different components of a circuit have different and specific functions.

At the start of unit Living things and their habitats (Yr 6 Su1) to review and reinforce Year 4 Living things and their habitats (Yr4 Su1)

- That the wide variety of living organisms can be sorted into classes that have certain characteristics in common
- That there is a hierarchy for sorting organisms

Year 6 to have cross-curricular writing in the long-term plan.

- Writing will reinforce key concepts taught in Animals, including humans from Y6 Autumn1 to reinforce children's understanding of the circulatory system (including the heart and how blood and nutrients are transported around the body).
- Writing will reinforce key concepts taught in Light (Y3 Aut 1 and Y6 Spring 1) where children write an explanation text about how we see.