



## **Science Policy 2025 2026**

Date adopted:

Signed by Chair of Governors:

Signed by Headteacher:

Date of review:

## **Intent**

Science, as a core subject, is taught weekly using the structure of CUSP with some adaptations. Like CUSP, we place knowledge, vocabulary, working and thinking scientifically at the heart of our principles, structure and practice. The weekly lessons allow for the ongoing revision needed to move the knowledge into long-term memory. The curriculum is carefully designed to allow for revisiting topics and key concepts. Scientific thinking, knowledge and vocabulary are taught from nursery onwards with a view to building content and understanding from year to year.

### **Aims:**

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

- develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics
- develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them
- are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future

Throughout the curriculum, one main aim is to maintain the curiosity that children naturally have in the early years. Added into the curriculum are opportunities for further scientific methodology with key STEM challenges related to the topics taught.

Our Science curriculum is well sequenced and rich in vocabulary and knowledge, ensuring children gain a deep understanding of scientific methods, events and figures, as well as embedding key vocabulary and terminology (Tier 3 vocabulary). In addition, children are encouraged to develop their curiosity and understanding of the world as a whole. At Percy Main we use a variety of teaching and learning styles in Science lessons. The principal aim is to develop the children's knowledge, skills and understanding in Science.

## **Long Term Plan for Science**

### **Early Years:**

In Early Years, children are encouraged to become scientists. Children's understanding of the world is developed by being encouraged to explore, investigate and manipulate objects. Children regularly take their Science learning outside. With specific focuses, children are able to make sense of the world and community around them. Early years is all about exploring and investigating the world, and Science combines these two key elements. It also connects all other areas of learning, for example language, describing what's happening in an experiment and learning new vocabulary. Science in Nursery and Reception is about raising questions and

seeking answers. In Nursery, the outdoor environment is ideal for setting up imaginative and exciting learning opportunities.

Children will:

- Show curiosity and interest in physical objects
- Talk about and describe what they see
- Show an awareness of change
- Ask appropriate questions
- Explain their understanding and share their own knowledge
- Investigate objects using all 5 senses
- Observe changes in the environment carefully
- Experiment with nature.

See Appendix 1 for EYFS long term plans

	Autumn	Spring	Summer
Year 1	Seasonal changes and daily weather Introduce Plants – (trees) Animals, including humans	Everyday materials Revisit 1: Animals, including humans	Plants Revisit 2: Plants, Animals including humans (or alternative focus for insecure knowledge)
Year 2	Living things and their habitats  Animals, including humans	Uses of everyday materials  Revisit Living things and their habitats / materials	Plants  Revisit Living things and their habitats / Animals, including humans
Year 3	Rocks Animals, including humans Revisit Rocks	Forces and magnets Plants	Plants continued... Light
Year 4	Living things and their habitats States of matter	Animals, including humans	Electricity Sound

Year 5	Properties and changes of materials Animals, including humans	Forces (Gravity and Galileo) Earth in space	Living things and their habitats Forces continued
Year 6	Electricity Animals including humans (circulatory system)	Animals including humans (water transport) Light	Living things and their habitats Evolution and inheritance

### Scientific Thinking:

As the children progress through Key Stage 1 and Key Stage 2, lessons will include opportunities for the children to develop a range of enquiry skills:

- identifying and classifying
- fair test, observing over time
- pattern seeking and research.

These enquiry skills underpin our Science teaching across the school. Children are able to recognise and name these skills.

### Addressing Misconceptions

At Percy Main, common scientific misconceptions, identified in all CUSP Science learning modules, are made explicit to pupils. Children draw upon substantive and disciplinary knowledge to reason and practise acquiring the conception, whilst repelling the misconceptions. Examples and non-examples are powerful ways of saying what something is and what something isn't.

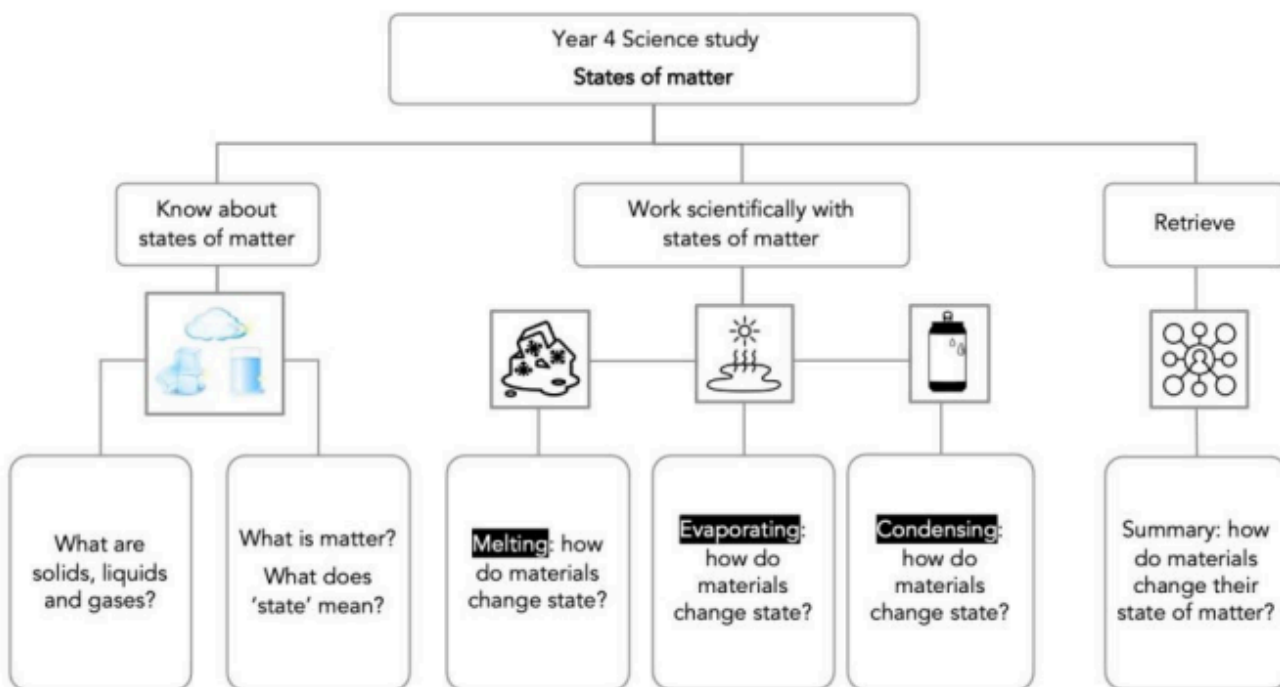
### Implementation

#### Modular Approach – Knowledge

At Percy Main Primary School, Science is taught across each year group in modules that enable pupils to study in depth scientific concepts, skills and vocabulary. Each module aims to activate and build upon prior learning, including EYFS, to ensure better cognition and retention. Each module is carefully sequenced to enable pupils to purposefully layer learning from previous sessions, to facilitate the acquisition and retention of key scientific knowledge. Our teaching develops pupils' 'fingertip knowledge' of topics in order to support scientific analysis and interpretation. Each module is revisited either later in the year or in the following year as part of a spaced retrieval practice method to ensure pupils retain key knowledge and information.

## The Big Ideas

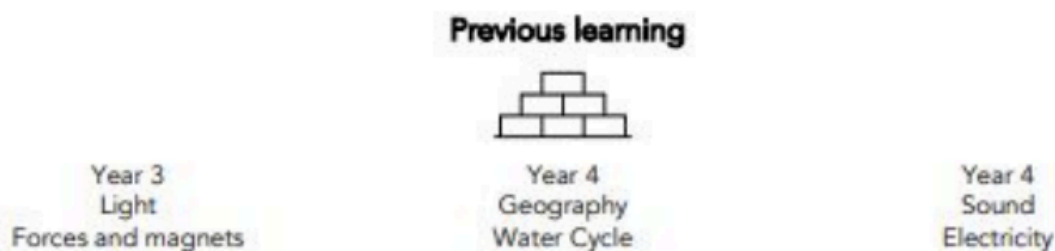
At Percy Main, we put an emphasis on sharing the big ideas with the children at the beginning of every module.



National Curriculum objectives and how these links to prior learning are evident at the beginning of every module.

Pupils should be taught to:

- compare and group materials together, according to whether they are solids, liquids or gases
- observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C)
- identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature



Thinking Scientifically: Children are set tasks throughout the module in order to develop their scientific thinking.

Ask relevant questions	Set up simple, practical enquiries and comparative and fair tests	Make accurate measurements using standard units, using a range of equipment, e.g. thermometers and data loggers	Gather, record, classify and present data in a variety of ways to help in answering questions	Record findings using simple scientific language, drawings, labelled diagrams, bar charts and tables	Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions	Use results to draw simple conclusions and suggest improvements, new questions and predictions for setting up further tests	Identify differences, similarities or changes related to simple, scientific ideas and processes

## Quizzing

As part of each lesson, pupils are given the opportunity to revisit prior learning and retrieve their knowledge through the use of quiz questions. The start of each lesson children will revisit the last lesson through a quiz

or an activity checking on the retainment of the previous week's learning. At the end of the lesson the children will answer 2 to 5 more questions based on that lesson.

### **Minimum lesson expectations**

Science lessons will broadly follow the six phases outlined in the CUSP document – 'How can I use CUSP resources to sequence teaching and learning in a lesson?'

All Science lessons will incorporate the following elements:

- 'The Big Idea' and clear instruction on where the lesson fits in the unit
- Short activity to revisit previous learning
- Vocabulary – tier 2 and 3 vocabulary, including dual coding
- Explain; Attempt; Apply and Challenge
- Children will be given opportunities to think as scientists
- Ending on a short quiz on what has been learnt



### **Vocabulary**

At Percy Main, we want our children to have an expansive vocabulary and through teacher modelling and planning, children are given the opportunity to use and apply appropriate vocabulary. Scientific language is taught and built upon with vocabulary being a focus. This is also encouraged through planning trips and having visitors in school.

# Vocabulary modules in Years 1 - 6

Vocabulary instruction is at the heart of the curriculum and subject specific words are incorporated in each module.

Vocabulary overview for a Year 4 'States of Matter' unit:- including Tier 2 and 3 language, etymology and morphology as well as idioms and colloquialisms.



## Y4 States of matter

### Vocabulary Essentials: Teacher Guide

Prior vocabulary knowledge

Words I should know	Roots, prefixes, suffixes and spelling rules
heat, cool, temperature, change, freeze compare, materials, properties	-tion -ing

### Vocabulary for explicit instruction

 Tier 2 multiple meaning or high frequency	 Tier 3 subject specific
permanent	existing all the time
particle	a very small piece of something
solid	a substance that is neither a gas nor a liquid
liquid	a substance that flows freely and is not a solid or a gas
gas	a substance that is neither a solid nor a liquid
vapour	small drops of liquid in the air
evaporate	turn from liquid into vapour
condense	turn from vapour into liquid
melt	to become a liquid as a result of heating
matter	the physical substance that everything is made up of
state	the physical condition that a thing is in
volume	the amount of space that an object or substance fills

### Etymology and morphology for explicit instruction

Prefix / Suffix / Root	Meaning	Examples
part	bit, fragment	particle, partial, particular
re	again, back	reverse, reversible, return

### Relevant idioms and colloquialisms

cooking on gas	to make rapid progress or perform well
out of gas	completely exhausted or having no energy
be in/get into a state	to become excited or anxious

## Explicit teaching of vocabulary

evaporate



condense



melt

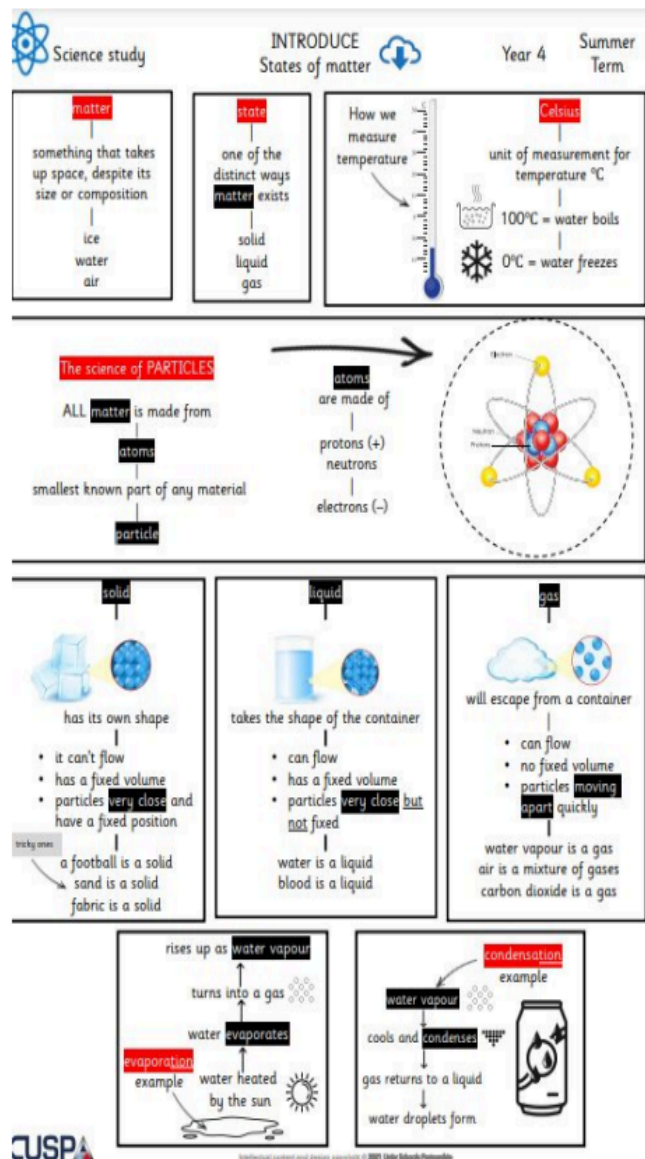


Dual coding is seen across the subject:- on knowledge organisers and knowledge strips; on a vocabulary slide during the lesson input; and on working walls.



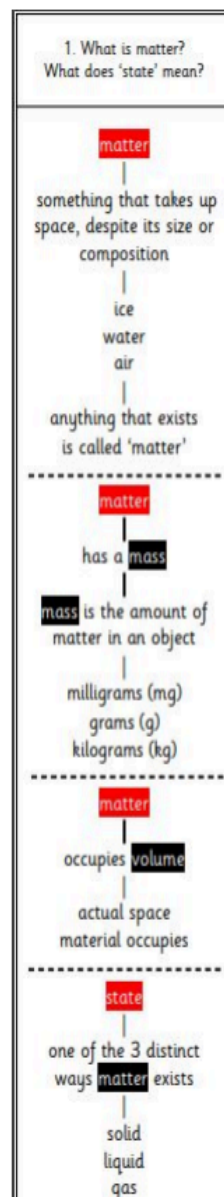
## Knowledge Notes

Accompanying each module is a Knowledge Organiser which contains key vocabulary, information and concepts which all pupils are expected to understand and retain. Knowledge Notes are the elaboration and detail which help pupils acquire the content of each lesson. They support vocabulary and concept acquisition through a well-structured sequence that is cumulative. Each Knowledge Note begins with questions that link back to the cumulative quizzing, focussing on key content to be learnt and understood. Knowledge Organisers and Knowledge Notes are dual coded to provide pupils with visual calls to aid understanding and recall. Knowledge Organisers and Knowledge Notes are referenced throughout each module



Year 4 Knowledge  
Organiser

Accompanying  
Year 4 Knowledge  
Note



## Planning using CUSP materials

When lesson planning, teachers use the suggested lesson sequence in CUSP and the Base Slide Decks, in conjunction with teacher assessment and 'Thinking Scientifically' ideas from the Knowledge Notes.

**SCIENCE** **INTRODUCE** Electricity **Year 4** Autumn Term

Foundational knowledge that is essential to teach

Suggested lesson	Learning question	Cumulative questions from quiz
1.	What appliances use electricity? What sort of power makes them work? <b>Notice It</b> – what are the everyday appliances that run on electricity - battery or mains?	1 - 3
2	<b>Name It</b> – what are the components in a simple series circuit? <b>Test It</b> – what happens when a circuit is open or closed?	4 – 22 (High volume practice using similar question types)
3	<b>Diagnose It</b> – what are the effects of changing circuit components and batteries?	23 – 25

The learning questions can be taught over more than one lesson, if needed. Remember these essential components of a lesson or lessons: Connect, Explain, Example, Attempt, Apply and Challenge.

**1. Notice It**  
What appliances use electricity?  
What sort of power makes them work?  
How can we be safe with electricity?

**mains electricity**  
supplied to a building by wires

What appliances need **mains electricity**? Why is that?

**a battery** is portable source of stored energy

**BEING SAFE WITH ELECTRICITY**

NEVER **plug** into a socket

NEVER **stand** near electric pylons

DON'T use switches with **wet hands**

DO NOT **recharge** **normal** batteries  
ONLY recharge rechargeable batteries

If a wire is **exposed** on an appliance – DO NOT touch it

**Year 4 Electricity**

**Q1 What appliances use electricity?  
What sort of power makes them work?  
How can we be safe with electricity?**

**Applying**

Pupils consider the consequences of ignoring each of the 'Being safe with electricity' guidelines in turn before ranking them in order of importance. Are any of the tips equally important?

**Connecting**

Discuss the meaning of the following words that are used across the Knowledge Note and ask pupils to give antonyms for them: portable, never, rechargeable, insulator, renewable and controlled. Support: Pupils match the above words with antonyms provided. Challenge: finite, variable

**Creating**

Discuss how all the 'Being safe with electricity' guidelines recorded on the Knowledge Note have been written using negative language, i.e. DON'T, DO NOT, NEVER. Ask pupils to re-write these guidelines as positive directives, e.g. Only use switches with dry hands. (Note: the battery example on the Knowledge Note exemplifies this format.) Challenge: Do pupils think that people will take more notice of guidelines written as negative messages or as positive messages?

**Interpreting Reasoning**

In pairs, brainstorm appliances / devices that require electricity. Which Venn diagram do you think best represents the number of appliances / devices that are powered by mains electricity / batteries / both. Discuss with a partner. Key: mains battery

**Creating Applying**

Discuss the importance of universally recognised symbols, e.g. and examples of when they are used. Consider the difference between icons (such as those on Slide 28 of the CUSP Science unit) and symbols - refer to electrical circuit symbols if appropriate. Pupils then list all the different sources which generate electricity, e.g. wind, solar, hydro, tidal, biomass, nuclear, coal, petrol, gas etc., agree whether they are fossil fuels / renewable and design a colour-coded symbol for each. Compare and evaluate symbols created. Challenge: Debate which form of generating electricity is 'the best'.

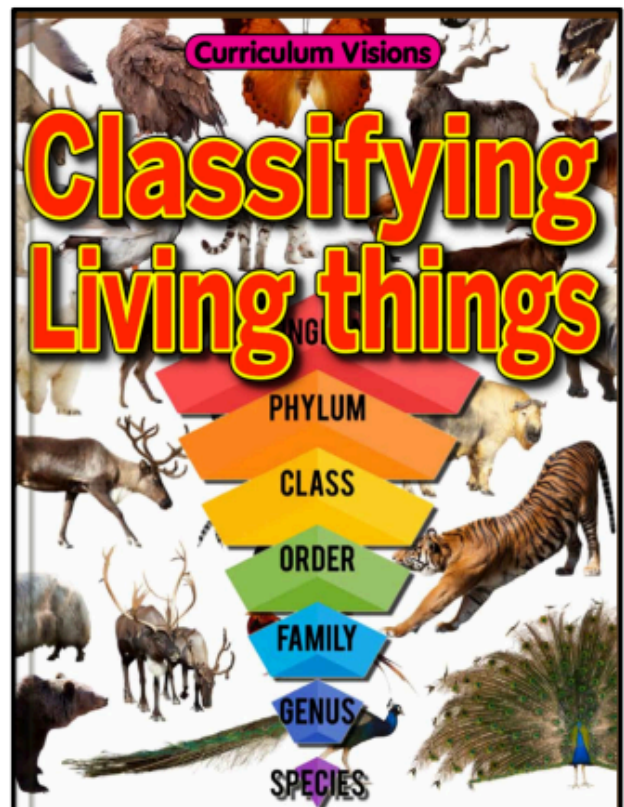
## Tailoring for SEND

At Percy Main, we aim for all Science lessons and learning questions to be accessible to all pupils. Pre-teaching of vocabulary and small group support provides all children with the opportunity to demonstrate an understanding of subject specific language. The use of dual coded Knowledge Notes and Organisers provide visuals to aid understanding and recall. In addition, Knowledge Notes can be edited to minimise cognitive overload, so children can use and apply their knowledge more easily. 'Sentence stems' can be used where necessary to help pupils produce written evidence.

## Reading

We subscribe to Curriculum Visions to support high quality non-fiction texts that can also be accessed at home.

Recommended reads are referenced in the learning modules.



## Oracy – Voice 21

As a Voice 21 school we intend to provide our pupils with a high quality oracy education. This is 'the ability to articulate ideas, develop understanding and engage with others through spoken language.' Oracy is both learning to and through talk. It is through talk that pupils have the opportunity to develop and share their understanding, through interactions with both teachers and peers. However, to do this effectively, pupils must also be taught to talk effectively, ensuring they have the necessary skills and understanding to engage in talk for learning. Through the use of Talk Tasks and purposeful planning of key questions at Percy Main we expect the pupils to talk as a scientist.

## Writing

Pupils are expected to write across all areas of the curriculum with teachers modelling how to write purposefully in each subject. All writing should feature Science objectives rather than English objectives.

## Continuous Professional Development

All staff have undergone CPD and this has supported the development of the wider curriculum. In addition to this, staff have accessed planning sessions with Alex Bedford (author of CUSP) to support them in effectively planning sequences of work using the materials provided within the modules. There are also a number of CPD courses for Science for teachers to access on CUSP.

## Impact

How do we measure the impact of science teaching?

Learning Walks and Pupil Book Studies are used as effective monitoring techniques. Pupil Book Studies take place 3 weeks after a unit finishes to check retention of knowledge. Using this information, along with sets of books from each year, an accurate picture can be established. Teachers also use the quizzing results to adapt learning and close gaps.

## Cumulative quizzing

At the end of each module, the children will be given up to 20 questions from all those seen throughout the module, encouraging them to draw on prior knowledge and retrieve the information needed. This will be completed by children in their books, or on ipads. The results will then be analysed by class teachers and subject leads so that gaps in learning can be recognised and addressed.

## Example of teacher assessment record for each unit studied

Assessment of CUSP subjects:

Year:	5	Subject:	Science	Unit:	Properties and Changes of Materials
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To be secure pupils must:

- be able to compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets
- know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution
- use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating
- give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic
- demonstrate that dissolving, mixing and changes of state are reversible changes
- explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda

Study Summary Assessment at the end of a unit:

Quiz/ assessment	End of Unit		
	Support	Working at	Standout
%			
Pupil names			

## Pupil Book Study

### Vocabulary

<b>Tier 2</b>	<b>property</b>	<b>particle</b>	<b>separate</b>	<b>combine</b>	<b>recover</b>	<b>comparative</b>
<b>Tier 3</b>	<b>atom</b>	<b>molecule</b>	<b>Chemical (changes)</b>	<b>Physical (changes)</b>	<b>reversible</b>	<b>reaction</b>

	Working Scientifically								
	Asking simple questions	Observing closely, using simple equipment	Performing simple tests	Identifying and classifying	To suggest answers to questions	Gathering and recording data			
<b>Knowledge and Sequence</b>							<b>Support</b>	<b>Standout</b>	<b>Notes</b>
What properties do materials have? How do we use them?									
What is a solution and what is a mixture?									
How can we separate materials from a mixture?									
How can we separate materials from a solution									
What changes are reversible?									
What changes are irreversible?									

<b>Helping</b>	<b>Hindering</b>

### Teacher assessment of knowledge, skills and vocabulary applied

<b>Present knowledge (Working towards expected standard)</b>	<b>Operate on and with knowledge (Working at expected standard)</b>	<b>Conceptual understanding with depth (Greater depth of understanding)</b>

# Appendix 1

## EYFS long term plan

### Reception

	Autumn	Spring	Summer / Early Learning Goal
<b>Understanding the World</b> Past and Present	Three and Four-Year-Olds will be learning to <ul style="list-style-type: none"> <li>● Begin to make sense of their own life-story and family's history.</li> </ul>	Children in Reception will be learning to <ul style="list-style-type: none"> <li>● Talk about members of their immediate family and community.</li> <li>● Name and describe people who are familiar to them.</li> <li>● Comment on images of familiar situations in the past.</li> <li>● Compare and contrast characters from stories, including figures from the past.</li> </ul>	<b>ELG - Children at the expected level of development will:</b> <ul style="list-style-type: none"> <li>● Talk about the lives of the people around them and their roles in society.</li> <li>● Know some similarities and differences between things in the past and now, drawing on their experiences and what has been read in class.</li> <li>● Understand the past through settings, characters and events encountered in books read in class and storytelling.</li> </ul>
<b>Understanding the World</b> People, Culture and communities	Three and Four-Year-Olds will be learning to <ul style="list-style-type: none"> <li>● Show interest in different occupations.</li> <li>● Explore how things work.</li> <li>● Continue developing positive attitudes about the differences between people.</li> <li>● Know that there are different countries in the world and talk about the differences they have experienced or seen in photos.</li> <li>● Uses ICT hardware to interact with age appropriate software.</li> </ul>	Children in Reception will be learning to <ul style="list-style-type: none"> <li>● Draw information from a simple map.</li> <li>● Understand that some places are special to members of their community.</li> <li>● Recognise that people have different beliefs and celebrate special times in different ways.</li> <li>● Recognise some similarities and differences between life in this country and life in other countries.</li> <li>● Can use ICT device to record a video or draw a picture.</li> </ul>	<b>ELG - Children at the expected level of development will:</b> <ul style="list-style-type: none"> <li>● Describe their immediate environment using knowledge from observation, discussion, stories, non-fiction texts and maps; EYFS reforms early adopter framework 15.</li> <li>● Know some similarities and differences between different religious and cultural communities in this country, drawing on their experiences and what has been read in class.</li> <li>● Explain some similarities and differences between life in this country and life in other countries, drawing on knowledge from stories, non-fiction texts and – when appropriate – maps.</li> </ul>
<b>Understanding the World</b> The Natural world	Three and Four-Year-Olds will be learning to <ul style="list-style-type: none"> <li>● Use all their senses in hands on exploration of natural materials.</li> <li>● Explore collections of materials with similar and/or different properties.</li> <li>● Talk about what they see, using a wide vocabulary.</li> <li>● Plant seeds and care for growing plants.</li> <li>● Understand the key features of the life cycle of a plant and an animal.</li> <li>● Begin to understand the need to respect and care for the natural environment and all living things.</li> <li>● Explore and talk about different forces they can feel.</li> <li>● Talk about the differences between materials and changes they notice.</li> </ul>	Children in Reception will be learning to <ul style="list-style-type: none"> <li>● Explore the natural world around them by making observations and drawings of animals and plants. .</li> <li>● Describe what they see, hear and feel whilst outside.</li> <li>● Recognise some environments that are different to the one in which they live.</li> <li>● Understand the effect of changing seasons on the natural world around them.</li> </ul>	<b>ELG - Children at the expected level of development will:</b> <ul style="list-style-type: none"> <li>● Explore the natural world around them, making observations and drawing pictures of animals and plants.</li> <li>● Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class.</li> <li>● Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.</li> </ul>



## Nursery

	Autumn 1	Spring	Summer 2
<b>Knowledge and Understanding</b> Past and Present	<ul style="list-style-type: none"> <li>Begin to make sense of their own life-story and family's history.</li> </ul>		
<b>Knowledge and Understanding</b> People, Culture and Communities	<b>Birth to three - babies, toddlers and young children will be learning to:</b> <ul style="list-style-type: none"> <li>Make connections between the features of their family and other families.</li> <li>Begins to question what makes them unique and can describe what they feel is special about them and others.</li> <li>Shows an interest in digital devices such as IPADS</li> </ul>	<b>Three and Four-Year-Olds will be learning to</b> <ul style="list-style-type: none"> <li>Show interest in different occupations.</li> <li>Explore how things work.</li> <li>Notice differences between people.</li> </ul>	<b>Three and Four-Year-Olds will be learning to</b> <ul style="list-style-type: none"> <li>Continue developing positive attitudes about the differences between people.</li> <li>Know that there are different countries in the world and talk about the differences they have experienced or seen in photos.</li> <li>Remembers significant events and times throughout their Nursery year in and in their family and can describe these to others.</li> <li>Is able to make sense and communicate their own life story and that of others.</li> </ul>
<b>Knowledge and Understanding</b> The Natural World	<b>Birth to three - babies, toddlers and young children will be learning to:</b> <ul style="list-style-type: none"> <li>Repeat actions that have an effect.</li> <li>Explore materials with different properties.</li> <li>Explore natural materials, indoors and outside.</li> <li>Explore and respond to different natural phenomena in their setting and on trips.</li> <li>Begins to notice the changes in season and their outdoor environment</li> <li>Talks about the impact of these changes and suggests ways to support the wildlife.</li> <li>Talks about and recognises the changes to clothing in relation to the season</li> </ul>	<b>Three and Four-Year-Olds will be learning to</b> <ul style="list-style-type: none"> <li>Use all their senses in hands on exploration of natural materials.</li> <li>Explore collections of materials with similar and/or different properties.</li> <li>Talk about what they see, using a wide vocabulary.</li> <li>Plant seeds and care for growing plants.</li> <li>Understand the key features of the life cycle of a plant and an animal.</li> <li>Begin to understand the need to respect and care for the natural environment and all living things.</li> </ul>	<b>Three and Four-Year-Olds will be learning to</b> <ul style="list-style-type: none"> <li>Explore and talk about different forces they can feel.</li> <li>Talk about the differences between materials and changes they notice.</li> <li>Children are able to care for the living things in the environment</li> <li>Continues to understand and explore how and why things grow, decay and change over time.</li> </ul>

## Rainbows

	Autumn 1	Spring	Summer 2
<b>Knowledge and Understanding</b> Past and Present	<ul style="list-style-type: none"> <li>Begin to make sense of their own life- story and family's history.</li> </ul>		
<b>Knowledge and Understanding</b> People, Culture and Communities	<ul style="list-style-type: none"> <li>Make connections between the features of their family and other families.</li> <li>Notice differences between people.</li> </ul>	<ul style="list-style-type: none"> <li>Begins to question what makes them unique and can describe what they feel is special about them and others.</li> <li>Shows an interest in digital devices such as IPADS</li> <li>Begins to question what makes them unique and can describe what they feel is special about them and others.</li> </ul>	
<b>Knowledge and Understanding</b> The Natural World	<ul style="list-style-type: none"> <li>Repeat actions that have an effect.</li> <li>Explore materials with different properties.</li> <li>Explore natural materials, indoors and outside.</li> <li>Explores objects by linking them together (shaking, hitting, pulling, poking or tasting)</li> </ul>	<ul style="list-style-type: none"> <li>Explore and respond to different natural phenomena in their setting and on trips.</li> <li>Begins to notice the changes in season and their outdoor environment</li> <li>Enjoys toys with buttons, flaps or mechanisms and how to make them work (cause and effect)</li> <li>Enjoys play with small world models such as cars, farm animals, dolls house trains or tools</li> </ul>	<ul style="list-style-type: none"> <li>Talks about the impact of these changes and suggests ways to support the wildlife.</li> <li>Talks about and recognises the changes to clothing in relation to the season</li> <li>During pretend play in home corner, children will imitate everyday actions and events such as washing dishes or making a cup of tea.</li> </ul>

