Intent

Science

Intent

Ditton Lodge Primary School Curriculum Statement

The Ditton Lodge Primary School curriculum is designed to help everyone to have the knowledge they need to thrive and flourish in our 21st century global community. Throughout our curriculum the children will:

- Have a sense of belonging
- Be ambitious to succeed
- Excel as lifelong learners
- Experience a world beyond Ditton Lodge

Science

Intent

Alongside the above, our vision, and the values of our Ditton Lodge High 5, underpin our curriculum intent and our shared purpose.

We aim to provide a knowledge-rich and broad curriculum for all of our children. Each subject is taught discretely within a sequence of learning to allow children to build on previous knowledge and skills and articulate links. We place great emphasis on subject specific vocabulary as we believe this allows children to communicate confidently and effectively as well as providing the foundations for their future.

We begin with a sense of belonging, fostered by strong relationships which are the bedrock of our teaching and learning. We invest time in building meaningful and positive relationships with one another.

We are ambitious for every person in our school and are clear about our high expectations for everyone. We provide strong and coherent learning opportunities alongside carefully planned additional experiences to enable children to discover new talents, skills and interests. Underpinning this is the belief that every child has the potential to achieve and excel.

To enable children to excel throughout their learning journey, and to encourage them to continue on that journey as their life progresses, we are clear about the intent of our school curriculum:

Intent

Science

- To acquire knowledge to allow them to thrive in today's society
- To secure for all children fluent and effective reading to enable them to access the wider curriculum, develop a rich vocabulary and enjoy reading for pleasure
- To secure for all children a fluency in number and an ability to manipulate number to support problem solving and reasoning
- To ensure children are able to communicate articulately and confidently in a range of forms and situations
- To offer for all our children the knowledge and understanding of how to keep themselves mentally and physically safe and healthy

Our curriculum provides children with memorable experiences, visits and visitors from which they can learn. It encourages them to view the world outside of Ditton Lodge with excitement and curiosity. It makes for independent and confident learners who know about their community, the wider world and how to make a positive contribution.

Intent

Science

Aims

The aims of the Syllabus are that students:

- 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

(The National Curriculum, Updated 6 May 2015)

Intent

Science

Why is Science important?

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.

Intent

Science

Key stage 1

The principal focus of science teaching in key stage 1 is to enable pupils to experience and observe phenomena, looking more closely at the natural and humanly constructed world around them.

They should be encouraged to be curious and ask questions about what they notice.

They should be helped to develop their understanding of scientific ideas by using different types of scientific enquiry to answer their own questions, including observing changes over a period of time, noticing patterns, grouping and classifying things, carrying out simple comparative tests, and finding things out using secondary sources of information.

They should begin to use simple scientific language to talk about what they have found out and communicate their ideas to a range of audiences in a variety of ways.

Most of the learning about science should be done through the use of first-hand practical experiences, but there should also be some use of appropriate secondary sources, such as books, photographs and videos.

Intent

Science

Working Scientifically in Key Stage 1

During years 1 and 2, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- asking simple questions and recognising that they can be answered in different ways
- observing closely, using simple equipment
- performing simple tests
- identifying and classifying
- using their observations and ideas to suggest answers to questions
- gathering and recording data to help in answering questions

Intent

Science
Key Stage 1 Sequence of Study
Introduce

Year 1 Introduce Animals, including humans

Pupils should be taught to:
•identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals
•identify and name a variety of common animals that are carnivores, herbivores and omnivores
•describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets)
•identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense
Includes our wonderful **new vocabulary module** to support explicit instruction.

Intent

Science
Key Stage 1 Sequence of Study
Introduce

Year 1 Introduce Everyday Materials

Pupils should be taught to:
•distinguish between an object and the material from which it is made
•identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock
•describe the simple physical properties of a variety of everyday materials
•compare and group together a variety of everyday materials on the basis of their simple physical properties

Intent

Science
Key Stage 1 Sequence of Study
Introduce

Year 1 Introduce Plants

Pupils should be taught to:
•identify and name a variety of common wild and garden plants, including deciduous and evergreen trees
•identify and describe the basic structure of a variety of common flowering plants, including trees

Intent

Science
Key Stage 1 Sequence of Study
Introduce

Year 1 Seasonal changes and weather.

Pupils should be taught to:
•observe changes across the 4 seasons
•observe and describe weather associated with the seasons and how day length varies

Intent

Science
Key Stage 1 Sequence of Study
Revisit

Year 1 Revisit Animals including humans

Pupils should be taught to:
•identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals
•identify and name a variety of common animals that are carnivores, herbivores and omnivores
•describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets)
•identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense

Intent

Science
Key Stage 1 Sequence of Study
Revisit

Year 1 Revisit Plants

Pupils should be taught to:
•identify and name a variety of common wild and garden plants, including deciduous and evergreen trees
•identify and describe the basic structure of a variety of common flowering plants, including trees

Intent

Science
Key Stage 1 Sequence of Study
Revisit

Year 1 Revisit Plants + Animals, including humans

Pupils should be taught to:

•identify and name a variety of common wild and garden plants, including deciduous and evergreen trees

•identify and describe the basic structure of a variety of common flowering plants, including trees

•identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals

•identify and name a variety of common animals that are carnivores, herbivores and omnivores

•describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets)

•identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense

Intent

Science
Key Stage 1 Sequence of Study
Introduce

Year 2 Introduce Animals, including humans

Pupils should be taught to:
•notice that animals, including humans, have offspring which grow into adults
•find out about and describe the basic needs of animals, including humans, for survival (water, food and air)
•describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene
Includes our wonderful **new vocabulary module** to support explicit instruction.

Intent

Science
Key Stage 1 Sequence of Study
Introduce

Year 2 Introduce Living things and their habitats

Pupils should be taught to:
•explore and compare the differences between things that are living, dead, and things that have never been alive
•identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other
•identify and name a variety of plants and animals in their habitats, including microhabitats
•describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food

Intent

Science
Key Stage 1 Sequence of Study
Introduce

Year 2 Introduce Plants

Pupils should be taught to:
•observe and describe how seeds and bulbs grow into mature plants
•find out and describe how plants need water, light and a suitable temperature to grow and stay healthy

Intent

Science
Key Stage 1 Sequence of Study
Introduce

Year 2 Uses of Everyday Materials

Pupils should be taught to:

•identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses
•find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching

Intent

Science
Key Stage 1 Sequence of Study
Revisit

Year 2 Revisit Living things and their habitats

Pupils should be taught to:
•explore and compare the differences between things that are living, dead, and things that have never been alive
•identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other
•identify and name a variety of plants and animals in their habitats, including microhabitats
•describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food

Intent

Science
Key Stage 1 Sequence of Study
Revisit

Year 2 Revisit Living things and their habitats – Everyday materials

Pupils revisit and elaborate:

•explore and compare the differences between things that are living, dead, and things that have never been alive

•identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other

•identify and name a variety of plants and animals in their habitats, including microhabitats

•describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food

•identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses

•find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching

Intent

Science
Key Stage 1 Sequence of Study
Revisit

Year 2 Revisit Plants and Animals, including humans

Pupils should be taught to:
•observe and describe how seeds and bulbs grow into mature plants
•find out and describe how plants need water, light and a suitable temperature to grow and stay healthy
Pupils should be taught to:
•notice that animals, including humans, have offspring which grow into adults
•find out about and describe the basic needs of animals, including humans, for survival (water, food and air)
•describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene

Intent

Science
Key Stage 1 Sequence of Study
Revisit

Year 2 Revisit Use of everyday materials

Pupils should be taught to:
•identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses
•find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching

Science

Intent

Lower key stage 2 – years 3 and 4

The principal focus of science teaching in lower key stage 2 is to enable pupils to broaden their scientific view of the world around them. They should do this through exploring, talking about, testing and developing ideas about everyday phenomena and the relationships between living things and familiar environments, and by beginning to develop their ideas about functions, relationships and interactions.

They should ask their own questions about what they observe and make some decisions about which types of scientific enquiry are likely to be the best ways of answering them, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative and fair tests and finding things out using secondary sources of information.

They should draw simple conclusions and use some scientific language, first, to talk about and, later, to write about what they have found out.

Intent

Science

Working scientifically

During years 3 and 4, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- asking relevant questions and using different types of scientific enquiries to answer them
- setting up simple practical enquiries, comparative and fair tests
- making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers
- gathering, recording, classifying and presenting data in a variety of ways to help in answering questions
- recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
- reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
- using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions
- identifying differences, similarities or changes related to simple scientific ideas and processes
- using straightforward scientific evidence to answer questions or to support their findings.

Intent

Science In EYFS

Science		
Three and Four-Year-Olds	Communication and Language	• Understand 'why' questions, like: "Why do you think the caterpillar got so fat?"
	Physical Development	• Make healthy choices about food, drink, activity and toothbrushing.
	Understanding the World	• Use all their senses in hands-on exploration of natural materials. • Explore collections of materials with similar and/or different properties. • Talk about what they see, using a wide vocabulary. • Begin to make sense of their own life-story and family's history. • Explore how things work. • Plant seeds and care for growing plants. • Understand the key features of the life cycle of a plant and an animal. • Begin to understand the need to respect and care for the natural environment and all living things. • Explore and talk about different forces they can feel. • Talk about the differences between materials and changes they notice.

Intent

Science In EYFS

Reception	Communication and Language	• Learn new vocabulary. • Ask questions to find out more and to check what has been said to them. • Articulate their ideas and thoughts in well-formed sentences. • Describe events in some detail. • Use talk to work out problems and organise thinking and activities. Explain how things work and why they might happen. • Use new vocabulary in different contexts.
Reception Continued	Physical Development	• Know and talk about the different factors that support their overall health and wellbeing: - regular physical activity - healthy eating - toothbrushing - sensible amounts of 'screen time' - having a good sleep routine - being a safe pedestrian
	Understanding the World	• Explore the natural world around them. • Describe what they see, hear and feel while they are outside. • Recognise some environments that are different to the one in which they live. • Understand the effect of changing seasons on the natural world around them.

Science In EYFS

Intent

ELG	Communication and Language	Listening, Attention and Understanding	• Make comments about what they have heard and ask questions to clarify their understanding.
	Personal, Social and Emotional Development	Managing Self	• Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices.
	Understanding the World	The Natural World	• Explore the natural world around them, making observations and drawing pictures of animals and plants. • 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. • Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.

Intent

Science
Lower Key Stage 2 Sequence of Study
Introduce

Year 3 Introduce Animals, including humans

Pupils should be taught to:
•identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat
•identify that humans and some other animals have skeletons and muscles for support, protection and movement

Intent

Science

Lower Key Stage 2 Sequence of Study

Introduce

Year 3 Introduce Forces and magnets

Pupils should be taught to:

- compare how things move on different surfaces
- notice that some forces need contact between 2 objects, but magnetic forces can act at a distance
- observe how magnets attract or repel each other and attract some materials and not others
- compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials
- describe magnets as having 2 poles
- predict whether 2 magnets will attract or repel each other, depending on which poles are facing

Intent

Science

Lower Key Stage 2 Sequence of Study

Introduce

Year 3 Introduce Light

Pupils should be taught to:

•recognise that they need light in order to see things and that dark is the absence of light

•notice that light is reflected from surfaces

•recognise that light from the sun can be dangerous and that there are ways to protect their eyes

•recognise that shadows are formed when the light from a light source is blocked by an opaque object

•find patterns in the way that the size of shadows change

Intent

Science
Lower Key Stage 2 Sequence of Study
Introduce

Year 3 Introduce Plants

Pupils should be taught to:
•identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers
•explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant
•investigate the way in which water is transported within plants
•explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal

Intent

Science

Lower Key Stage 2 Sequence of Study

Introduce

Year 3 Introduce Rocks

Pupils should be taught to:

- compare and group together different kinds of rocks on the basis of their appearance and simple physical properties
- describe in simple terms how fossils are formed when things that have lived are trapped within rock
- recognise that soils are made from rocks and organic matter

Intent

Science

Lower Key Stage 2 Sequence of Study

Revisit

Revisit and Retrieve Rocks

Pupils should be taught to:

- Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties.
- Describe in simple terms how fossils are formed when things that have lived are trapped within rock
- Recognise that soils are made from rocks and organic matter.

Intent

Science
Lower Key Stage 2 Sequence of Study
Introduce

Year 4 Introduce Animals, including humans

Pupils should be taught to:
•describe the simple functions of the basic parts of the digestive system in humans
•identify the different types of teeth in humans and their simple functions
•construct and interpret a variety of food chains, identifying producers, predators and prey

Intent

Science

Lower Key Stage 2 Sequence of Study

Introduce

Year 4 Living things and their habitats

Pupils should be taught to:

- recognise that living things can be grouped in a variety of ways
- explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment
- recognise that environments can change and that this can sometimes pose dangers to living things

Intent

Science

Lower Key Stage 2 Sequence of Study

Introduce

Year 4 Science Introduce Electricity

Pupils should be taught to:

- identify common appliances that run on electricity
- construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers
- identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery
- recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit
- recognise some common conductors and insulators, and associate metals with being good conductors

Intent

Science

Lower Key Stage 2 Sequence of Study

Introduce

Year 4 Science Introduce Sound

Pupils should be taught to:

•identify how sounds are made, associating some of them with something vibrating

•recognise that vibrations from sounds travel through a medium to the ear

•find patterns between the pitch of a sound and features of the object that produced it

•find patterns between the volume of a sound and the strength of the vibrations that produced it

•recognise that sounds get fainter as the distance from the sound source increases

Intent

Science

Lower Key Stage 2 Sequence of Study

Introduce

Year 4 Science Introduce States of Matter

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

Science

Intent

Upper key stage 2 – years 5 and 6

The principal focus of science teaching in upper key stage 2 is to enable pupils to develop a deeper understanding of a wide range of scientific ideas. They should do this through exploring and talking about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically. At upper key stage 2, they should encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. They should also begin to recognise that scientific ideas change and develop over time. They should select the most appropriate ways to answer science questions using different types of scientific enquiry, including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information. Pupils should draw conclusions based on their data and observations, use evidence to justify their ideas, and use their scientific knowledge and understanding to explain their findings.

Intent

Science
Working scientifically

During years 5 and 6, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

•planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary

•taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate

•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

•reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations

•identifying scientific evidence that has been used to support or refute ideas or arguments

Intent

Science

Upper Key Stage 2 Sequence of Study

Introduce

Year 5 Introduce Living things and their habitats

Pupils should be taught to:

•describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird

•describe the life process of reproduction in some plants and animals

Intent

Science

Upper Key Stage 2 Sequence of Study

Introduce

Year 5 Science Introduce Animals, including humans

Pupils should be taught to:

•describe the changes as humans develop to old age

Intent

Science

Upper Key Stage 2 Sequence of Study

Introduce

Year 5 Science Introduce Earth and Space

Pupils should be taught to:

•describe the movement of the Earth and other planets relative to the sun in the solar system

•describe the movement of the moon relative to the Earth

•describe the sun, Earth and moon as approximately spherical bodies

•use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky

Intent

Science

Upper Key Stage 2 Sequence of Study

Introduce

Year 5 Science Introduce Forces

Pupils should be taught to:

•explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object

•identify the effects of air resistance, water resistance and friction, that act between moving surfaces

•recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect

Intent

Science

Upper Key Stage 2 Sequence of Study

Introduce

Year 5 Science Introduce Properties and changes of materials

Pupils should be taught 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

Intent

Science

Upper Key Stage 2 Sequence of Study Revisit

Year 5 Revisit Living things and their habitats

Pupils should be taught to:

•describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird

•describe the life process of reproduction in some plants and animals

Intent

Science

Upper Key Stage 2 Sequence of Study

Introduce

Year 6 Introduce living things and their habitats

Pupils should be taught to:

•describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals

•give reasons for classifying plants and animals based on specific characteristics

Intent

Science

Upper Key Stage 2 Sequence of Study

Introduce

Year 6 Light

Pupils should be taught to:

- recognise that light appears to travel in straight lines
- use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye
- explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes
- use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them

Intent

Science

Upper Key Stage 2 Sequence of Study

Introduce

Year 6 Science Introduce Animals, including humans

Pupils should be taught to:

•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 their bodies function

•describe the ways in which nutrients and water are transported within animals, including humans

Intent

Science

Upper Key Stage 2 Sequence of Study

Introduce

Year 6 Science Introduce Animals, including humans – water transportation

Pupils should be taught to:

•describe the ways in which nutrients and water are transported within animals, including humans

Intent

Science
Upper Key Stage 2 Sequence of Study
Introduce

Year 6 Science Introduce Electricity

Pupils should be taught to:
•associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit
•compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches
•use recognised symbols when representing a simple circuit in a diagram

Intent

Science

Upper Key Stage 2 Sequence of Study

Introduce

Year 6 Science Introduce Evolution and inheritance

Pupils should be taught to:

•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

Intent

Science
Cross Curricular Links

•Science is linked to practical experiences whenever appropriate.
•Visits, visitors and real life experiences are encouraged where possible;
•Teachers use a variety of teaching methods: modelling, demonstration, use of Internet links and video, experiments (both immediate and over time), research, discussion and debate;
•Children practise their art skills through diagrams and jottings
•Explanation texts in literacy or links to history and geography topics.
•Children are encouraged to read science literacy to research key ideas and facts.
•Every class should have a science display containing key vocabulary for their topic and investigative language relevant to the levels of the children in the class;
•Computing is used to support the delivery of science lessons.
•Children utilise their maths skills to record and explain their results.
•Children are encouraged to communicate their findings in a variety of ways, such as: diagrams, posters, mind maps, talking partners and group scribing;

Implementation

Reading

Reading forms part of almost all of our Science lessons. At Key Stage One level, students may work in small groups and pairs to read and discuss different ideas and facts. This reading will be scaffolded with students supported in mixed ability groupings and by differentiating text where required. At Key Stage Two level, students may also work in small groups, pairs or independently.

Vocabulary

Students will encounter lots of new vocabulary in their Science lessons. This is taught respectfully, and we insist on using the correct terminology in our lessons. Key vocabulary will be revisited throughout a topic to consolidate students' knowledge and understanding. Key vocabulary is displayed on the Science working wall and in the children's vocabulary grids in their books.

Oracy

Oracy plays a huge part of our lessons. Students will spend a lot of their time here discussing key ideas and opinions. Students will be taught how to listen and respond to other people's comments including how to agree and disagree in a sensible and appropriate way.

Writing

Children are encouraged to communicate their findings in a variety of ways, such as: diagrams, posters, mind maps, talking partners and group scribing. The children will also be expected to write out their experiments and investigations, complete with predictions, results and conclusions.

Intent

Units of work: Key Stage One

SCIENCE National Curriculum Expectations KS1	Year 1		
	Autumn	Spring	Summer
Plants • identify and name a variety of common wild and garden plants, including deciduous and evergreen trees • identify and describe the basic structure of a variety of common flowering plants, including trees.	Introduce Revisit		Revisit
Animals, including humans • identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals • identify and name a variety of common animals that are carnivores, herbivores and omnivores • describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets) • identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.	Introduce	Introduce and Revisit	Revisit
Everyday materials • distinguish between an object and the material from which it is made • identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock • describe the simple physical properties of a variety of everyday materials • compare and group together a variety of everyday materials on the basis of their simple physical properties.			Introduce
Seasonal changes • observe changes across the four seasons • observe and describe weather associated with the seasons and how day length varies.	Introduce		Revisit

Intent

Units of work: Key Stage One

SCIENCE National Curriculum Expectations KS1	Year 2		
	Autumn	Spring	Summer
1. Living things and their habitats • explore and compare the differences between things that are living, dead, and things that have never been alive • identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other • identify and name a variety of plants and animals in their habitats, including micro- habitats • describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food.	Introduce Revisit		Revisit
Plants • observe and describe how seeds and bulbs grow into mature plants • find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.		Introduce	Revisit
Animals, including humans • notice that animals, including humans, have offspring which grow into adults • find out about and describe the basic needs of animals, including humans, for survival (water, food and air) • describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.			Introduce
Uses of everyday materials • identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses • find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.	Introduce Revisit		

Intent

Units of work: Lower Key Stage Two

SCIENCE National Curriculum Expectations Year 3	Year 3		
	Autumn	Spring	Summer
3. Plants • identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers • explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant • investigate the way in which water is transported within plants • explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.			Introduce
Animals, including humans • identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat • identify that humans and some other animals have skeletons and muscles for support, protection and movement.	Introduce		
Rocks • compare and group together different kinds of rocks on the basis of their appearance and simple physical properties • describe in simple terms how fossils are formed when things that have lived are trapped within rock • recognise that soils are made from rocks and organic matter.	Introduce Revisit		
Light • recognise that they need light in order to see things and that dark is the absence of light • notice that light is reflected from surfaces • recognise that light from the sun can be dangerous and that there are ways to protect their eyes • recognise that shadows are formed when the light from a light source is blocked by an opaque object • find patterns in the way that the size of shadows change.		Introduce	
Forces and magnets • compare how things move on different surfaces • notice that some forces need contact between two objects, but magnetic forces can act at a distance • observe how magnets attract or repel each other and attract some materials and not others • compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials • describe magnets as having two poles • predict whether two magnets will attract or repel each other, depending on which poles are facing.		Introduce	

Intent

Units of work: Lower Key Stage Two

SCIENCE National Curriculum Expectations Year 4	Year 4		
	Autumn	Spring	Summer
4 Living things and their habitats • recognise that living things can be grouped in a variety of ways • explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment • recognise that environments can change and that this can sometimes pose dangers to living things.	Introduce		
Animals, including humans • describe the simple functions of the basic parts of the digestive system in humans • identify the different types of teeth in humans and their simple functions • construct and interpret a variety of food chains, identifying producers, predators and prey.		Introduce	
States of matter • 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.			Introduce
Sound • identify how sounds are made, associating some of them with something vibrating • recognise that vibrations from sounds travel through a medium to the ear • find patterns between the pitch of a sound and features of the object that produced it • find patterns between the volume of a sound and the strength of the vibrations that produced it • recognise that sounds get fainter as the distance from the sound source increases.			Introduce
Electricity • identify common appliances that run on electricity • construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers • identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery • recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit • recognise some common conductors and insulators, and associate metals with being good conductors.	Introduce		

Intent

Units of work: Upper Key Stage Two

SCIENCE National Curriculum Expectations Year 5	Year 5		
	Autumn	Spring	Summer
Living things and their habitats Pupils should be taught to: • describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird • describe the life process of reproduction in some plants and animals	Introduction Revisit		
Animals, including humans Pupils should be taught to: • describe the changes as humans develop to old age		Introduce	
Properties and changes of materials Pupils should be taught 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			Introduce
Earth and space Pupils should be taught to: describe the movement of the Earth and other planets relative to the sun in the solar system describe the movement of the moon relative to the Earth describe the sun, Earth and moon as approximately spherical bodies use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky		Introduce Revisit	
Forces Pupils should be taught to: • explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object • identify the effects of air resistance, water resistance and friction, that act between moving surfaces • recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect			Introduce

Intent

Units of work: Upper Key Stage Two

SCIENCE National Curriculum Expectations Year 6	Year 6		
	Autumn	Spring	Summer
Living things and their habitats Pupils should be taught to: • describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals • give reasons for classifying plants and animals based on specific characteristics	Introduce		
Animals including humans Pupils should be taught to: • 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 their bodies function (Summer) • describe the ways in which nutrients and water are transported within animals, including humans (Summer)		Introduce	Introduce water transport
Evolution and inheritance Pupils should be taught to: • 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			Introduce
Light Pupils should be taught to: • recognise that light appears to travel in straight lines • use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye • explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes • use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them	Introduce		
Electricity Pupils should be taught to: • associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit • compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches • use recognised symbols when representing a simple circuit in a diagram		Introduce	

Implementation

Implementation

To deliver these goals we are purposeful and strategic in our implementation of the whole school curriculum. Our rigorous self-evaluation informs school development priorities and CPD to ensure we are effective as a whole staff team in meeting these aims and continuously develop our subject knowledge.

Curriculum overviews ensure coherence and progression in both knowledge and skill development across all year groups in every subject. The curriculum is carefully structured to build upon prior learning. Revisiting and interleaving subject knowledge allows for expertise and depth of understanding. It allows us to foster children's curiosity and interest, give them the chance to write with real purpose, make links and retain knowledge. It allows for an efficient use of resources and greater cooperation between staff.

Implementation

Implementation

Each area of study is well organised and coherent, allowing implementation of teaching through the use of Knowledge Organisers, Focussed Vocabulary units, Knowledge Strips and quizzes. The acquisition of knowledge is underpinned by the implementation of a variety of teaching methods intended to help children retain and recall their learning.

Each lesson is consciously constructed using the model of Connect, Explain, Attempt and Apply.

The development of our learning environment reflects our values and vision. We balance displays and opportunities to celebrate children's achievements and work with working walls which support the learning journey for all children in all classrooms.

Implementation

Example of planning

Although we follow the same syllabus for Key Stage One and Two, we do adapt the plans in order that they are sufficient for both teachers to teach from and for students to learn.

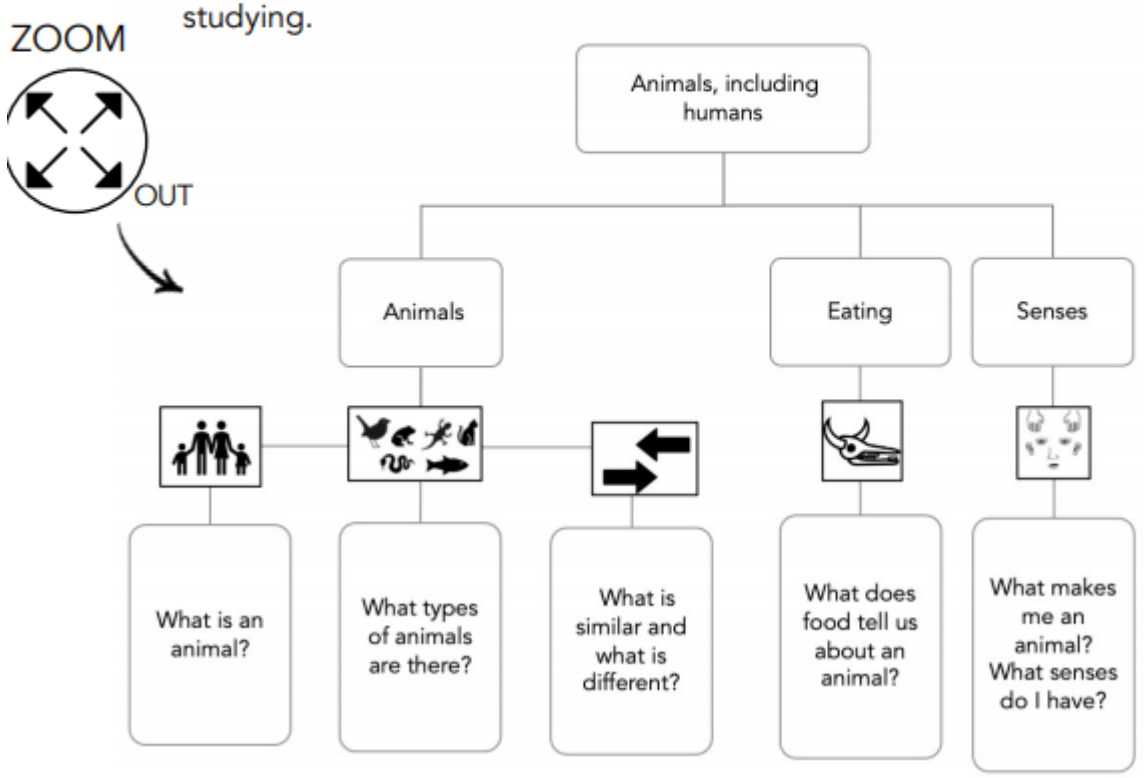
Teachers are non-specialists and the plans have therefore been set out to ensure that staff have the information and training they need in order that they can successfully deliver the lessons to our students.

Implementation

Example of planning: Key Stage One

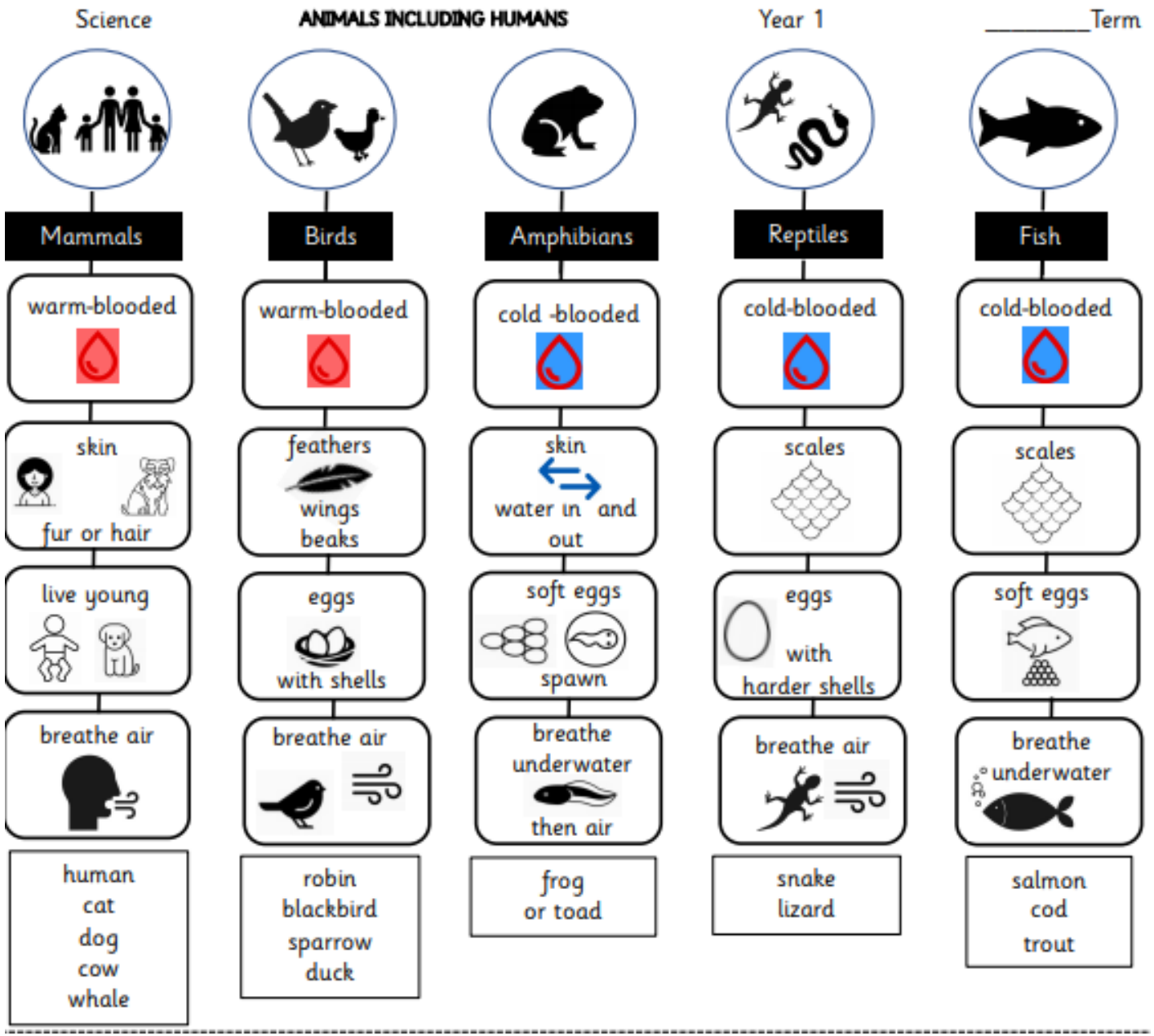
Find a large version of this in the resource section at the end of this Learning Module.

Share the big ideas that you will be studying.



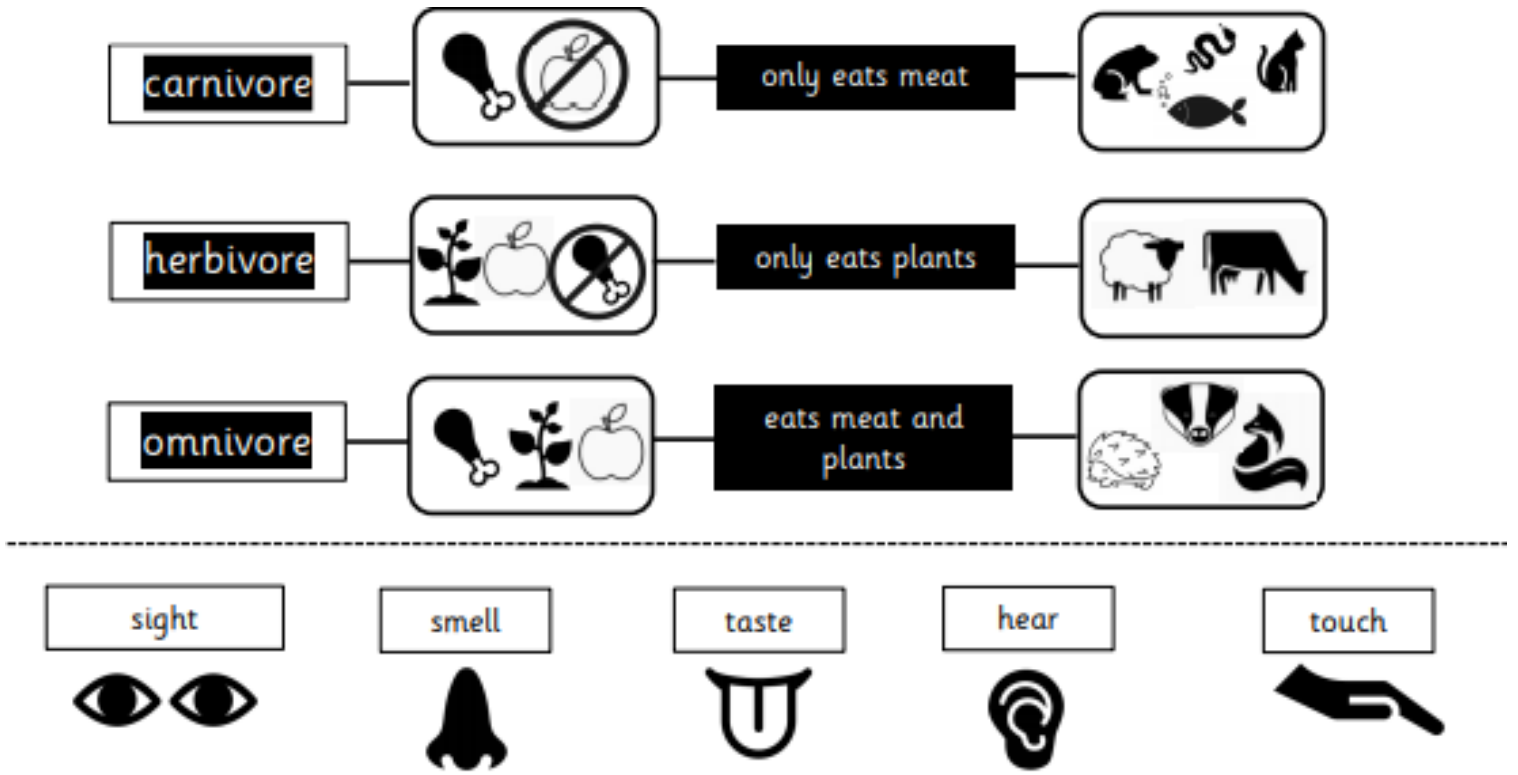
Implementation

Example of planning: Key Stage One



Implementation

Example of planning: Key Stage One



Implementation

Example of Vocabulary: Key Stage One

Prior vocabulary knowledge

Words I should know	Roots, prefixes, suffixes and spelling rules
animal, human, living, plant	

Vocabulary for explicit instruction

Tier 2 multiple meaning or high frequency		Tier 3 subject specific	
blood	red liquid found inside animals	mammal	a warm-blooded animal that makes milk for its babies
senses	the things that make us aware of the world	amphibian	animal that lives on land and in water
young	another word for babies	reptile	animal with cold blood and scaly skin
feathers	things that grow out of a bird's skin	herbivore	animal that eats plants
fur	soft hair found on some animals	carnivore	animal that eats other animals
scales	thin plates on the skin of fish and reptiles	omnivore	animal that eats plants and animals

Implementation

Example of Vocabulary: Key Stage One

Etymology and **morphology** for explicit instruction

Prefix / Suffix / Root	Meaning	Examples
vore	devour, eat	carnivore, herbivore, omnivore, voracious
carn	flesh, meat	carnivore, carnivorous
herb	plant, grass	herbivore, herbal
omni	all, every	omnivore, omnipresent
ing	happening now	living, eating, hunting

Relevant **idioms** and **colloquialisms**

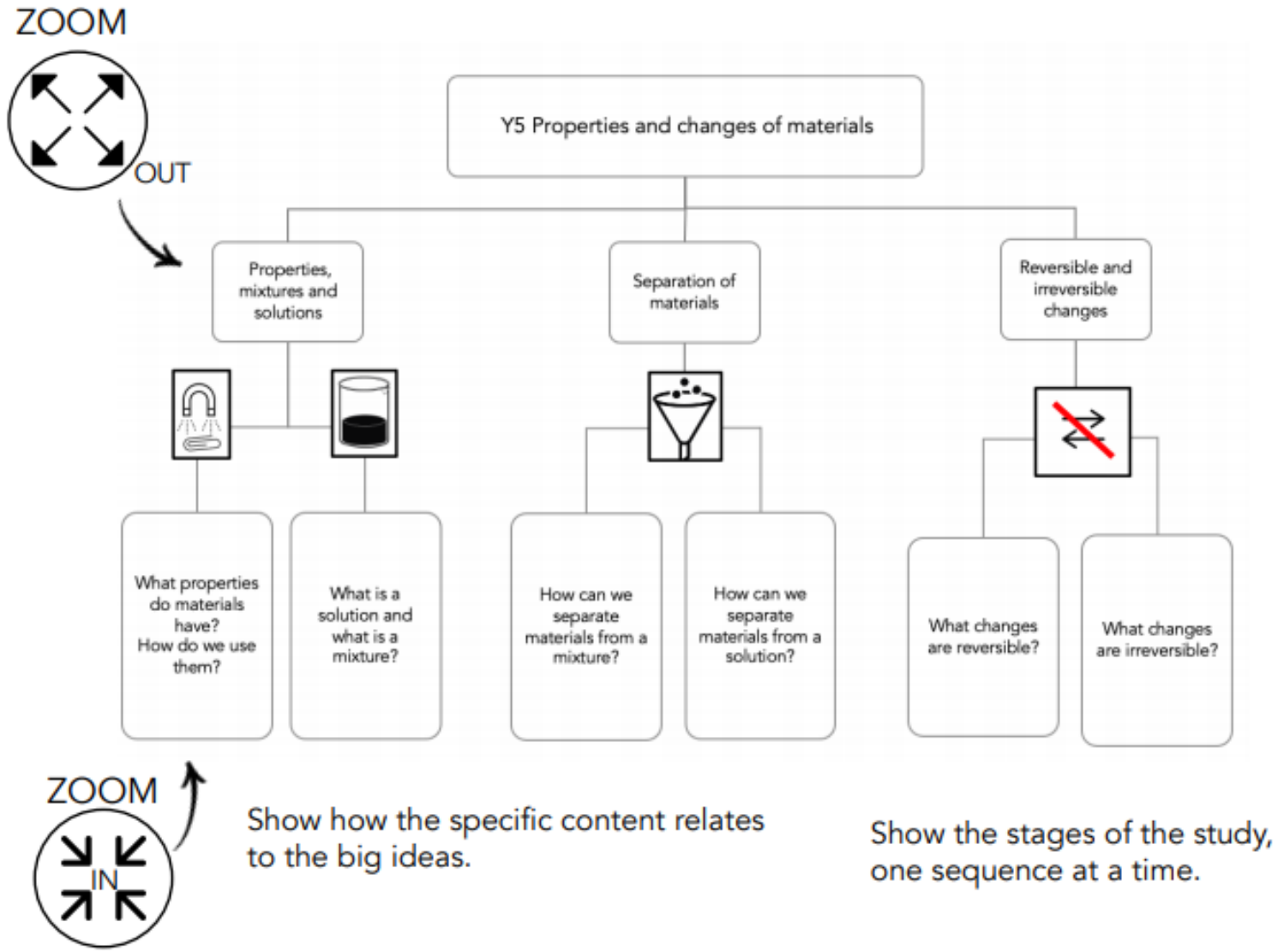
don't count your chickens before they are hatched	not to assume or rely on something before it has actually happened Old English saying referring to the fact that not every egg that is laid will result in a chick.

Moving beyond

nutrition
respiration
reproduction
sensitivity

Implementation

Example of planning: Key Stage Two



Implementation

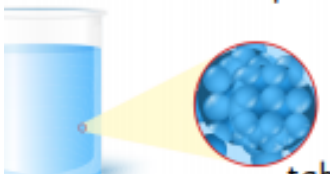
Example of planning: Key Stage Two

structure of material

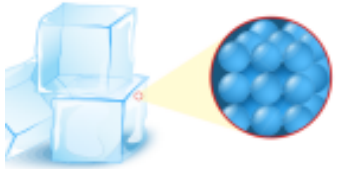
everything made from **atoms** and **molecules**

- **atom** = smallest known part of any material
- **molecule** = two or more atoms, bonded
- **particles** = atoms + molecules

gas
air-like
can flow
no fixed shape
particles **moving apart** quickly



liquid
can flow
take shape of the container
particles **very close** but not fixed



solid
own shape
can't flow
fixed volume
particles **very close** and fixed position

uses and properties of materials

conductor
material that **allows** heat or electricity through

insulator
material that **does not** allow heat, electricity or sound through very well

hardness
how easily a material can be **scratched**

solubility
how well a substance **mixes** into a liquid

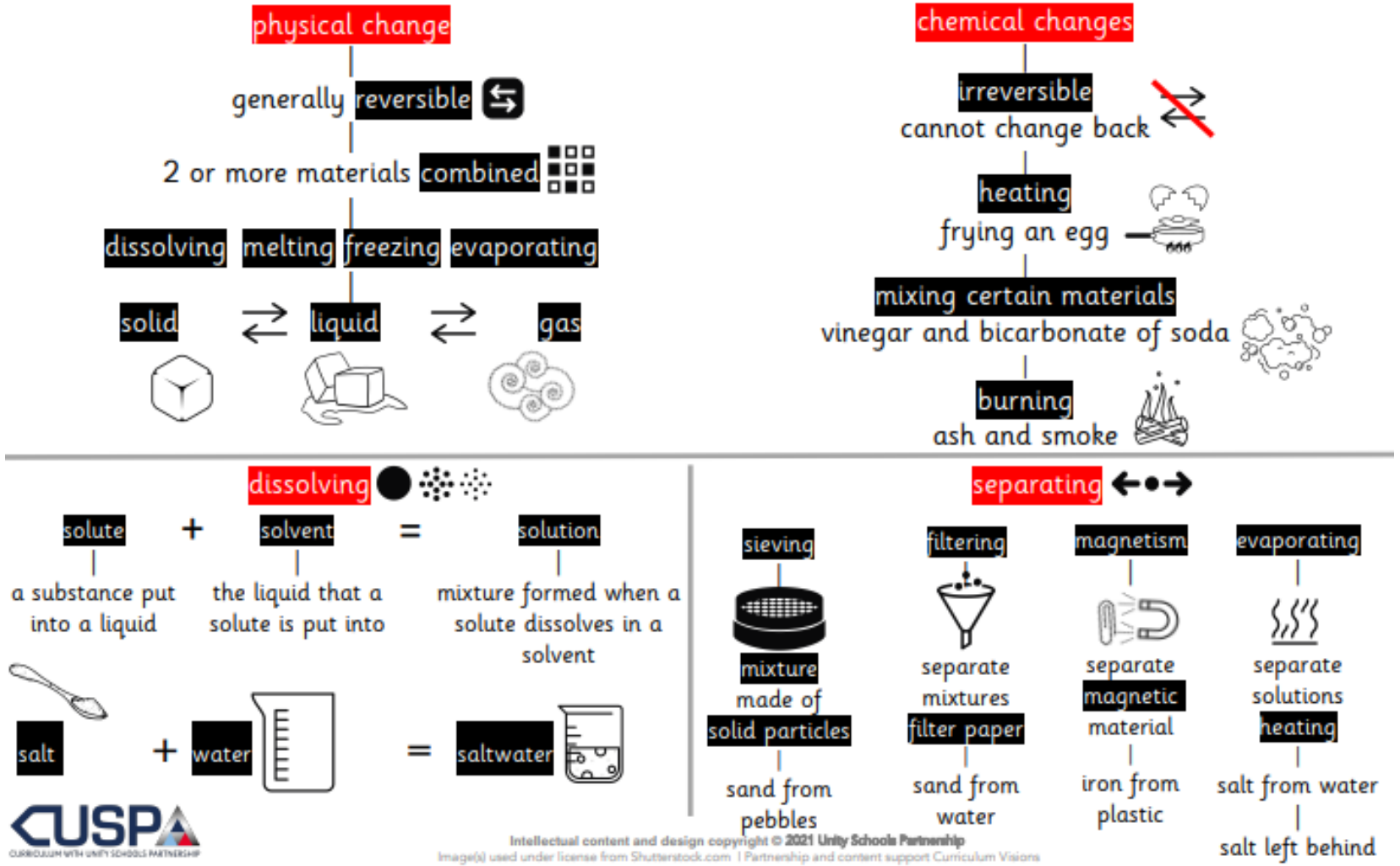
transparency
how see-through a material is

- **transparent**
- **translucent**
- **opaque**

magnetism
when a material is attracted by **magnetic** force

Implementation

Example of planning: Key Stage Two



Implementation

Example of Vocabulary: Key Stage Two

Prior vocabulary knowledge	
Words I should know	Roots, prefixes, suffixes and spelling rules
transparent, transparency, translucent	trans
thermal	therm
magnetism	-ism

Vocabulary for explicit instruction

Tier 2 multiple meaning or high frequency	
property	a quality or characteristic that something has
particle	a very small piece of something
separate	divide something into different parts
combine	join two or more things to form a single one
recover	return to its original state
comparative	measured or judged by how similar or different it is to something else

Tier 3 subject specific	
atom	the smallest particle of a chemical element that can exist
molecule	a group of atoms
chemical (changes)	processes that involve changes to atoms or molecules
physical (changes)	how forces such as heat, light, sound, etc. affect objects
reversible	can be changed so that something returns to its original state
reaction	a chemical change produced by two or more substances acting on each other

Implementation

Example of Vocabulary: Key Stage Two

Etymology and **morphology** for explicit instruction		
Prefix / Suffix / Root	Meaning	Examples
struct	make, build	structure, construct
solv/solu	loosen, set free	soluble, solution, solubility, solute, dissolve
form	shape	form, formation, deform

Relevant **idioms** and **colloquialisms**	
acid test	a decisive test that shows the worth or quality of something This refers to a chemical test developed in the 18th century to prove the purity of gold.

Moving beyond
nucleus nuclear combustion

Implementation

Implementation

In ensuring high standards of teaching and learning in Science, we implement a curriculum that is progressive throughout the whole school.

Planning for Science is a process in which all teachers are involved to ensure that the school gives full coverage of “The National Curriculum programmes of study for Science 2014” through the CUSP curriculum. Science teaching at Ditton Lodge Primary School involves adapting and extending the curriculum to match all pupils needs.

Science is taught as discrete units and lessons where needed to ensure coverage. Due to one form year groups in our school, Science units are taught on a year rolling programme. This ensures progression between year groups and guarantees topics are covered.

Implementation

How do you document learning, monitor progress and achievement?

Students are expected to record learning in their exercise books in almost all lessons. This may take the form of writing, mind maps, pictures etc and will involve students answering specific questions. This work in students' books should take into account the school's presentation rules and minimum expectations. During lessons, teachers may use discussion to support students in self-assessing their work and they may be asked to edit and improve their work during this time using blue pen.

During each individual lesson, teachers will use the school's marking policy in order that they can assess students' progress against the lessons objectives. This also takes into account how far students have used the minimum expectations set out in this policy. By the end of the lesson, staff are expected to know whether students have achieved the objective and teaching in the next lesson will be adapted if needed to ensure that understanding is complete, and any misconceptions have been addressed.

Impact

Science

Impact

Impact

Implementation

Impact

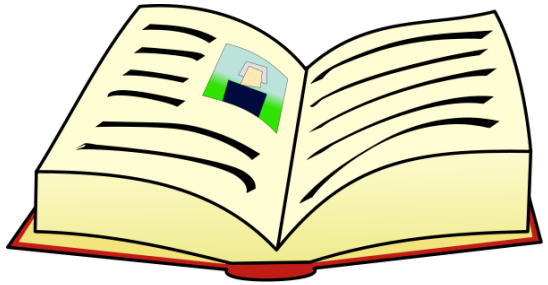
To measure impact, we will use a range of assessments, including low stakes quizzes throughout a study unit, ensuring that they support teaching and learning and promote progress for all children. Assessment processes reflect subject specific need and are viewed as a valued tool used positively by staff. Pupil book studies allow us to quality assure through monitoring implementation, productivity and improvement.

The development of our learning environment reflects our values and vision. We balance displays and opportunities to celebrate children's achievements and work with working walls which support the learning journey for all children in all classrooms.

Impact

How do you measure the impact of Science teaching?

- Book studies
- Structured learning conversations with pupils
- Assess how well the children have understood the content
- Teacher assessment
- End of unit assessments through “Socrative” quizzing
- Test children’s vocabulary



Impact

Ditton Lodge Primary School
Formative Assessment Toolkit
September 2022

Ditton Lodge's curriculum subject coverage is planned sequentially and with a clear rationale for making connections with prior learning: selecting, organising and integrating new knowledge with prior learning. Our knowledge and vocabulary-rich learning modules are positioned to support and enhance learning so that pupils both retrieve and transfer knowledge.

It is the gleaning of information through responsive teaching and a range of well-chosen pedagogical practice that informs the next steps, such as:

- Deliberate practice and rephrasing of taught content - Think aloud and the use of My Turn, Your Turn
- Cumulative quizzing within the learning sequence.
- Retrieval practice, including just two things (self-testing).
- Asking relevant questions that engage all pupils, not just a few using techniques that allow everyone to participate, such as show what you know or think-pair-share
- Vocabulary use and application. Pupils' practise and define words. Words are used, connected and deconstructed for meaning within the learning sequence.
- Summarising and explaining the learning question from the sequence.

Impact

How do you measure the impact of Science teaching?

Subject Leaders use iAbacus as a tool for developing their subject, as seen in this example:

Impact

What do you consider to be the strengths of Science within the school?

A well thought out and comprehensive syllabus that engages and informs students by using:

Links with the wider community through class trips and visitors.
Practical experiments and investigations.
A weekly Science Club.
Annual Science Week celebrations

How do you know?

Termly book scrutiny
Half-termly learning walks/observations
Pupil Voice Questionnaire