

# Brundall Primary School Science Curriculum



be extraordinary

Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
1 / 2 Cycle A					
Biology: Parts of the body / senses	Earth Science: Seasonal change Throughout the year	Chemistry: Materials and their properties	Earth Science: Seasonal change Throughout the Year.  Diversity in science.	Biology: Identify common animals and plants	Earth Science: Seasonal change Throughout the year
Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
1 / 2 Cycle B					
Biology: Basic needs of animals and offspring.	Biology: Healthy me.	Chemistry: The uses of everyday materials	Biology: Growing seeds and bulbs (water, light, warmth) Identify what plants need to grow.	Biology: identify living things in their habitats.	Biology: Differentiate living, dead and non-living. Simple food chains & habitats.
Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
3 / 4 Cycle A					
Physics: Light	Biology: Animals and humans - nutrition	Biology: Animals including humans. Muscles and skeletons	Physics: Forces – friction and magnets	Biology: Plants: Life cycle - functions of flowering plants	Chemistry / Earth Science Rocks, soils and fossils
Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
3 / 4 Cycle B					
Biology: Teeth and digestion	Chemistry: States of matter Solid, liquid and gas. The water cycle	Physics: Sound	Physics: Electricity	Biology: Living things and their habitats Grouping and classification	Biology: Living things and their habitats Changes to habitats.
Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
5 / 6 Cycle A					

Chemistry: Properties and changes of materials	Chemistry: Properties and changes of materials	Physics: Forces	Physics: Earth and Space	Biology: Life cycles of plants and animals.	Animals including humans : Describe changes as humans develop to old age (wellbeing)
Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
5 / 6 Cycle B					
Biology: Classification	Physics: Electricity	Biology: Circulatory System	Physics: Light	Biology: Evolution and inheritance	Biology: Evolution and inheritance

## The Brundall Primary School Science Curriculum

### Intent

At Brundall Primary School we believe that **our curriculum should enable children to become:**

- **successful learners, who make progress and achieve**
- **confident individuals who are able to live safe, healthy and fulfilling lives**
- **responsible citizens who make a positive contribution to society.**

These are central in the development and delivery of the curriculum across all subject areas.

Science at Brundall Primary School is very much a practical part of the curriculum that enables our children to be 'Scientists', making sense of the world around them through exploration, investigation and discovery. Through practical and meaningful experiences, we seek to develop the key scientific knowledge and the skills of observation, questioning, exploration and investigation to prepare our children for life in an increasingly scientific and technological world. Scientific enquiry skills are embedded in each topic the children study and these topics are revisited and developed throughout their time at school. Our curriculum offers a wealth of experiences and ideas that encourage children's natural curiosity, inspiring awe and wonder.

Our curriculum documents are designed to ensure that the knowledge, skills and vocabulary are mapped out and children's understanding and learning is built on each year. The aim is for our children to leave KS2 ready to take on the challenge of a subject-based timetable at secondary level and with a passion for learning and knowledge.

## **Implementation**

We teach the National Curriculum and ensure that skills and knowledge are built on year by year and sequenced appropriately to maximise learning for all children. Each phase group has a long term plan (2 year rolling plan) which allows meaningful links to be made across subjects during a half term. This provides children with the opportunity to apply their knowledge in different contexts which will help them to remember more. Skills and knowledge are built on year by year and sequenced appropriately to maximise learning for all children.

Successful timetabling is key to the success of the curriculum delivery. We have deliver our direct science teaching in 2 week blocks, dedicating 3 2 hour sessions a week, over the two week period to science. Medium Term Plans are written by year groups with the support of the Subject Leads to ensure the necessary coverage and progression as set out in the Curriculum documents. For Science, planning from The Association for Science Education (ASE) has been used to create a curriculum that is broad, balanced and deep. The Science Subject Lead has created a LTP for each year group which maps skills, knowledge and vocabulary. This is carefully mapped out to ensure that learning is progressive, also allowing the teacher to link scientific knowledge with other curriculum areas, which allows retrieval of information over an academic year, with connections made across a variety of subjects. As well as block week lessons each year group will regular complete retrieval tasks with their classes, including quizzes and link learning to other curriculum subjects. The class teacher, supported by the science subject lead, will also organise trips and visits, throughout the year, from experts who will enhance the learning experience, inspire children and open up the world of work and future careers.

The daily visual timetable in all phases from 1/2 to 5/6 informs children of what subjects will be studied when. Our aim is for children to be taught in a range of ways and for these to be recorded in their science books or in floor books. In EYFS floor books and class dojo are used to record learning.

Sessions begin with retrieval opportunities which will be recorded in floor books. These are to allow children to recall previous knowledge to help them learn more and remember more. For discussion or practical based sessions, the record in books may be photographic, showing the practical activity in progress or an image of the class flipchart / screen to which ideas have been contributed. In this way, children will be reminded of the work they have undertaken and be able to discuss and explain their learning.

Medium Term Plans will be reviewed at the end of each term with a view to making any adjustments as necessary before the next cycle. Even where all sessions have been deemed successful, subject leaders will still review plans in the light of the next cohort, taking into account any specific needs or challenges presented by that particular year group.

Monitoring through book looks, lesson visits and pupil voice, led by the Subject Lead and SLT will focus on the children and their learning journey. This will provide support where necessary, assessing the appropriate level of challenge and adapting where necessary. Teachers will identify those children who would benefit from an additional level of challenge with support from the Subject Lead.

## **Impact**

As our curriculum is a progression model, children who are succeeding with the challenges provided in each year group can be deemed to have made progress from the previous year.

Teachers will be aware of the learning journeys that their children are on and be able to provide examples of where they have adapted or deviated from plans to meet needs, evidencing that adaptation with learning in books. Learning in books will show that children take pride in their work. Activities will be able to be tracked through a coherent sequence of lessons and misconceptions will be addressed with further activities. Subject specific vocabulary will be evident in children's work.

Where children find it difficult to record their thoughts in written format, alternative recording methods (e.g. video / voice recordings on class dojo; use of an adult as a scribe) will capture their progress in a subject.

Pupil voice interviews will reveal children who are able to talk confidently about what they have learned. They will be able to talk about the specific features of different subjects and demonstrate an understanding of how what they are studying now builds upon what they have studied previously, as well as where their studies will take them next.

Children will be able to explain how they receive feedback from their teachers and how this supports their next steps learning.

By the time children at Brundall Primary School leave our school, they will have developed an enjoyment of scientific learning and a love of science. They will have an understanding and knowledge of scientific processes and developed the skills of investigation - including planning, observing, measuring, predicting, hypothesising, experimenting, communicating, interpreting, explaining and evaluating, with the use of scientific language. They will have developed the skills of working cooperatively with others and be able to tackle problems confidently and resiliently.

Children will have developed a respect for living and non-living things, building upon their own natural curiosity of the world around them and ask questions. They will have become effective communicators of scientific ideas, facts and data.

Most importantly they will have high aspirations, which will see them through to further study, work and a successful adult life.

## The Early Years Foundation Stage

### **Strong beginnings:**

During the EYFS, the children are introduced to critical learning habits - to be observant, investigative, curious, determined, imaginative, adventurous, co-operative and to use reasoning. The children are taught how to learn, how to become successful learners and how to self-regulate.

The Early Years Foundation Stage 2021 is split into 7 areas of learning.

**Prime** areas are: communication and language, physical development and personal, social and emotional development.

**Specific** areas are: literacy, mathematics, understanding the world and expressive arts and design. **Play is at the heart of all teaching in the EYFS.**

We teach the children not only the content but also how to learn. Those skills, called The Characteristics of Effective Learning, include: **playing and exploring, active learning** and **creating and thinking critically**. The key skills that we will teach EYFS children in order to prepare them to be keen scientists in KS1 are:

Reception	Communication and Language	<ul style="list-style-type: none"><li>● Learn new vocabulary.</li><li>● Ask questions to find out more and to check what has been said to them.</li><li>● Articulate their ideas and thoughts in well-formed sentences.</li><li>● Describe events in some detail.</li><li>● Use talk to work out problems and organise thinking and activities. Explain how things work and why they might happen.</li><li>● Use new vocabulary in different contexts.</li></ul>
Reception Continued	Physical Development	<ul style="list-style-type: none"><li>● Know and talk about the different factors that support their overall health and wellbeing:<ul style="list-style-type: none"><li>● regular physical activity</li><li>● healthy eating</li><li>● tooth brushing</li><li>● sensible amounts of 'screen time'</li><li>● having a good sleep routine</li><li>● being a safe pedestrian</li></ul></li></ul>

	Understanding the World	<ul style="list-style-type: none"> <li>● Explore the natural world around them.</li> <li>● Describe what they see, hear and feel while they are 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>	
ELG	Communication and Language	Listening, Attention and Understanding	<ul style="list-style-type: none"> <li>● Make comments about what they have heard and ask questions to clarify their understanding.</li> </ul>
	Personal, Social and Emotional Development	Managing Self	<ul style="list-style-type: none"> <li>● Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices.</li> </ul>
	Understanding the World	The Natural World	<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.</li> </ul>

# Phase 1 / 2 Cycle A

Topic: **Biology - Parts of the body Senses**

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

Key Vocabulary:

Senses, touch, see, smell, taste, hear, fingers (skin), eyes, nose, ear and tongue, Head, body, eyes, ears, mouth, teeth, leg, tail, wing, claw, fin, scales, feathers, fur, beak, paws, hooves

Session	Session 1	Session 2	Session 3	Session 4	Session 5
LO	Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.	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)	Take measurements of parts of their body Look for patterns between people e.g. Do people with big hands have big feet?
Working scientifically	Asking simple questions and recognising that they can be answered in different ways Observing closely	identifying and classifying using their observations and ideas to suggest answers to questions	identifying and classifying using their observations and ideas to suggest answers to questions	identifying and classifying using their observations and ideas to suggest answers to questions	Ask simple questions Use simple equipment Perform simple tests Gathering and recording data to help in answering questions



Topic: Earth Science – Seasonal change

- observe changes across the 4 seasons
- observe and describe weather associated with the seasons and how day length varies

Key Vocabulary:

Weather (sunny, rainy, windy, snowy etc.), seasons (Winter, Summer, Spring, Autumn), sun, sunrise, sunset, day length

Session	Session 1	Session 2	Session 3	Session 4	Session 5
LO	Autumn Collect information about the weather regularly throughout the year Gather data about day length regularly throughout the year and present this to compare the seasons	Winter Collect information about the weather regularly throughout the year Gather data about day length regularly throughout the year and present this to compare the seasons	Spring Collect information about the weather regularly throughout the year Gather data about day length regularly throughout the year and present this to compare the seasons	Summer Collect information about the weather regularly throughout the year Gather data about day length regularly throughout the year and present this to compare the seasons	Collect information, regularly throughout the year, of features that change with the seasons e.g. plants, animals, humans
Working scientifically	Asking simple questions and recognising that they can be answered in different ways Observing closely	identifying and classifying using their observations and ideas to suggest answers to questions	identifying and classifying using their observations and ideas to suggest answers to questions	identifying and classifying using their observations and ideas to suggest answers to questions	Ask simple questions Use simple equipment Gathering and recording data to help in answering questions

Topic: [Chemistry - Materials and their properties](#)

- 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

Key Vocabulary:

Object, material, wood, plastic, glass, metal, water, rock, brick, paper, fabric, elastic, foil, card/cardboard, rubber, wool, clay, hard, soft, stretchy, stiff, bendy, floppy, waterproof, absorbent, breaks/tears, rough, smooth, shiny, dull, see through, not see through

Term: Spring

Session	Session 1	Session 2	Session 3	Session 4	Session 5
LO	Classify objects made of one material in different ways e.g. a group of object made of metal.	Classify in different ways one type of object made from a range of materials e.g. a collection of spoons made of different materials.	Classify materials based on their properties.	Test the properties of objects e.g. absorbency of cloths.	Test the properties of objects e.g. strength of party hats made of different papers
Working scientifically	Asking simple questions and recognising that they can be answered in different ways Observing closely	Identifying and classifying using their observations and ideas to suggest answers to questions	Identifying and classifying using their observations and ideas to suggest answers to questions	Ask simple questions Use simple equipment Perform simple tests Gathering and recording data to help in answering questions	Ask simple questions Use simple equipment Perform simple tests Gathering and recording data to help in answering questions

Topic: **Biology – Identify common animals and plants**

- identify and name a variety of common wild and garden plants, including deciduous and evergreen trees
- identify and describe the basic structure of various common flowering plants, including trees

Key Vocabulary:

Leaf, flower, blossom, petal, fruit, berry, root, seed, trunk, branch, stem, bark, stalk, bud

Session	Session 1	Session 2	Session 3	Session 4	Session 5
LO	Identify, name, draw and label common wild and garden plants in the school's locality	Identify and name a variety of common deciduous and evergreen trees	Name and identify a plants and trees By labelling diagrams and pictures Make observations of how plants change over a period of time	Describe and compare the structure of a variety of common plants	Compare two leaves, seeds, flowers etc Classify leaves, seeds, flowers etc. using a range of characteristics.
Working scientifically	Asking simple questions and recognising that they can be answered in different ways Observing closely	identifying and classifying using their observations and ideas to suggest answers to questions	identifying and classifying using their observations and ideas to suggest answers to questions Observing closely	identifying and classifying using their observations and ideas to suggest answers to questions	Ask simple questions Use simple equipment Perform simple tests Gathering and recording data to help in answering questions Observing closely

## Phase 1 / 2 Cycle B

Topic: **Biology – 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)

Key Vocabulary:

Offspring, reproduction, growth, child, young/old stages (examples - chick/hen, baby/child/adult, caterpillar/butterfly),

Term : Autumn 1

Session	Session 1	Session 2	Session 3	Session 4	Session 5	Session 6
LO	What are the parts of the human body?	What are our senses?	Who is the baby? Exploring the offspring of animals.	What is the lifecycle of an animal?	What is the lifecycle of a human?	How to look after a pet. Show what they know about looking after a baby/animal by creating a parenting/pet owners' guide
Working scientifically	Identifying and classifying	Using their observations and ideas to suggest answers to questions	Using their observations and ideas to suggest answers to questions	Research: Asking simple questions and recognising that they can be answered in different ways	Using their observations and ideas to suggest answers to questions	Asking simple questions and recognising that they can be answered in different ways

Topic: **Biology – Animals including humans**

- describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.

Key Vocabulary:

exercise, heartbeat, breathing, hygiene, germs, disease, food types (examples – meat, fish, vegetables, bread, rice, pasta)

Term: Autumn 2

Session	Session 1	Session 2	Session 3	Session 4
LO	Classifying food into different food groups.	The importance of eating healthy food and a balanced diet.	The importance of keeping clean.	The importance of exercise.
Working scientifically	Identifying and classifying	Identify and classifying.	Using their observations and ideas to suggest answers to questions	Investigations. Recording data in a table. gathering and recording data to help in answering questions.

Topic: **Chemistry – 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

Key Vocabulary:

Names of materials – increased range from year 1

Properties of materials - as for year 1 plus opaque, transparent and translucent, reflective, non-reflective, flexible, rigid

Shape, push/pushing, pull/pulling, twist/twisting, squash/squashing. Bend/bending, stretch/stretching

Term: Spring 1

Session	Session 1	Session 2	Session 3	Session 4	Session 5
LO	Classify and sort different materials based on their physical properties.	Describe materials using a variety of technical vocabulary. Identify materials that are unsuitable for objects and explain why.	Exploring different solid objects. Changing materials by squashing, bending and twisting.	Investigation Test materials for waterproofness	Investigation Example: – which material would make a good .....
Working scientifically	Identifying and classifying	Using their observations and ideas to suggest answers to questions	Practical performing simple tests Record data in simple prepared tables	Practical performing simple tests gathering and recording data to help in answering questions	performing simple tests

Topic: Biology – Growing seeds and bulbs

- 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.

Key Vocabulary:

As for year 1 plus - light, shade, sun, warm, cool, water, grow, healthy

Term: Spring 2

Session	Session 1	Session 2	Session 3	Session 4	Session 5
LO	Sort a selection of seeds and bulbs. Make careful observational drawing with annotations.	Assessment What I know about plants.  Plant a variety of bulbs.	How does light affect growth? Growing sunflower seeds in dark and light.	How does warmth affect growth?	How does temperature affect growth?
Working scientifically	Identifying and classifying. Using their observations and ideas to suggest answers to questions	Observation over time. Take measurements	Comparison investigation. Gathering and recording data to help in answering questions	Observation over time. Comparison investigation.	Observation over time. Comparison investigation.

Topic: **Biology – 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

Key Vocabulary:

shelter, move, feed, names of local habitats e.g. pond, woodland etc., names of micro-habitats e.g. under logs, in bushes etc.

Term: Summer 1

Session	Session 1	Session 2	Session 3	Session 4	Session 5/6
LO	<p><u>Trip</u> Habitats: Identify that most living things live in habitats which they are suited to. Explore animals in a range of Habitats at cremers meadow.</p>	<p>Habitats: Identify that most living things live in habitats which they are suited to. Explore habitats in school grounds, including microhabitats.</p>	<p>Habitats: Identify that most living things live in habitats which they are suited to. Research other habitats. Match animals to habitats and give reasons</p>	<p>What makes a good habitat for an animal? Explore good and bad aspects of a habitat.</p>	<p>Mini beast enquiry. Animal decision boxes. Which microhabitat will a woodlouse choose and why?</p>
Working scientifically	<p>Asking simple questions and recognising that they can be answered in different way</p>	<p>Gathering and recording data to help in answering questions. Observing closely, using simple equipment</p>	<p>Research. Asking simple questions and recognising that they can be answered in different way</p>	<p>Asking simple questions and recognising that they can be answered in different ways.</p>	<p>Practical investigation. Observing closely, using simple equipment. Performing simple tests.</p>



Topic: **Biology – Living things and their habitats**

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

Key Vocabulary:

Living, dead, never been alive, suited, suitable, basic needs, food, food chain

Term: Summer 2

Session	Session 1	Session 2	Session 3	Session 4 / 5
LO	What makes something alive. Explore what things that are alive have in common.	Explore and compare the differences between things that are living, dead, and things that have never been alive	Describe how animals obtain their food. Create a food chain	Diversity in science. Explore the work of Rachel Carson and a range of other biologists.
Working scientifically	Gathering and recording data to help in answering questions. Observing closely, using simple equipment	Asking simple questions and recognising that they can be answered in different ways	Asking simple questions and recognising that they can be answered in different way	Asking simple questions and recognising that they can be answered in different way

## Phase 3 / 4 Cycle A

Topic: **Physics – 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.

Key Vocabulary:

Light, light source, dark, absence of light, transparent, translucent, opaque, shiny, matt, surface, shadow, reflect, mirror, sunlight, dangerous

Term: Autumn 1

Session	Session 1	Session 2	Session 3	Session 4	Session 5
	<p>Assessment. What I know. Revise - Light sources. To recognise that we need light in order to see things and that dark is the absence of light. Use light box Use black out curtains</p>	<p>To know that light can pass through some things and not others. Explain what the words transparent, translucent, reflective and opaque mean</p>	<p>To know that different objects reflect light differently. To investigate how reflective materials are. Use a data logger</p>	<p>Recognise that shadows are formed when the light from a light source is blocked by an opaque object. Practical</p>	<p>To know what can cause a shadow to change shape and size.  Problem solving. Create a puppet show.</p>
Working scientifically	<p>Pattern seeking Make records using bar charts. Suggest improvements for the way I looked at patterns.</p>	<p>Problem solving Comparative testing. Decide what data to collect Present information in different ways</p>	<p>Pattern seeking Begin to use and interpret data collected through data logger</p>	<p>Pattern seeking. Help to plan a fair test. Decide what data to collect.</p>	<p>Talk about, and explain, simple causal relationships using some scientific language.</p>

Topic: **Biology – Animals including humans – Nutrition**

- 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.

Key vocabulary: Nutrition, nutrients, carbohydrates, sugars, protein, vitamins, minerals, fibre, fat, water.

Term: Autumn 2

Session	Session 1	Session 2	Session 3	Session 4	Session 5
LO	MRS GREN I can understand that animals have different diets. MRS GREN	I can classify animals based on what they eat.  I can explain how living things obtain food.	Different food groups: nutrients. I can explain why my body needs different nutrients and how they keep me healthy. Nutrient matching card game	Explore food nutritional labels. Odd one out.	Plan a healthy menu. Explain the consequences of not eating a healthy diet
Working scientifically	Pattern seeking	Classifying: Venn diagrams		Researching:	Link to DT cooking a healthy meal.

Topic: Y3 Biology - Animals including humans- Muscles and skeletons

- identify that humans and some other animals have skeletons and muscles for support, protection and movement.

Key Vocabulary: skeleton, bones, muscles, support, protect, move, skull, ribs, spine, muscles, joints

Term: Spring 1

Session	Session 1	Session 2	Session 3	Session 4	Session 5
LO	Learn the names of the main bones in the human body.	I can name the functions of the skeleton. Sort and explore bones.	Compare, contrast and classify different animal skeletons. Use X-rays.	Investigation. Do people with longer femurs jump further? Do people with longer legs/taller run quicker?	Muscles and how they work. Muscles work in pairs.
Working scientifically	Asking relevant questions and using different types of scientific enquiries to answer them.	Gathering, recording, classifying and presenting data in a variety of ways to help in answering question	Identifying differences, similarities or changes related to simple scientific ideas and processes	setting up simple practical enquiries, comparative and fair tests	Using straightforward scientific evidence to answer questions or to support their findings

Topic: **Physics - Forces magnets**

- 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, 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
- Compare how things move on different surfaces

Key vocabulary: Force, push, pull, twist, contact force, non-contact force, magnetic force, magnet, strength, bar magnet, ring magnet, button magnet, horseshoe magnet, attract, repel, magnetic material, metal, iron, steel, poles, north pole, south pole.

Term: Spring 2

Session	Session 1	Session 2	Session 3	Session 4	Session 5
LO	Assessment Mind map. What is a force? Revision.  Skills enquiry Using force meters	Observe how magnets attract or repel each other. Describe magnets as having two poles. Predict whether two magnets will attract or repel depending on which poles are facing.  Practical Explore magnets	Compare and group together a variety of materials as magnetic/non magnetic.	Compare how things move on different surfaces. Friction investigation.	Explore non contact forces. Make a paperclip move without touching it. Use knowledge of magnets to create a game. Go fish, car track.
Working scientifically	Measure using standard units Make records using tables.	Pattern seeking Draw conclusions about simple patterns. Talk about patterns using scientific language.	Plan their own simple test based on a question. Draw conclusions.	Fair testing Draw conclusions, with a simple causal relationship.	Problem solving

Topic: **Biology – Life cycle – functions of flowering 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.

Key vocabulary: Photosynthesis, pollen, insect/wind pollination, seed formation, seed dispersal – wind dispersal, animal dispersal, water dispersal

Term: Summer 1

Session	Session 1	Session 2	Session 3	Session 4	Session 5	Session 6
LO	Explore different parts of a flowering plant. Dissect a flowering plant to find different parts. Label scientific drawing of flowering plant.	Set up investigation to explore how water travels up a plant – predict what you think will happen and how water travel, after exploring plant. Set up experiment – tulip/celery in vase of food dye.	Look at what has happened to tulip/celery. Make carefully observational drawing. Analysis results.  Look at the lifecycle of plants – explore different ways of pollination, seed formation and seed dispersal. Make careful observations of different types of seeds.	Over 3 weeks  Experiment – do plants need air, nutrients from soil and room to grow (as well as light and water). Set up fair test with seed to test conditions.  Make scientific drawings of experiment.	Record observations from experiment. Are the plants growing? Why/why not? Make prediction for further growth.	Record observations from experiment. How have the plant grown? Why? Analysis results.
Working scientifically	Careful observations. Scientific drawings.	Fair testing. Making predicts Recording using observations.	Careful observation. Scientific drawings.	Comparative and Fair testing Observing over time	Comparative and Fair testing Draw simple Conclusions Observing over time	Comparative and Fair testing Draw simple Conclusions Observing over time

- 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.

Key vocabulary: Rock, stone, pebble, boulder, grain, crystals, layers, hard, soft, texture, absorb water, soil, fossil, marble, chalk, granite, sandstone, slate, soil, peat, sandy/chalk/clay soil

Term: Summer 1

Session	Session 1	Session 2	Session 3	Session 4	Session 5
LO	<p>Assessment</p> <p>“What’s under the ground? Explore graphite.</p>	<p>Compare and group together different types of rock based on their physical properties.</p>	<p>Testing rocks for permeability/hardness</p> <p>Uses of rocks.</p>	<p>Recognise that soils are made from rocks and organic matter</p> <p>Soil samples</p>	<p>Describe in simple terms how fossils are formed, when living things are trapped in rock. Use fossilised animals and plants</p>
Working scientifically	<p>Classify, pattern seeking recording findings using simple scientific language, drawings, labelled diagram</p>	<p>identifying and classifying, Use Carroll and Venn diagrams Talk about criteria used to sort and classify Pattern seeking</p>	<p>Comparative and Fair testing Make records using tables and bar charts. Draw simple conclusions</p>	<p>Observing over time Suggest improvements to the way I observe</p>	<p>Talk about patterns using scientific language Draw simple conclusions about things I sorted and classified</p>

## Phase 3 / 4 Cycle B

Topic: **Biology - Teeth and digestion**

- 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

Key vocabulary: Digestive system, digestion, mouth, teeth, saliva, oesophagus, stomach, small intestine, nutrients, large intestine, rectum, anus, teeth, incisor, canine, molar, premolars, herbivore, carnivore, omnivore, producer, predator, prey, food chain

Term: Autumn 1

Session	Session 1	Session 2	Session 3	Session 4	Session 5	Session 6
LO  Dental nurse visit	Why do we have teeth? What is their purpose?	How tough are our teeth? Why do we need to look after them? What increases the risk of decay?	Why so different animals have different teeth?	Where does our food go? What is our digestive system?	Name the basic parts of the digestive system in humans.	Describe the simple functions of the basic parts of the digestive system in humans
Working scientifically	Research Annotated diagrams.	Use a range of equipment to collect data using standard measures	Sorting, grouping and classifying.	Setting up simple practical enquires.	Research	Research



Topic: Chemistry - States of matter - solid, liquid and gas. The water cycle.

- compare and group materials, 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

Key vocabulary: Solid, liquid, gas, state change, melting, freezing, melting point, boiling point, evaporation, temperature, water cycle

Term: Autumn 2

Session	Session 1	Session 2	Session 3	Session 4	Session 5
LO	compare and group materials, according to whether they are solids, liquids or gases	compare and group materials, according to whether they are solids, liquids or gases identify differences and similarities	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).	Evaporation and condensation. investigate the rate of evaporation with temperature Changes.	Learn about the water cycle. Identify the part played by evaporation and condensation in the water cycle
Working scientifically	Sorting, grouping and classifying.	Role play properties of solid liquids and gas. Venn diagram	Melting chocolate melting ice cube Observation over time Thermometer data recorded	Observation over time Evaporation and condensation. practical	Annotated diagrams. AWA workshop and guest speaker.

Topic: **Physics - 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

Key Vocabulary: Sound, source, vibrate, vibration, travel, pitch (high, low), volume, faint, loud, insulation

Term: Spring 2

Session	Session 1	Session 2	Session 3	Session 4	Session 5
LO Chroma Ensemble orchestra workshop	Mind map – what is sound? What is sound? Know how sound is made and how sound travels.	Recognise that vibrations from sounds travel through a medium to the ear.	Pitch; Find patterns between the pitch of a sound and features of the object that produced it	Recognise that vibrations from sounds travel through a medium to the ear	Volume: Recognise that sounds get fainter as the distance from the sound source increases.
Working scientifically	Investigate with a variety of materials	Set up a simple practical enquiries, comparative and fair tests.	Set up a simple investigation. Comparative test. Conclusions.	Problem solving	Simple investigation. Gather data.

Topic: **Physics – 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

Key Vocabulary: Electricity, electrical appliance/device, mains, plug, electrical circuit, complete circuit, component, cell, battery, positive, negative, connect/connections, loose connection, short circuit, crocodile clip, bulb, switch, buzzer, motor, conductor, insulator, metal, non-metal, symbol

N.B. Children in year 4 do not need to use standard symbols as this is taught in year 6

Term: Summer 1

Session	Session 1	Session 2	Session 3	Session 4	Session 5
LO	What I know already. Assessment. Electrical appliances	Construct a simple series electrical circuit.	Conductors and insulators – testing conductivity of a number of materials, gathering, recording, classifying and presenting data.	Switches: recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit  make a switch.	Uses of materials Explain the properties of materials and why they are used for different purposes.
Working scientifically	Sorting and classifying Venn diagrams	Make predictions about simple electrical circuits	Investigation	Problem solving –	Problem solving

Topic: **Biology – 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
- construct and interpret various food chains, identifying producers, predators and prey.

Key Learning: Living things can be grouped (classified) in different ways according to their features. Classification keys can be used to identify and name living things.

Term: Summer

Session	Session 1	Session 2	Session 3	Session 4	Session 5
LO	Grouping living things. Sort animals according to their characteristics	Explore and use classification keys Vertebrate	Explore and use classification keys Invertebrate/plants	Local habitat survey. What creatures would you find in different habitats? Explain.	Recognise that environments change and that this can pose dangers to living things.
Working scientifically	Identifying and classifying Venn diagrams Carroll	Classification Use a branching database to identify things	Classification Construct a simple branching database (keys) for things that have clear differences	Observation Produce a list of living things.	Research Use information sources Record what I found out in my own words Present information in different ways

## Phase 5 / 6 Cycle A

Topic: [Chemistry - Properties and changes of materials](#)

- 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.

Key vocabulary: Thermal/electrical insulator/conductor, change of state, mixture, dissolve, solution, soluble, insoluble, filter, sieve reversible/non-reversible change, burning, rusting, new material

Term: Autumn

Session	Session 1	Session 2	Session 3	Session 4	Session 5
LO	Compare and group together materials based on their properties.	Dissolving: Know that some materials will dissolve in liquid to form a solution.	Separating mixtures: Filtering Reversible changes. including evaporation to separate dissolved solids.	Can explain the results from their investigations Explore a range of non reversible changes e.g. rusting, adding fizzy tablets to water, burning.	Investigate thermal properties.
Working scientifically	Classifying: can create a chart or table grouping/comparing everyday materials by different properties.	Explore adding a range of solids to water and other liquids e.g. cooking oil, as appropriate  Investigate rates of dissolving by carrying out comparative and fair test	Pupils to respond with a suitable method to separate mixtures. Can give reasons for choice of equipment and methods to separate a given solution or mixture such as salt or sand in water	Carry out comparative and fair tests involving non reversible changes e.g. What affects the rate of rusting? What affects the amount of gas produced?	To set up an investigation to explore how well different types of cups would keep a drink warm. Present data in line graphs

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.

Key vocabulary: Force, gravity, Earth, air resistance, water resistance, friction, mechanisms, simple machines, levers, pulleys, gears

Term: Spring 1

Session	Session 1	Session 2	Session 3	Session 4	Session 5
LO	Gravity: Explain with the aid of annotated diagrams of observation that objects that have mass will fall to the earth's surface once released. Explain the effect of gravitational force.	Air resistance: Draw and illustrate diagrams to illustrate forces acting on an object including the direction to show how frictions acts in the opposing direction to motion.	Water resistance: Explain with reference to investigations that frictional force opposes motion in water.	Friction: Identify the effects of friction between moving surfaces.	Can demonstrate clearly the effects of using levers, pulleys and gears
Working scientifically	Make observations of a range of objects of different mass and shape dropped without additional thrust or downward force to record effect	Investigate and record data for a range of comparative tests. Test the effects of air resistance in a range of contexts e.g. parachutes, spinners, sails on boats	Investigate and record data for a comparative test using boat designs, or dropping different sized and shaped plasticine objects into a tube/column of water.	Investigate the effect of friction in a range of contexts e.g. trainers, bathmats, mats for a helter skelter	Make observations and measurements using force meters of 1,2 and 3 pulley systems to investigate mechanical advantage of lifting 1 kg mass vertically.

Topic: **Physics – Earth and Space**

- 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

Key vocabulary: Earth, Sun, Moon, (Mercury, Jupiter, Saturn, Venus, Mars, Uranus, Neptune) spherical, solar system, rotates, star, orbit, planets

Term: Spring 2

Session	Session 1	Session 2	Session 3	Session 4	Session 5
LO	Can use a model to explain how the Earth moves in relation to the Sun and the Moon moves in relation to the Earth	Describe the movement of the Moon relative to the Earth. Describe the Moon’s orbit as describing a circular anti clockwise circle in a flat plane with duration of	Describe the Sun, earth and moon as approximately spherical bodies. ( The earth as an oblate spheroid)	Use the idea of the Earth’s rotation to explain day and night and the apparent movement of the Sun across the sky	Make a sundial. Explain how it works
Working scientifically	Use a simple model Research	Use a simple model	Use models to compare an equally sized rotating flat circle geographical map representation of the Sun, moon and Erath to describe the difference.	With reference to models and observations explain in terms of the rotation of the Earth why shadows change and the Sun appears to move across the sky during the course of the day.	Practical research

Topic: **Biology – Living things and their habitats**

- 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

**Key vocabulary: Puberty: the vocabulary to describe sexual characteristics**

Term: Summer

Session	Session 1	Session 2	Session 3	Session 4	Session 5
LO	<p>To describe the life cycle of a plant</p> <p>Can explain how a range of plants reproduce asexually</p>	<p>Pupils can investigate the life cycles of mammals, using the process of fertilisation, and development to adulthood:</p> <p>mammal: internal fertilisation; internal development, live birth, infant child adolescent, adult.</p> <p>Buy - Caterpillar kits Tadpoles Stick insects</p>	<p>To compare the life cycles of different animals (amphibian, bird)</p> <p>Amphibian: external fertilisation; egg; external development; tadpole; frog – let; adult.</p> <p>Bird: internal fertilisation; egg; chick; fledgling; adult.</p>	<p>To investigate the life cycle of insects.</p> <p>Insect: external fertilisation; egg; pupa; chrysalis; imago; adult.</p>	<p>Describe the differences and compare life cycles.</p> <p>Can present their understanding of the life cycle of a range of animals in different ways e.g. drama, pictorially, chronological reports, creating a game</p>
Working scientifically	<p>Grow and observe plants that reproduce asexually e.g. strawberries, spider plants, potatoes.</p>	<p>Observe changes over time.</p>	<p>Classifying. Observing over time. Pattern seeking</p>	<p>Classifying. Observing over time. Pattern seeking</p>	<p>Research</p>



## Phase 5 / 6 Cycle B

Topic: **Biology – classification**

- 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

Key vocabulary: Vertebrates, fish, amphibians, reptiles, birds, mammals, invertebrates, insects, spiders, snails, worms, flowering and non-flowering

Term: Autumn 1

Session	Session 1	Session 2	Session 3	Session 4	Session 5
LO	Compare differences and similarities between leaves. Use a classification key.	Create a classification key	Give examples of the 5 taxonomic groups of vertebrate: amphibians, reptiles, fish and birds.	Research about different micro organisms and presented this in their own way.	create their own imaginary animals, giving their key features and explaining which group they would best fit into.
Working scientifically	Grouping / classification Classify plants and animals, presenting this in a range of ways e.g. Venn diagrams, Carroll diagrams and keys	Make own keys and branching databases	Research	Research Use secondary sources to identify and classify things	Research Evaluate how well keys work Recognise significance in sorting and classifying

Topic: **Physics- electricity**

- 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.

Key Vocabulary: Circuit, complete circuit, circuit diagram, circuit symbol, cell, battery, bulb, buzzer, motor, switch, voltage

NB Children do not need to understand what voltage is but will use volts and voltage to describe different batteries. The words cells and batteries are now used interchangeably

Term: Autumn 2

Session	Session 1	Session 2	Session 3	Session 4	Session 5	Session 5
LO	Construct a simple series circuit (with a switch and a varying number of cells, lamps and buzzers.) Use standard symbols to draw a circuit diagram.	Read circuit diagrams and assess whether they work. Build circuits from diagrams.	What are the effects of differing voltages in a circuit?	What is the effect of adding more batteries to a circuit?	Investigation - Varying number of bulbs, length of wire, and loudness of buzzer in a circuit.	Making a product.
Working scientifically	Pattern seeking	Pattern seeking	Use equipment accurately to collect observations Present data in line graphs	Use equipment accurately to collect observations Present data in line graphs	Plan and carry out a fair test.	Using test results to make predictions to set up further comparative and fair tests.

Topic: **Biology - Animals, including humans – Circulatory system**

- 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

Key vocabulary: Heart, pulse, rate, pumps, blood, blood vessels, transported, lungs, oxygen, carbon dioxide, nutrients, water, muscles, cycle, circulatory system, diet, exercise, drugs and lifestyle

Term: Spring 1

Session	Session 1	Session 2	Session 3	Session 4	Session 5
LO	Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood.  PIG heart dissection	Pulse rate investigation Are our resting pulse rates all the same?’	Test the effect of different activities on pulse rate.	Research the circulatory system. Describe the ways in which nutrients and water are transported within animals, including humans. Discuss The impact of diet, exercise, drugs and lifestyle on the way their bodies function	Design a poster to show the impact of diet, exercise, drugs and lifestyle on the way the body functions.
Working scientifically	Observation	Measure using standard units. Prepare own tables to record data	Plan a simple comparative test. Plot a line graph	Research. Use relevant information and data from a range of sources	Research Present findings in a suitable format

Topic: **Physics – Light**

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.

Key vocabulary: As for year 3 plus straight lines, light rays.

Term: Summer

Session	Session 1	Session 2	Session 3	Session 4	Session 5	Session 6
LO	How do we see? Light sources: 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.	Does light travel in straight lines or curved lines? Enquiry 'Up periscope' Take measurements with scientific equipment, with increasing accuracy. To report data and results using scientific diagrams and labels	What is refraction?	What colour is light?	How do we see colours?	Who is Sir Isaac Newton?
Working scientifically	Practical enquiry using test results to make predictions to set up further comparative and fair tests	Problem solving taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat	Practical enquiry using test results to make predictions to set up further comparative and fair	Problem solving taking measurements, using a range of scientific equipment, with increasing	planning different types of scientific enquiries to answer questions, including recognising and controlling	Research.

		readings when appropriate	tests	accuracy and precision, taking repeat readings when appropriate	variables where necessary	
--	--	---------------------------	-------	---	---------------------------	--

Topic: **Biology – Evolution and inheritance**

:

- 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.

Key vocabulary: Offspring, sexual reproduction, vary, characteristics, suited, adapted, environment, inherited, species, fossils

Term: Spring 2

Session	Session 1	Session 2	Session 3	Session 4	Session 5
LO	I can explain the scientific concept of inheritance.	I can demonstrate understanding of the scientific meaning of adaptation.	I can identify the key ideas of the theory of evolution. Evidence of evolution from fossil records. Use fossils collections	I can understand how human beings have evolved.	Adaptations How adaptations can result in both advantages and disadvantages
Working scientifically	Pattern seeking	Research	Research	Research	Observation

## Working Scientifically Skills Progression



### Progression in working scientifically skills

NB - The National Curriculum statements in *italics* in these tables indicate that they feature more than once.

Year 1 & 2	Year 3 & 4	Year 5 & 6
<b>Asking questions and recognising that they can be answered in different ways</b>		
<p><b>Asking simple questions and recognising that they can be answered in different ways</b></p> <ul style="list-style-type: none"> <li>While exploring the world, the children develop their ability to ask questions (such as what something is, how things are similar and different, the ways things work, which alternative is better, how things change and how they happen). Where appropriate, they answer these questions.</li> <li>The children answer questions developed with the teacher often through a scenario.</li> <li>The children are involved in planning how to use resources provided to answer the questions using different types of enquiry, helping them to recognise that there are different ways in which questions can be answered.</li> </ul>	<p><b>Asking relevant questions and using different types of scientific enquiries to answer them</b></p> <ul style="list-style-type: none"> <li>The children consider their prior knowledge when asking questions. They independently use a range of question stems. Where appropriate, they answer these questions.</li> <li>The children answer questions posed by the teacher.</li> <li>Given a range of resources, the children decide for themselves how to gather evidence to answer the question. They recognise when secondary sources can be used to answer questions that cannot be answered through practical work. They identify the type of enquiry that they have chosen to answer their question.</li> </ul>	<p><i>Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</i></p> <ul style="list-style-type: none"> <li>Children independently ask scientific questions. This may be stimulated by a scientific experience or involve asking further questions based on their developed understanding following an enquiry.</li> <li>Given a wide range of resources the children decide for themselves how to gather evidence to answer a scientific question. They choose a type of enquiry to carry out and justify their choice. They recognise how secondary sources can be used to answer questions that cannot be answered through practical work.</li> </ul>
<b>Making observations and taking measurements</b>		
<p><b>Observing closely, using simple equipment</b></p> <ul style="list-style-type: none"> <li>Children explore the world around them. They make careful observations to support identification, comparison and noticing change. They use appropriate senses, aided by equipment such as magnifying glasses or digital microscopes, to make their observations.</li> <li>They begin to take measurements, initially by comparisons, then using non-standard units.</li> </ul>	<p><b>Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers</b></p> <ul style="list-style-type: none"> <li>The children make systematic and careful observations.</li> <li>They use a range of equipment for measuring length, time, temperature and capacity. They use standard units for their measurements.</li> </ul>	<p><b>Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate</b></p> <ul style="list-style-type: none"> <li>The children select measuring equipment to give the most precise results e.g. ruler, tape measure or trundle wheel, force meter with a suitable scale.</li> <li>During an enquiry, they make decisions e.g. whether they need to: take repeat readings (fair testing); increase the sample size (pattern seeking); adjust the observation period and frequency (observing over time); or check further secondary sources (researching); in order to get accurate data (closer to the true value).</li> </ul>
<b>Engaging in practical enquiry to answer questions</b>		
<p><b>Performing simple tests</b></p> <ul style="list-style-type: none"> <li>The children use practical resources provided to gather evidence to answer questions generated by themselves or the teacher. They carry out: tests to classify; comparative tests; pattern seeking enquiries; and make observations over time.</li> </ul> <p><b>Identifying and classifying</b></p> <ul style="list-style-type: none"> <li>Children use their observations and testing to compare objects, materials and living</li> </ul>	<p><b>Setting up simple practical enquiries, comparative and fair tests</b></p> <ul style="list-style-type: none"> <li>The children select from a range of practical resources to gather evidence to answer questions generated by themselves or the teacher.</li> <li>They follow their plan to carry out: observations and tests to classify; comparative and simple fair tests; observations over time; and pattern seeking.</li> </ul>	<p><i>Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</i></p> <ul style="list-style-type: none"> <li>The children select from a range of practical resources to gather evidence to answer their questions. They carry out fair tests, recognising and controlling variables. They decide what observations or measurements to make over time and for how long. They look for patterns and relationships using a suitable sample.</li> </ul>

<p>things. They sort and group these things, identifying their own criteria for sorting.</p> <ul style="list-style-type: none"> <li>• They use simple secondary sources (such as identification sheets) to name living things. They describe the characteristics they used to identify a living thing.</li> </ul>	<div style="border: 1px solid black; padding: 5px;"> <p><b>Explanatory note</b> A comparative test is performed by changing a variable that is qualitative e.g. the type of material, shape of the parachute. This leads to a ranked outcome.</p> <p>A fair test is performed by changing a variable that is quantitative e.g. the thickness of the material or the area of the canopy. This leads to establishing a causative relationship.</p> </div>	
---	---	--

<b>Recording and presenting evidence</b>		
--	--	--

<p><b>Gathering and recording data to help in answering questions</b></p> <ul style="list-style-type: none"> <li>• The children record their observations e.g. using photographs, videos, drawings, labelled diagrams or in writing.</li> <li>• They record their measurements e.g. using prepared tables, pictograms, tally charts and block graphs.</li> <li>• They classify using simple prepared tables and sorting rings.</li> </ul>	<p><b>Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions</b></p> <p><b>Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables</b></p> <ul style="list-style-type: none"> <li>• The children sometimes decide how to record and present evidence. They record their observation e.g. using photographs, videos, pictures, labelled diagrams or writing. They record their measurements e.g. using tables, tally charts and bar charts (given templates, if required, to which they can add headings). They record classifications</li> </ul>	<p><b>Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs</b></p> <ul style="list-style-type: none"> <li>• The children decide how to record and present evidence. They record observations e.g. using annotated photographs, videos, labelled diagrams, observational drawings, labelled scientific diagrams or writing. They record measurements e.g. using tables, tally charts, bar charts, line graphs and scatter graphs. They record classifications e.g. using tables, Venn diagrams, Carroll diagrams and classification keys.</li> </ul>
---	--	---

	<p>e.g. using tables, Venn diagrams, Carroll diagrams.</p> <ul style="list-style-type: none"> <li>• Children are supported to present the same data in different ways in order to help with answering the question.</li> </ul>	<ul style="list-style-type: none"> <li>• Children present the same data in different ways in order to help with answering the question.</li> </ul>
--	--	--

<b>Answering questions and concluding</b>		
---	--	--

<p><b>Using their observations and ideas to suggest answers to questions</b></p> <ul style="list-style-type: none"> <li>• Children use their experiences of the world around them to suggest appropriate answers to questions. They are supported to relate these to their evidence e.g. observations they have made, measurements they have taken or information they have gained from secondary sources.</li> </ul>	<p><b>Using straightforward scientific evidence to answer questions or to support their findings.</b></p> <ul style="list-style-type: none"> <li>• Children answer their own and others' questions based on observations they have made, measurements they have taken or information they have gained from secondary sources. The answers are consistent with the evidence.</li> </ul>	<p><b>Identifying scientific evidence that has been used to support or refute ideas or arguments</b></p> <ul style="list-style-type: none"> <li>• Children answer their own and others' questions based on observations they have made, measurements they have taken or information they have gained from secondary sources. When doing this, they discuss whether other evidence e.g. from other groups, secondary sources and their scientific understanding, supports or refutes their answer.</li> <li>• They talk about how their scientific ideas change due to new evidence that they have gathered.</li> <li>• They talk about how new discoveries change scientific understanding.</li> </ul>
<p><b>Using their observations and ideas to suggest answers to questions</b></p> <ul style="list-style-type: none"> <li>• The children recognise 'biggest and smallest', 'best and worst' etc. from their data.</li> </ul>	<p><b>Identifying differences, similarities or changes related to simple scientific ideas and processes</b></p> <ul style="list-style-type: none"> <li>• Children interpret their data to generate simple comparative statements based on their evidence. They begin to identify naturally occurring patterns and causal relationships.</li> </ul>	<p><b>Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations</b></p> <ul style="list-style-type: none"> <li>• In their conclusions, children: identify causal relationships and patterns in the natural world from their evidence; identify</li> </ul>



	<p><i>Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions</i></p> <ul style="list-style-type: none"> <li>• They draw conclusions based on their evidence and current subject knowledge.</li> </ul>	<p>results that do not fit the overall pattern; and explain their findings using their subject knowledge.</p>
--	--	---

#### Evaluating and raising further questions and predictions

	<p><i>Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions</i></p> <ul style="list-style-type: none"> <li>• They identify ways in which they adapted their method as they progressed or how they would do it differently if they repeated the enquiry.</li> </ul>	<p><i>Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations</i></p> <ul style="list-style-type: none"> <li>• They evaluate, for example, the choice of method used, the control of variables, the precision and accuracy of measurements and the credibility of secondary sources used.</li> <li>• They identify any limitations that reduce the trust they have in their data.</li> </ul>
--	--	---

	<p><i>Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions</i></p> <ul style="list-style-type: none"> <li>• Children use their evidence to suggest values for different items tested using the same method e.g. the distance travelled by a car on an additional surface.</li> <li>• Following a scientific experience, the children ask further questions which can be answered by extending the same enquiry.</li> </ul>	<p><i>Using test results to make predictions to set up further comparative and fair tests</i></p> <ul style="list-style-type: none"> <li>• Children use the scientific knowledge gained from enquiry work to make predictions they can investigate using comparative and fair tests.</li> </ul>
--	---	---

#### Communicating their findings

	<p><i>Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions</i></p> <ul style="list-style-type: none"> <li>• They communicate their findings to an audience both orally and in writing, using appropriate scientific vocabulary.</li> </ul>	<p><i>Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations</i></p> <ul style="list-style-type: none"> <li>• They communicate their findings to an audience using relevant scientific language and illustrations.</li> </ul>
--	---	---

## Vocabulary Progression

Year					
1	<b>Animals including humans</b> Fish, Reptiles, Mammals, Birds, Amphibians (+ examples of each) Herbivore, Omnivore, Carnivore, Leg, Arm, Elbow, Head, Ear, Nose, Back, Wings, Beak	<b>Plants</b> deciduous, evergreen trees, leaves, flowers (blossom), petals, fruit, berry, roots, bulb, seed, trunk, branches, stem, stalk, bark, bud	<b>Everyday Materials</b> Wood, Plastic, Glass, Paper, Water, Metal, Rock, Hard, Soft, Bendy, Rough, Smooth, push, pull, speed	<b>Seasonal Changes</b> Summer, Spring, Autumn, Winter, Sun, Day, Moon, Night, Light, Dark	
2	Survival, Water, Air, Food, Adult, Baby, Offspring, Kitten, Calf, Puppy, Exercise, Hygiene	Light, shade, sun warm, cool, water, grow healthy, temperature	Stretchy, Stiff, Shiny, Dull, Rough, Waterproof, Absorbent, Opaque, Transparent Brick, Paper, Fabrics, Squashing, Bending, Twisting, Stretching Elastic, Foil		<b>Living things and their habitats</b> Living, Dead, Habitat, Energy, Food chain, Predator, Prey, Woodland, Pond, Desert
3	Movement, Muscles, contract, relax Bones, Skull, Skeletons, Vertebrates, invertebrates Nutrition,	Photosynthesis, nutrients, soil, Reproduction, Transportation, Dispersal, Pollination, seed formation, seed dispersal(Wind, animal, water)	<b>Rocks</b> Sedimentary, Metamorphic, Igneous, Fossils, Soils, Sandstone, Granite, Marble, Pumice, Pebble, Crystals, Absorbent	<b>Light</b> Shadows, Mirror, Reflective, Dark, Reflection	<b>Forces and magnets</b> Magnetic, Force, Contact, Non contact, Attract, Repel, Poles, North, South, Friction, Texture
4	Mouth, Tongue, Teeth, Oesophagus, Stomach, Small Intestine, Large Intestine, Canine, Incisor, Molar	<b>Living things and habitats</b> Classification, classification keys, Environment, hibernate, migrate.	<b>States of Matter</b> Solid, Liquid, Gas, Evaporation, Condensation, Particles, Temperature, Freezing, Heating Water cycle	<b>Sound Source,</b> Volume, Vibration, Wave, Pitch( high, low) Tone, Faint, Travel, Insulation	<b>Electricity</b> Cells, Wires, Bulbs, Switches, Buzzers, Battery, Circuit, Conductors, Insulator
5	Foetus, Embryo, Womb, Gestation, Baby, Toddler, Teenager, Elderly, Growth, Development, Puberty	Mammal, Reproduction, Insect, Amphibian, Bird, Offspring	<b>Properties and changes of materials</b> Hardness, Solubility, Transparency, Conductivity, Magnetic, Filter, Evaporation, Dissolving, Mixing	<b>Earth and Space</b> Earth, Sun, Moon, Axis, Rotation, Day, Night, Phases of the Moon, star, constellation, Gravity, Resistance,	<b>Forces</b> Air resistance, Water resistance, Friction, Gravity, Newton, Gears, Pulleys

6	Circulatory, Heart, Blood Vessels, Veins, Arteries, Oxygenated, Deoxygenated, Valve, Exercise, Respiration	Classification, Micro organisms,	<b>Evolution and Inheritance</b> Adaptation, Evolution, Characteristics, Reproduction, Genetics, Species, Adapted, Suited, Vary, Offspring, Inherited	<b>Light</b> Refraction, Reflection, Light, Spectrum, Rainbow, Colour,	<b>Electricity,</b> Series, Conductors, Insulators, Amps, Volts, Circuit diagram symbols
---	--	----------------------------------	--	---	---

## Assessment

As our curriculum is progressive in both knowledge and skills it is essential that children have the opportunity to revisit their learning throughout the year so that they become fluent and can make connections in other areas of their learning. This can be achieved through quizzes, text types chosen for reading activities and other tasks designed to test knowledge and understanding of taught content.

As the skills and knowledge are organised carefully to progress and be retained over time, a child who can recall and use them in different contexts is considered to be making progress. Due to the organisation of the curriculum, learning outcomes are clear and assessment tasks are being designed to accurately assess learning. They will recall, develop and deepen their knowledge and skills as they move into the next year. Our aim is for our children to build on schemas and become more skilled and knowledgeable as 'scientists'.

At Brundall Primary School we know that children are making good progress because our curriculum has been designed to teach new knowledge and skills whilst revisiting and building on previous schemas.

### Assessment design – how can children show what they have learned?

Subject leaders match assessment model to content	Multiple choice questions – careful design	Quick quizzes	Examples and non examples
Well framed questions	Diagrams	Explaining	Show me
Debates/plays	Writing/ Comprehension/ Short answers	Make or produce...	Other ideas formed with subject leaders

## Appendix – Big Ideas in Science

### Physics

The universe follows unbreakable rules that are all about forces, matter and energy. Forces are different kinds of pushes and pulls that act on all the matter that is in the universe. Matter is all the stuff, or mass, in the universe.

Energy, which cannot be created or destroyed, comes in many different forms and tends to move away from objects that have lots of it.

### Chemistry

All matter (stuff) in the universe is made up of tiny building blocks.

The arrangement, movement and type of the building blocks of matter and the forces that hold them together or push them apart explain all the properties of matter (e.g. hot/cold, soft/hard, light/heavy, etc.).

Matter can change if the arrangement of these building blocks changes.

### Biology

Living things are special collections of matter that make copies of themselves, use energy and grow.

Living things on Earth come in a huge variety of different forms that are all related because they all came from the same starting point 4.5 billion years ago.

The different kinds of life, animals, plants and microorganisms, have evolved over millions of generations into different forms in order to survive in the environments in which they live.

### Earth science

The Earth is one of eight planets that orbit the sun.

The Earth is tilted and spins on its axis leading to day and night, the seasons and the climate. The Earth is made up of several layers, including a relatively thin rocky surface which is divided into tectonic plates, and the movement of these plates leads to many geologic events (such as earthquakes and volcanoes) and geographical features (such as mountains.)