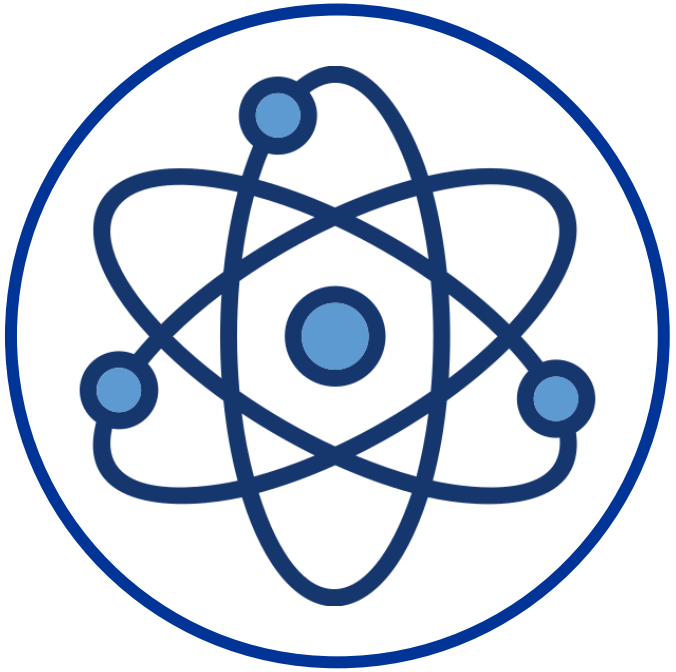
Subject Overview

Science



Here, children thrive...

Science curriculum intent

Our high-quality science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. We want children to learn how science has changed and influenced our lives and is vital to the world's future prosperity. All pupils are taught essential aspects of the knowledge, methods, processes and uses of science. Through building up a body of key foundational knowledge and concepts, children are encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They are encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes.

Through our study of Science, we aim to ensure all pupils:

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

Implementation

Curriculum structure & sequencing

We structure our Science curriculum by using the National Curriculum. This allows all our children, in every year group, to have a full and in depth understanding of the biology, chemistry and physics strands. In each year group, all children have the opportunity to study a scientist who links with a taught topic that year.

Content & concepts

Our aim is to ensure that our Science curriculum consists of more than simply learning scientific concepts and factual information. In each unit, teachers plan for multiple opportunities for children to actively participate within their learning, through a range of individual activities and investigations. At the start of each unit, teachers make sure that pupils are confident with prior learning to ensure all learning is progressive.

Enrichment and personal development:

At Boughton Heath, children have a range of enrichment opportunities. Pupils from KS1 and KS2 have the opportunity to attend STEM club and learn further about science, technology, engineering and maths. Each year, every class partakes in Science Week and engages with a school-wide theme.

Assessment and next steps

We assess Science in a variety of ways, giving pupils the opportunity to explain their reasoning and metacognition of a topic as well as their accumulation of knowledge. This may be done through practical exercises, group tasks, quizzes or discussion. We value developing scientific oracy and place great emphasis on children being able to explain how, and why; understanding the knowledge and skills within scientific learning.

Science in Early Years Foundation Stage

Whilst not a standalone area of learning within the Early Years Foundation Stage, Science forms important parts of various aspects of the EYFS framework. The very nature of scientific inquiry, trial and error and investigation; lend themselves perfectly to the way children in early years engage with and explore the environment around them, and science can be seen within the teaching and learning of the following areas of EYFS:

- Communication and Language,
- Personal, Social and Emotional Development,
- Understanding the World

Through the study of science in early years, children will not only learn about the world around them and the associated processes that occur naturally and via through stimulation; they will also learn important self care skills and ways in which they can use and look after their bodies.

Effective teaching of science within the early years establishes not only a solid foundation on which to build further scientific learning, it also develops critical thinking, questioning skills and a thirst for knowledge and enquiry which will serve children well as we strive to develop a love of learning which will stay with them throughout their school years and beyond.

Links to Development Matters

Communication and Language

1. 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 help work out problems and organise thinking and activities, and to explain how things work and why they might happen.
• Use new vocabulary in different contexts.

Personal, Social and Emotional 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

Links to Development Matters (continued)

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

Links to Early Learning Goals

Listening, attention and understanding

.Listen attentively and respond to what they hear with relevant questions, comments and actions when being read to and during whole class discussions and small group interactions,

.Make comments about what they have heard and ask questions to clarify their understanding,

Speaking

.Participate in small group, class and one-to-one discussions, offering their own ideas, using recently introduced vocabulary,

.Offer explanations for why things might happen, making use of recently introduced vocabulary from stories, non-fiction, rhymes and poems when appropriate;

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.

.

Managing self

.Be confident to try new activities and show independence, resilience and perseverance in the face of challenge ,

.Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices.

Inclusion within Science

We are an inclusive school and as such, do not believe in narrowing the curriculum for any learner. Our curriculum is designed with inclusion of all at heart, and our curriculum intent is therefore the same for all children.

However we are mindful that there are an abundance of factors which need to be considered in order for all learners to be able to access learning according to their individual needs; perhaps none more so than for those learners with Special Educational Needs and Disabilities (SEND).

Therefore, whilst our curriculum intent is the same for all learners; our implementation of the curriculum may well look different for different groups of pupils. Teachers will plan, scaffold, challenge and embed learning through activities which are adapted to meet children's needs – we call this adapted implementation. This is to ensure that our curriculum can be met by all within an inclusive environment, mindful and responsive to children's needs.

We use guidance set out within the NASEN teacher handbook to assist us in amending our implementation within Science. Examples of this, though not an exhaustive list, can be seen to the right. Note, these are suggestions of what may be implemented but all teachers will amend according to learner need.

Same intent, adapted implementation

- Word banks and picture resources may be supplied to assist learners with scientific language and processes.
- Staff may scribe for children to ensure a child's scientific explanations and articulation is not limited by writing competence.
- Make regular references to relevant language throughout the lesson and school day using tools such as working and display walls.
- Where necessary, provide pre teaching opportunities to hear vocabulary and develop conceptual understanding prior to the lesson.
- Use small group teaching opportunities to dedicate more time and support to provide additional learning opportunities to learners working towards a planned objective.
- Provide learners with targeted resources to support their learning and understanding such as concept cartoons and visual aids.

Science Curriculum **Working Scientifically – approach & skill set**

Over the course of an academic year, pupils should carry out different types of investigations that involve different types of enquiry approaches as can be seen in the Approaches column. These approaches provide the opportunity for children to develop a multitude of scientific knowledge through the use of enquiry skills. These can be seen in the column labelled Skills

Teachers and pupils focus on recording specific enquiry skills during practical lessons. For example, pupils could record their data in a table or write a short paragraph to say what they found out following an observation.

Teaching in this way ensures our children receive full coverage of the requirements of the National Curriculum, alongside opportunities to learn, develop and embed specific scientific skills which progress year on year. The progression of such skills for each year group can be found in the following pages, alongside the progression of National Curriculum objectives.

Approaches

Comparative / fair testing
Changing one variable to see its effect on another, whilst keeping all others the same.

Research
Using secondary sources of information to answer scientific questions.

Observation over time
Observing changes that occur over a period of time ranging from minutes to months.

Pattern-seeking
Identifying patterns and looking for relationships in enquiries where variables are difficult to control.

Identifying, grouping and classifying
Making observations to name, sort and organise items.

Problem-solving
Applying prior scientific knowledge to find answers to problems.

Skills

Asking questions
Asking questions that can be answered using a scientific enquiry.

Making predictions
Using prior knowledge to suggest what will happen in an enquiry.

Setting up tests
Deciding on the method and equipment to use to carry out an enquiry.

Observing and measuring
Using senses and measuring equipment to make observations about the enquiry.

Recording data
Using tables, drawings and other means to note observations and measurements.

Interpreting and communicating results
Using information from the data to say what you found out.

Evaluating
Reflecting on the success of the enquiry approach and identifying further questions for enquiry.

Boughton Heath Academy Curriculum Road Map - Science

Year R

- Nocturnal Animals
- The Seasons
- Farm and Food
- Life Cycles
- Minibeasts
- Under the Sea

Year 1

- The Human Body
- Materials
- Seasonal Change: Autumn and Winter
- Animals Seasonal Change: Spring
- Caring for our Planet
- Plants Seasonal Change: Summer
- Growing and Cooking

Year 2

- Animal needs For survival Humans
- Materials Plastics
- Plants Living things and their habitats
- Light and Dark
- Plants Growing Up
- Bulbs and Seeds Wildlife
- Skeletons Movement Nutrition and Diet
- Food Waste Rocks
- Fossils Soils
- Light
- Plants
- Forces Magnets
- Group and Classify living things
- States of matter
- Electricity Energy
- Sound

Year 3

Year 4

Year 5

- Habitats Deforestation
- The Digestive System Food Chains
- Forces Space
- Global Warming
- Properties of materials
- Animals including Humans Life Cycles
- Reproduction Plastic Pollution
- Reversible and Irreversible changes

Year 6

- Living things and their habitats
- Electricity Renewable Energy
- Light The Circulatory System
- Diet, drugs and lifestyle
- Variation Adaptations
- Fossils

Boughton Heath Academy – Science Endpoints

Reception	Year One	Year Two	Year Three	Year Four	Year Five	Year Six
Nocturnal Animals	**The Human Body**	**Animals needs for survival**	**Skeletons**	**Grouping and classifying living things**	**Forces**	**Living things and their habitats**
Learn about the behaviour, habitats, and characteristics of nocturnal animals such as owls, bats, and foxes.	I can identify, name, draw, label the basic parts of the human body, and associate each sense with the corresponding part of the body.	I can learn about living things, understand where they live, what they eat, and how they depend on each other in different habitats.	I can recognise that humans have skeletons made up of many bones serving different functions, and that similar variations exist in skeletons of other animals, while understanding that joints, muscles, and bones work together to enable movement.	I can group and classify animals and plants by knowing that vertebrates have spines and include mammals, birds, fish, amphibians, and reptiles, while invertebrates don't have spines, and I can use classification keys with closed questions to do this accurately.	I can explain that objects fall to Earth because of the force of gravity, recognize the effects of forces like air resistance, water resistance, and friction on moving objects, and understand that some tools, such as levers, pulleys, and gears, make it easier to apply forces to objects.	I can explain how we group living things like plants, animals, and micro-organisms into different categories by looking at what makes them alike and different, and I can tell why we do this based on their special features.
The Seasons	**Seasonal Change**	**Humans**	**Rocks**	**States of matter**	**Space**	**Electricity**
Learn and explore the different seasons, including the weather, changes in nature, and holidays associated with each season.	I can observe and describe changes across the four seasons, including weather patterns associated with each season and variations in day length.	I can understand the life cycle of animals, including humans, and their basic survival needs for water, food, and air, while also recognizing the significance of exercise, proper nutrition, and hygiene for human well-being.	I can discover that rocks come in different types, like those with grains or shiny crystals, some have layers, and they can be heavy or light, and people use them to build things, while some rocks change as they get older.	I can understand the three states of matter and how we can interchange between them, understanding how this can be seen in the water cycle.	I can describe how the Earth and other planets move around the Sun, explain how the Moon moves around the Earth, and understand that the Sun, Earth, and Moon are roughly round, using the Earth's rotation to explain day, night, and the Sun's movement in the sky.	I can connect the brightness of a lamp or the loudness of a buzzer to the number and power of batteries in the circuit, explain why components like bulbs and buzzers work differently, and draw simple circuit diagrams using symbols.
Farm and Food	**Everyday Materials**	**Materials**	**Nutrition and Diet**	**Sound**	**Properties of materials**	**Light**
I know about the origins of food from a farm by exploring the animals and plants that grow on a farm and understanding the types of jobs needed to produce food.	I can distinguish between objects and the materials they are made from, identify and name various everyday materials such as wood, plastic, glass, metal, water, and rock, describe their simple physical properties, and compare and group them based on these properties.	I can learn which everyday materials, like wood, metal, plastic, glass, brick, rock, paper, and cardboard, are good for different tasks, and I can see how we can change the shape of some things made from these materials by squashing, bending, twisting, or stretching them.	I can learn that humans and animals need different types of food to stay healthy, like fruits and veggies for vitamins, carbs for energy, protein for muscles, and dairy for teeth and bones. We should eat a balanced diet, and animals eat what they need, which can be plants or other animals.	I can understand how sounds are made through vibrations, how they travel through a medium to the ear, and find patterns between the pitch/volume of a sound and the strength/features of the object that produced it while also acknowledging that sounds get fainter as distance from the source increa.es.	Understand and group everyday materials based on their properties, knowledge of their solubility and recovery from a solution, separate mixtures through filtering, sieving, and evaporation, determine the particular uses of everyday materials based on evidence.	Recognise that light travels in straight lines, and use this concept to explain why objects are seen when they give out or reflect light into the eye, how we see things, and why shadows have the same shape as the objects that cast them.
Minibeasts	**Animals**	**Plastic**	**Food Waste**	**Electricity**	**Animals, including humans**	**The circulatory system**
I can compare, sort minibeasts, discovering where they live and create habitats suitable for them such as a bug hotel.	Identify, name, and describe a variety of common animals including fish, amphibians, reptiles, birds, and mammals, including pets, their diets, and compare their structures.	I can understand that plastic can be both helpful and harmful, some can be recycled while others cannot, and I can learn ways to reduce my plastic waste.	I can learn that food waste means throwing away good food, but we can do things like turning some of it into compost or finding other ways to use it to help the Earth.	Identify electric appliances, construct and identify parts of a simple series circuit, predict if a lamp will light in a complete loop with a battery, understand the function of switches in circuits, and identify conductors/insulators and their properties such as metals being good conductors.	Describe the changes as humans develop to old age.	I can identify the parts of the human circulatory system and their functions.

Boughton Heath Academy – Science Endpoints

Reception	Year One	Year Two	Year Three	Year Four	Year Five	Year Six
Life Cycles	**Plants**	**Plants**	**Foss**	**Living things and their habitats**	**Reproduction**	**Diet, drugs and lifestyle**
Find out about the life cycles of plants and animals, including how they grow and change over time, and the different stages involved in their development.	Identify, name, and describe the basic structure of a variety of common wild and garden plants, including deciduous and evergreen trees and common flowering plants.	Observe and describe the growth process of seeds and bulbs into mature plants, and find out how plants require water, light, and appropriate temperature to sustain their growth and health.	I can describe in simple terms how fossils are formed when things that have lived are trapped within rock.	Learn to group and identify living things using classification keys and understand the impact of changing environments on living organisms.	Understand the differences in life cycles among mammals, amphibians, insects, and birds, and describe the process of reproduction in certain plants and animals.	I can understand how diet, exercise, drugs, and lifestyle impact bodily functions, and describe how nutrients and water are transported in animals, including humans.
Under the Sea	**Growing and Cooking**	**Living things and their habitats**	**Soils**	**The Digestive System**	**Reversible and irreversible changes**	**Variations and Adaptations**
I know the names of sea creatures and plants and can explore the similarities and differences among them, talking about coral reefs and their importance under the sea.	I can observe and gather data from planting seeds and answer simple questions about what I have found out.	I can explore the differences between living, dead, and non-living things, identify how living things are adapted to their habitats and their dependence on each other, recognise various plants and animals in their habitats, describe how animals acquire food through a simple food chain and name different sources of food.	I can recognise that soils are made from rocks and organic matter.	Understand the basic functions of human digestive system, identify types of human teeth and their functions.	I can differentiate between reversible and irreversible changes, including those associated with the formation of new materials, such as burning and the action of acid on bicarbonate of soda.	I can recognise the changes of living things over time through fossils, the variation of offspring from parents, and the adaptation of animals and plants to their environment, which may lead to evolution.
			Light	**Food Chains**		
			Recognise and understand the properties of light, including its necessity for vision, reflection from surfaces, potential danger to our eyes, formation of shadows by opaque objects, and patterns in the changing size of shadows.	I can construct/interpret food chains by identifying producers, predators and prey.		
		Growing Up	**Plants**			
		I can understand the life cycle of animals, including humans, and their basic survival needs for water, food, and air.	Identify and describe the functions of different parts of flowering plants, explore their requirements for life and growth, investigate water transportation within plants, and explore the role of flowers in the life cycle of flowering plants.			
			Forces and Magnets			
			Compare and classify the movement of objects on different surfaces and explore the effects of contact and magnetic forces, including how magnets have two poles and can attract or repel each other and certain materials.			

Progression in Substantive Knowledge

Animals, including humans

White Rose SCIENCE

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
• 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	• 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	• 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	• 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	• Describe the changes as humans develop to old age	• 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
Autumn 1 Spring 2	Autumn 1, Autumn 2 Spring 2 Summer 2, Summer 4	Autumn 1, Autumn 2, Autumn 3	Summer 4, Summer 5	Spring 2	Summer 3, Summer 4

Living things and their habitats

White Rose SCIENCE

Year 2	Year 4	Year 5	Year 6
• 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	• 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	• 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	• 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
Spring 2 Summer 2, Summer 4	Autumn 1, Autumn 2 Spring 2 Summer 1, Summer 2	Spring 3 Summer 1, Summer 4	Autumn 1

Plants

White Rose SCIENCE

Year 1	Year 2	Year 3
• 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	• 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	• 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
Spring 1, Spring 5 Summer 1, Summer 2	Spring 1, Spring 3 Summer 1, Summer 3	Summer 1, Summer 4

Materials

White Rose SCIENCE

Year 1	Year 2	Year 5
• 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	• 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	• 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
Autumn 3	Autumn 3	Spring 1 Summer 2

Rocks

White Rose SCIENCE

Year 3

- 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

Autumn 5
Spring 1, Spring 2

States of matter

Year 4

- 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

Autumn 3

Electricity

White Rose SCIENCE

Year 4	Year 6
• 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	• 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
Spring 3	Autumn 2

Earth and space

White Rose SCIENCE

Year 5
• 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
Autumn 2

Seasonal changes

Year 1
• Observe changes across the 4 seasons • Observe and describe weather associated with the seasons and how day length varies
Autumn 2, Autumn 4 Spring 4 Summer 4

Sound

Year 4
• 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
Spring 1

Light

Year 3	Year 6
• 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	• Recognise that light travels 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
Spring 3	Spring 1

Forces and magnets

White Rose SCIENCE

Year 3	Year 5
• 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	• 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
Summer 2, Summer 3	Autumn 1

Evolution and inheritance

Year 6
• 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
Summer 1, Summer 2, Summer 3

Progression in Disciplinary Knowledge

Ask questions

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
• Ask simple questions.	• **Ask simple questions and recognise that they can be answered in different ways.**	• Ask questions and understand there are different enquiry types they could use to answer them.	• **Ask relevant questions and use different types of scientific enquiry to answer them.**	• Ask scientific questions and begin to understand which questions would be best suited to each enquiry type.	• Ask relevant scientific questions and choose which enquiry type would be best suited to answer them.

Plan

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
• Verbally state what they are going to investigate.	• Make simple predictions based on a question. • Identify what they will change and keep the same.	• Make relevant predictions. • Identify what they will change, observe and keep the same. • With support, set up simple practical enquiries.	• Make predictions based on simple scientific knowledge. • Identify what they will change, observe or measure and keep the same. • **Set up simple practical enquiries, comparative and fair tests.**	• Make predictions based on scientific knowledge. • With support, plan different types of scientific enquiry. Where appropriate, identify the dependent, independent and controlled variables.	• Make predictions based on scientific knowledge. • **Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.**

Make observations

White Rose SCIENCE

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
• Observe closely.	• **Observe closely, using simple equipment.**	• Begin to use scientific equipment to make observations.	• **Make systematic and careful observations.**	• Use a range of scientific equipment to make systematic and careful observations.	• Use a range of scientific equipment to make systematic and careful observations with increased complexity.

Take measurements

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
• Carry out simple tests using non-standard measurements when appropriate.	• **Perform simple tests** using standard units when appropriate.	• Carry out tests and simple experiments and take measurements using standard units.	• **Take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.**	• Take accurate measurements using a range of scientific equipment. Start to take repeat readings when appropriate.	• **Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.**

Gather, record and classify data

White Rose SCIENCE

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
• Gather and record simple data. • Sort objects and living things into groups based on simple properties.	• **Gather and record data to help in answering questions.** • **Identifying and classifying.**	• Gather and record data in different ways to help answer questions. • **Recording findings using simple scientific language, drawings, labelled diagrams, bar charts, and tables.**	• **Gather, record and classify data in a variety of ways to help in answering questions.** • **Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.**	• Gather, record and classify data with increasing complexity to help in answering questions. • **Record data using scientific diagrams and labels, classification keys, tables, bar and line graphs.**	• **Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.**

Present findings

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
• Explain what they found out to an adult or a partner.	• **Talk about what they have found out and how they found it out. (non-statutory)**	• Report on findings from enquiries, including oral and written explanations.	• **Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.**	• Report and present findings from enquiries, including conclusions. • Begin to identify causal relationships in oral and written forms such as displays and other presentations.	• **Report and present 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.**

Answer questions and make conclusions

White Rose SCIENCE

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
• Answer simple questions.	• **Use their observations and ideas to suggest answers to questions.**	• Make simple conclusions. • Use results, findings or observations to answer questions.	• **Use straight-forward scientific evidence to answer questions or to support their findings.** • **Use results to draw simple conclusions.** • **Begin to identify differences, similarities or changes related to simple ideas or processes.**	• Use scientific evidence to answer questions. • Make conclusions based on scientific evidence and from their own testing and findings. • **Identify differences, similarities or changes related to simple ideas or processes.**	• Use scientific evidence to answer questions. • Make conclusions based on scientific evidence and from their own testing and findings. • **Identify scientific evidence that has been used to support or refute ideas or arguments.**

Evaluate

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
		• Suggest questions for further investigation.	• Begin to **make predictions for new values, suggest improvements and raise further questions.**	• **Make predictions for new values, suggest improvements and raise further questions.**	• **Use test results to make predictions to set up further comparative and fair tests.** • Suggest investigation improvements including accuracy of results. • Provide some simple examples of how to extend the investigation.

Assessment within Science

We place great emphasis on the importance of assessing children's knowledge, understanding and skillset within Science.

When assessing Science, it is first essential to clearly articulate two important areas:

1. The specific endpoint for the unit being delivered,
2. The substantive and disciplinary knowledge to be taught to reach this endpoint.

At Boughton Heath Academy, we have clearly mapped out all endpoints for all the Science units to be delivered, before specifying what substantive and disciplinary knowledge is to be taught within each unit to reach this endpoint. It is this knowledge and understanding that we assess children upon, believing accurate assessment can only be a reflection of what is taught to children .

As an organisational tool, the breakdown of this is organised on a single page as can be seen below; with the essential knowledge for each lesson being broken down:

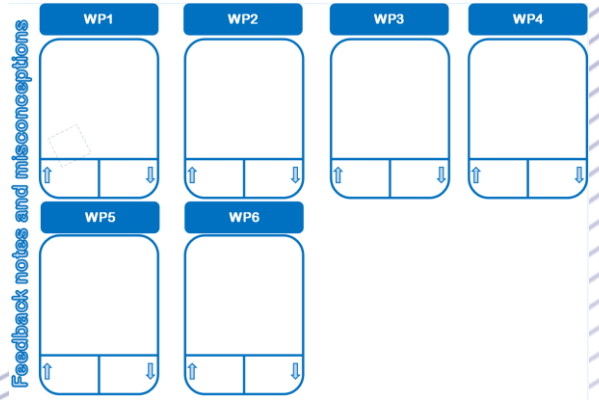
Boughton Heath Academy - Year 3 Science
Skeletons and movement: Assessment focus points

Year 3

Waypoint	Substantive Knowledge (I know...)	Disciplinary Knowledge (I can...)
Name and identify bones in the human body	• Humans have skeletons which are made up of lots of different bones. • An adult human typically has 206 bones that make up the skeleton. • The skull, spine (backbone), ribcage, pelvis and femur are bones within the skeleton.	• Asking relevant questions and using different types of scientific enquiries to answer them
Functions of the skeleton	• Bones have specific functions. • The skull protects the brain. • The femur helps humans to stand and move. • The pelvis helps to support the spine. • The spine helps humans to twist and be held upright. • The ribcage protects the heart and lungs.	• Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
Name and identify bones in a range of animals	• Mammals, birds, fish, amphibians and reptiles have skeletons. • There are some similarities and differences in skeletons of different animals. • Animal skeletons are made up of lots of different bones.	• Talk about criteria for grouping, sorting and classifying
Animals with and without a spine	• Some animals have a spine. • Some animals do not have a spine. • Some animals have an exoskeleton. • An exoskeleton provides support and protection.	• Talk about criteria for grouping, sorting and classifying
Are all skeletons the same?	• Animals have different skeletons. • All mammals, birds, fish, reptiles and amphibians have a spine. • Some animals do not have spines. • Skeletons provide support, protection and allow movement.	• Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.
Joints	• A joint is where two or more bones meet. • There are different joints in the human body. • The knees and elbows are hinge joints. • The shoulders and hips are ball and socket joints.	• Recognise when and how secondary sources might help them to answer questions that cannot be answered through practical investigations
How we move	• Muscles are attached to bones. • Muscles can only pull on bones and cannot push. • Muscles work in pairs by contracting and relaxing.	• Communicate their findings in ways that are appropriate for different audiences

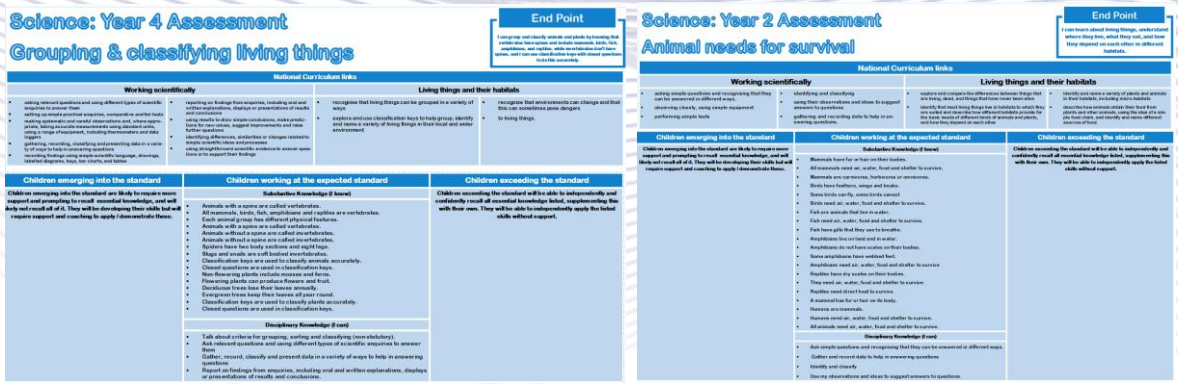
Making judgements – formative assessment

When delivering lessons; teachers record notes, comments and reflections they feel pertinent to the formative assessment of their teaching and learning of Science, recording these in their feedback files (see right). Such feedback is then delivered at the start of the following lesson, in order for children to recap prior learning undertaken before building upon this; as well as to give them opportunities to address misconceptions develop greater understanding of concepts and what has been taught.



Making judgements – summative assessment

With the unit endpoint in mind, teachers will form a summative assessment for each child within a particular unit. This will be either, working towards / working at / working above the expected standard.



We define what the expected standard is by listing the essential substantive and disciplinary knowledge children should know in order to achieve this, also articulating what would classify a pupil who may be working below / above this. Teachers record this on a single page at the end of each unit, creating this summative judgement through a culmination of their formative assessments and evidenced work within children's books; against this framework of what is to be taught.