

Whitegate Primary and Nursery School
Progression Map
Science



Developing Science at Whitegate

At Whitegate we follow the guidance of the national curriculum however, we make some alterations to suit our context and overall intent. In short, we match the curriculum but exceed the breadth. Technology is used to enhance the learning and as a further tool for engagement and our 'Big 5' question approach develops an enquiry-based approach. We want to encourage children to become enlightened and think deeper.

We plan carefully for progression in both knowledge and skills from EYFS to Year 6.

At Whitegate, we want our children to develop their learning so that, upon leaving, they are empowered to become a scientist. They think critically, they question and enquire. They are engaged in the subject and are excited to learn more. They move beyond the stereotypes of what it means to be a scientist and have a deep knowledge and understanding which means they are fully prepared for the next stage in their learning.

Colour coding of the progression map

The year group to which the objectives relate	An area which is repeated across multiple year groups	An area which is repeated in one other year group	An area the children will be coming across for the first time.
---	---	---	--

EYFS

Early Learning Goal
Understanding the World

Children know about similarities and differences in relation to places, objects, materials and living things. They make observations of animals and plants and explain why some things occur and talk about changes.

Year 1

Biology			Chemistry	Physics
Animals, including Humans	Animals, including Humans	Plants	Everyday Materials	Seasonal Change
Name common animals Know about carnivores etc.	Human body and senses	Common plants Plant structure	Properties of materials Grouping materials	The four seasons Seasonal weather
<ul style="list-style-type: none"> Know how to classify a range of animals by amphibian, reptile, mammal, fish and birds. Know and classify animals by what they eat (carnivore, herbivore and omnivore) Know how to sort by living and non-living things 	<ul style="list-style-type: none"> Know the name of parts of the human body that can be seen 	<ul style="list-style-type: none"> Know and name a variety of common wild and garden plants. Know and name the petals, stem, leaves and root of a plant. Know and name the roots, trunk, branches and leaves of a tree. 	<ul style="list-style-type: none"> Know the name of the materials an object is made from. Know about the properties of everyday materials. 	<ul style="list-style-type: none"> Name the seasons and know about the type of weather in each season.
Working Scientifically				
Ask questions such as: Why are flowers different colours? Why do some animals eat meat and others do not?				
Set up a test to see which materials keep things warmest, know if the test has been successful and can say what has been learned.				
Explain to someone what has been learned from an investigation they have been involved with and draw conclusions from the answers to the questions asked.				
Measures (within Y1 mathematical limits) to help find out more about the investigations undertaken.				

Year 2

Biology			Chemistry	
Animals, including Humans	Animals, including Humans	Plants	Everyday Materials	
Alive or dead Habitats Adaptations Food chains	Animal reproduction Healthy living Basic needs	Plant and seed growth Plant reproduction Keeping plants healthy	Identify different materials Name everyday materials Properties of materials	Compare the use of different materials Compare movement on different surfaces
<ul style="list-style-type: none"> Classify things by living, dead or never lived. Know how a specific habitat provides for the basic needs of things living there (plants and animals) Match living things to their habitat Name some different sources of food for animals. Know about and explain a simple food chain. 	<ul style="list-style-type: none"> Know the basic stages in a life cycle for animals (including humans). Know why exercise, a balanced diet and good hygiene are important for humans. 	<ul style="list-style-type: none"> Know and explain how seeds and bulbs grow into plants. Know what plants need in order to grow and stay healthy (water, light and suitable temp) 	<ul style="list-style-type: none"> Know how materials can be changed by squashing, bending, twisting and stretching. 	<ul style="list-style-type: none"> Know why a material might or might not be used for a specific job.
Working Scientifically				
Ask questions such as: Why do some trees lose their leaves in Autumn and others do not? How long are roots of tall trees? Why do some animals have underground habitats?			Classify or group things according to a given criteria, e.g. deciduous and coniferous trees.	
Use equipment such as thermometers and rain gauges to help observe changes to local environment as the year progresses.			Draw conclusions from fair tests and explain what has been found out.	
Use microscopes to find out more about small creatures and plants.			Use measures (within Year 2 mathematical limits) to help find out more about the investigations they are engaged with.	
Know how to set up a fair test and do so when finding out about how seeds grow best.				

Year 3

Biology		Chemistry	Physics		
Animals, including Humans	Plants	Plants	Rocks	Forces	Light
Skeleton and muscles Nutrition Exercise and Health	Plant life Basic structure and functions	Life cycle Water transportation	Fossil formation Compare and group rocks Soil	Different Forces Magnets	Reflections Shadows
<ul style="list-style-type: none"> Know about the importance of a nutritious, balanced diet. Know how nutrients, water and oxygen are transported within animals and humans. Know about the skeletal and muscular system of a human. 	<ul style="list-style-type: none"> Know the function of different parts of flowering plants and trees. 	<ul style="list-style-type: none"> Know how water is transported within plants., Know the plant life cycle, especially the importance of flowers. 	<ul style="list-style-type: none"> Compare and group rocks based on their physical appearance and physical properties, giving reasons. Know how soil is made and how fossils are formed. Know about and explain the difference between sedimentary, metamorphic and igneous rocks. 	<ul style="list-style-type: none"> Know about and describe how objects move on different surfaces. Know how a simple pulley works and use to lift an object. Know how some forces require contact and some do not, giving examples. Know about and explain how magnets attract and repel. Predict whether magnets will attract or repel and give a reason. 	<ul style="list-style-type: none"> Know that dark is the absence of light. Know that light is needed in order to see and is reflected from a surface. Know and demonstrate how a shadow is formed and explain how a shadow changes shape. Know about the danger of direct sunlight and describe how to keep protected.

Working Scientifically

Ask questions such as: Why does the moon appear as different shapes in the night sky? Why do shadows change during the day? Where does a fossil come from?	Use research to find out what the main differences are between sedimentary and igneous rocks.	Measure carefully (taking account of mathematical knowledge up to Year 3) and add to scientific learning.
	Test to see which type of soil is most suitable when growing two similar plants.	Use a thermometer to measure temperature and know there are two main scales used to measure temperature.
Observe at what time of day a shadow is likely to be at its longest and shortest.	Test to see if their right hand is as efficient as their left hand.	Gather and record information using a chart, matrix or tally chart depending on what is most sensible.
Observe which type of plants grow in different places. E.g. bluebells in woodland, roses in domestic gardens etc.	Set up a fair test with different variables e.g. the best conditions for a plant to grow.	Group information according to common factors, e.g. plants that grow in woodlands or plants that grow in gardens.
Use research to find out how reflection can help us see things that are around the corner.	Explain to a partner why a test is a fair one, e.g. lifting weights with the right and the left hand etc.	Use bar charts and other statistical tables to record findings.
Know how to use a key to help understanding information presented on a chart.	Be confident to stand in front of others and explain what has been found out, for example about how the moon changes shape.	Present findings using written explanations and include diagrams when needed.
Make sense of findings and draw conclusions which help them to understand more about scientific information.	Amend predictions according to findings.	Be prepared to change ideas as a result of what has been found out during a scientific enquiry.

Year 4

Biology		Chemistry	Physics	
Animals, including Humans	All living things and their habitats	States of Matter	Electricity	Sound
Digestive system Teeth Food chains	Grouping living things Classification keys Adaptation of living things	Compare and group materials Solids, liquids and gases Changing state Water cycle	Uses of electricity Simple circuits and switches Conductors and insulators	How sounds are made Sound vibrations Pitch and volume
<ul style="list-style-type: none"> Identify and name the parts of the human digestive system. Know the functions of the organs in the human digestive system. Identify and know the different types of human teeth. Know the functions of different human teeth. Use and construct food chains to identify producers, predators and prey. 	<ul style="list-style-type: none"> Use classification keys to group, identify and name living things Know how changes to an environment could endanger living things. 	<ul style="list-style-type: none"> Know the temperature at which materials change state. Know about and explore how some materials can change state. Know the part played by evaporation and condensation in the water cycle. Group materials based on their state of matter (solid, liquid, gas) 	<ul style="list-style-type: none"> Identify and name appliances that require electricity to function. Construct a series circuit. Identify and name the components in a series circuit. Predict and test whether a lamp will light within a circuit. Know the function of a switch. Know the different between a conductor and an insulator, giving examples of each. 	<ul style="list-style-type: none"> Know how sound is made, associating some of them with vibrating. Know how sound travels from a source to our ears. Know the correlation between pitch and the object producing a sound. Know the correlation between the volume of a sound and the strength of the vibrations that produced it. Know what happens to a sound as it travels away from its source.

Working Scientifically

Ask questions such as: Why are steam and ice the same thing? Why is the liver important in the digestive systems? What do we mean by 'pitch' when it comes to sound?	Measure carefully and add to scientific learning.	Write up findings using a planning, doing and evaluating process.
	Use a data logger to check on the time it takes ice to melt to water in different temperatures.	Make sense of findings and draw conclusions which helps them understand more about the scientific information that has been learned.
Use research to find out how much time it takes to digest most of our food.	Use a thermometer to measure temperature and know there are two main scales used to measure temperature.	When making predictions, there are plausible reasons as to why they have done so.
Use research to find out which materials make effective conductors and insulators of electricity.	Gather and record information using a chart, matric or tally chart, depending on what is most sensible.	Able to amend predictions according to findings.
Carry out tests to see, for example, which of two instruments make the highest or lowest sounds and to see if a glass of ice weighs the same as a glass of water.	Group information according to common facts, e.g. materials that make good conductors or insulators.	Prepared to change ideas as. Result of what has been found out during a scientific enquiry.
Set up a fair test with more than one variable e.g. using different materials to cut out sound.	Use bar charts and other statistical tables to record findings.	
Explain to others why a test that has been set up is a fair one. E.g. discover how fast ice melts in different temperatures.	Present findings using written explanations and include diagrams, when needed.	

Year 5

Biology		Chemistry	Physics	
All living things and their habitats	Animals, including humans	Properties and changes in materials	Forces	Earth and Space
Life cycles – plants and animals Reproductive processes Famous naturalists	Changes as humans develop from birth to old age	Compare properties of everyday materials Soluble/dissolving Reversible and irreversible substances	Gravity Friction Forces and motion of mechanical devices	Movement of the Earth and the planets Movement of the Moon Night and day
<ul style="list-style-type: none"> Know the life cycle of different living things, e.g. mammal, amphibian, insect and bird. Know the differences between different life cycles Know the processes of reproduction in plants. Know the processes of reproduction in animals. 	<ul style="list-style-type: none"> Create a timeline to indicate stages of growth in humans. 	<ul style="list-style-type: none"> Compare and group materials based on their properties (e.g. hardness, solubility, transparency, conductivity (electrical and thermal) and response to magnets. Know and explain how a material dissolves to form a solution. Know and show how to recover a substance from a solution. Know and demonstrate how some materials can be separated (e.g. through filtering, sieving and evaporating) Know and demonstrate that some changes are irreversible and some are not. Know how some changes result in the formation of new material and that this is usually irreversible. 	<ul style="list-style-type: none"> Know what gravity is and its impact on our lives. Identify and know the effect of air resistance and water resistance. Identify and know the effect of friction. Explain how levers, pulleys and gears allow a smaller force to have a greater effect. 	<ul style="list-style-type: none"> Know about the and explain the movement of the Earth and other planets relative to the sun. Know about and explain the movement of the Moon relative to the Earth. Know and demonstrate how night and day are created. Describe the Sun, Earth and Moon (using the term spherical).
Working Scientifically				
Set up and investigation when it is appropriate e.g. finding out which materials dissolve or not.	Use other scientific instruments as needed e.g. thermometer, rain gauge, spring scales	Create new investigations which take account of what has been learned previously.		
Set up a fair test when needed e.g. which surfaces create the most friction?	Able to record data and present them in a range of ways including diagrams, labels, classification keys, tables, scatter graphs and bar and line graphs.	Able to present information related to scientific enquiries in a range of ways including using IT.		
Set up an enquiry-based investigation e.g. find out what adults/children can do not that they couldn't do when they were a baby.	Use all measurements as set out in Year 5 mathematics including capacity and mass.	Use diagrams as and when necessary to support writing.		
Know what the variables are in a given enquiry and can isolate each one when investigating, e.g. finding out how effective parachutes are when made with different materials.	Make predictions based on information gleaned from investigations.	Is evaluative when explaining findings from scientific enquiry.		
Able to give an example of something focused on when supporting a scientific theory. E.g. how much easier it is to lift a heavy object using a pulley.	Their explanations set out clearly why something has happened and its possible impact on other things.	Clear about what has been found out from recent enquiry and can relate this to other enquiries where appropriate.		
Keep an on going record of new scientific words that they have come across for the first time.	Able to relate causal relationships when, for example, studying life cycles.	Frequently carry out research when investigating a scientific principle of theory.		

Year 6

Biology			Physics	
Animals, including humans	All living things and their habitats	Evolution and Inheritance	Electricity	Light
The circulatory system Water transportation Impact of exercise on the body	Classification of living things and the reasons for it	Identical and non-identical off-spring Fossil evidence and evolution Adaptation and evolution	Electrical components Simple circuits Fuses and voltage	How light travels Reflection Ray models of light
<ul style="list-style-type: none"> Identify and name the main parts of the human circulatory system Know the function of the heart, blood vessels and blood Know the impact of diet, exercise, drugs and lifestyle on health Know the ways in which nutrients and water are transported in animals, including humans. 	<ul style="list-style-type: none"> Classify living things into broad groups according to observable characteristics and based on similarities and differences. Know how living things have been classified. Give reasons for classifying plants and animals in a specific way. 	<ul style="list-style-type: none"> Know how the Earth and living things have changed over time. Know how fossils can be used to find out about the past. Know about reproduction and offspring (recognising that offspring normally vary and are not identical to their parents) Know how animals and plants are adapted to suit their environment. Link adaptation over time to evolution. Know about evolution and can explain what it is. 	<ul style="list-style-type: none"> Compare and give reasons for why components work and do not work in a circuit. Draw circuit diagrams using correct symbols. Know how the number and voltage of cells in a circuit links to the brightness of a lamp or the volume of a buzzer. 	<ul style="list-style-type: none"> Know how light travels., Know and demonstrate how we see objects. Know why shadows have the same shape as the object that casts them. Know how simple optical instruments work e.g. periscope, telescope, binoculars, mirror, magnifying glass etc.
Working Scientifically				
Know which type of investigation is needed to suit particular scientific enquiry. E.g. looking at the relationship between pulse and exercise.	Able to record data and present them in a range of ways including diagrams, labels, classification keys, tables, scatter graphs and bar and line graphs.	Aware of the need to support conclusions with evidence.		
Set up a fair test when needed e.g. does light travel in straight lines?	Make accurate predictions based on information gleaned from their investigations and create new investigations as a result.	Keep an on-going record of new scientific words that they have come across for the first time and use these regularly in future scientific write ups.		
Know how to set up an enquiry-based investigation, e.g. what is the relationship between oxygen and blood?	Able to present information related to scientific enquiries in a range of ways including using IT.	Use diagrams, as and when necessary, to support writing and be confident enough to present findings orally in front of the class.		
Know what the variables are in a given enquiry and can isolate each one when investigating.	Use a range of written methods to report findings, including focusing on the planning, doing and evaluating phases.	Able to give an example of something they have focused on when supporting a scientific theory, e.g. classifying vertebrate or invertebrate creatures or why certain creatures choose their unique habitats.		
Justify which variable has been isolated in a scientific investigation.	Clear about what has been found out from their enquiry and can relate this to others in class.	Frequently carry out research when investigating a scientific principle or theory.		
Use all measurements as set out in Year 6 maths including capacity, mass, ratio and proportion.	Explanations set out clearly why something has happened and its possible impact on other things.			