

Waverley Abbey Scientist

All things are possible for one who believes – Mark 9:23.

Our wish is for children to act as scientists themselves, building on their existing knowledge and having opportunities to share what they know and what they would like to find out. They will also be enabled to develop new skills to solve problems and learn more through practical activities and investigations. Teachers plan in experiments which will help them to make their own discoveries, observations and conclusions, and will even prompt them to ask further questions. The practical element of science is essential in helping children to realise that science is all around them – it is what makes up everything we see, explains how things work and it is still leaving us with further questions to be answered. As stated in the National Curriculum, we want Waverley Abbey students to ‘develop a sense of excitement and curiosity about natural phenomena’, whilst also being supported in understanding ‘how science can be used to explain what is occurring, predict how things will behave and analyse causes.’

We want children to be rich in their understanding of different scientific theories and processes and that is why our Science vocabulary has become a key focus of lessons, where children are continually reflecting on key terms and are able to use these words when providing their own explanations. We also want Science to enable our children to be more independent thinkers - this is most important in investigative work, where the children can set their own line of enquiry, considering what variables they will use and evaluating what happens at the end, and what this tells them.

What the National Curriculum requires in science at KS2

The principal focus of science teaching in lower key stage 2 is to enable pupils to broaden their scientific view of the world around them. They should do this through exploring, talking about, testing and developing ideas about everyday phenomena and the relationships between living things and familiar environments, and by beginning to develop their ideas about functions, relationships and interactions. They should ask their own questions about what they observe and make some decisions about which types of scientific enquiry are likely to be the best ways of answering them, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative and fair tests and finding things out using secondary sources of information. They should draw simple conclusions and use some scientific language, first, to talk about and, later, to write about what they have found out.

‘Working scientifically’ is described separately at the beginning of the programme of study, but must always be taught through and clearly related to substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content.

Pupils should read and spell scientific vocabulary correctly and with confidence, using their growing word reading and spelling knowledge.

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

‘Working and thinking scientifically’ is described separately at the beginning of the programme of study, but must always be taught through and clearly related to substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content.

Pupils should read, spell and pronounce scientific vocabulary correctly.

Curriculum enrichment – Trips and internal workshops also form a part of our science curriculum here at Waverley Abbey. In Year 6, we make links with secondary schools, such as Weyden, and also have a visit from ‘zoolab’. Further down the school, in Year 4, a trip is taken to Winchester Science centre. British Science Week is an exciting time for all at Waverley Abbey, as we

invite some specialists in to deliver a range of workshops for the children each year. We also have a focus on scientific experiments and activities during this week, encouraging pupils to think about everyday discoveries and to get 'hands-on'.

		Year 3	Year 4	Year 5	Year 6
<p>Topics studied</p> <p>Chemistry</p> <p>Biology</p> <p>Physics</p> <p>New for 2021</p> <p>Planning Support: https://explorify.uk/teaching-support/teaching-science/tackle-the-tricky-bits-of-science-with-our-topic-guides?utm_campaign=1865731_Topic%20guides%20and%20new%20domain&utm_medium=email&utm_source=Explorify&utm_i=471T,13ZLV,5FZ0BD,52D03,1</p>	Aut 1	<p>ROCKS</p> <ul style="list-style-type: none"> 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 relate to simple physical properties of some rocks to their formation (igneous or sedimentary) Recognise that living things have changed over time and that fossils provide information about living things that have inhabited the Earth millions of years ago. <p>Rocks https://www.tigttagworld.co.uk/mindmap/#/lessons/CLASS00271</p> <p>Soil https://www.tigttagworld.co.uk/mindmap/#/lessons/CLASS00272</p> <p>Observe & classify Research / Use secondary sources – History link Explore Comparing</p>	<p>SOUND</p> <ul style="list-style-type: none"> 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 <p>What is sound? https://www.tigttagworld.co.uk/mindmap/#/lessons/CLASS00309</p> <p>How does sound travel? https://www.tigttagworld.co.uk/mindmap/#/lessons/CLASS00310</p> <p>How do we hear? https://www.tigttagworld.co.uk/mindmap/#/lessons/CLASS00311</p> <p>Volume https://www.tigttagworld.co.uk/mindmap/#/lessons/CLASS00313</p> <p>Classify Explore Observe Measure – Maths link</p> <p>STATES OF MATTER</p> <ul style="list-style-type: none"> 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) 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 (Y5) <p>Solids https://www.tigttagworld.co.uk/mindmap/#/lessons/CLASS00254</p> <p>Liquids</p>		<p>FORCES (2021)</p> <ul style="list-style-type: none"> 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 <p>Gravity https://www.tigttagworld.co.uk/mindmap/#/lessons/CLASS00298</p> <p>Action and Reaction https://www.tigttagworld.co.uk/mindmap/#/lessons/CLASS00299</p> <p>Gears and Pulleys https://www.tigttagworld.co.uk/mindmap/#/lessons/CLASS00300</p> <p>ELECTRICITY (2022)</p> <ul style="list-style-type: none"> 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 <p>Electrical Circuits https://www.tigttagworld.co.uk/mindmap/#/lessons/CLASS00290</p> <p>Ask questions Make predictions & draw conclusions Set up tests – to solve a problem Interpret and explain results Observe Explore Classify Link to DT – design circuits that can be controlled</p> <p>Data loggers?</p>

		<p>https://www.tigtagworld.co.uk/mindmap/#/lessons/CLASS00255 Gases https://www.tigtagworld.co.uk/mindmap/#/lessons/CLASS00256 Changes of State https://www.tigtagworld.co.uk/mindmap/#/lessons/CLASS00256</p> <p>Ask questions Make predictions & draw conclusions Set up tests Observe Research / Use secondary sources – History link Present findings</p>			
Aut 2		<p>MAGNETS (Forces and Magnets)</p> <ul style="list-style-type: none"> observe how magnets attract or repel each other and attract some materials and not others compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials describe magnets as having two poles predict whether two magnets will attract or repel each other, depending on which poles are facing compare how things move on different surfaces notice that some forces need contact between two objects, but magnetic forces can act at a distance <p>Magnetism https://www.tigtagworld.co.uk/mindmap/#/lessons/CLASS00292 Using Magnetism https://www.tigtagworld.co.uk/mindmap/#/lessons/CLASS00293 What is Force? https://www.tigtagworld.co.uk/mindmap/#/lessons/CLASS00295 Friction https://www.tigtagworld.co.uk/mindmap/#/lessons/CLASS00296 Reducing Friction https://www.tigtagworld.co.uk/mindmap/#/lessons/CLASS00297</p> <p>Ask questions</p>		<p>EARTH & SPACE</p> <ul style="list-style-type: none"> 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 <p>The Solar System https://www.tigtagworld.co.uk/mindmap/#/lessons/CLASS00316 Sun and Earth https://www.tigtagworld.co.uk/mindmap/#/lessons/CLASS00317 The Moon https://www.tigtagworld.co.uk/mindmap/#/lessons/CLASS00318</p> <p>Observe Research / Use secondary sources – History link</p>	<p>EVOLUTION and INHERITANCE</p> <ul style="list-style-type: none"> 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 how and why the human skeleton has changed over time, since we separated from other primates 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 Relate knowledge of plants to studies of evolution and inheritance <p>Adaptation https://www.tigtagworld.co.uk/mindmap/#/lessons/CLASS00347 Evolution https://www.tigtagworld.co.uk/mindmap/#/lessons/CLASS00351</p> <p>Observe Compare Classify Research / Use secondary sources – History link</p> <p>Current Affairs Link: global warming – are animals/plants adapting fast enough to survive in the changing climate?</p>

	<p>Make predictions & draw conclusions Set up tests Observe & measure – Maths link Classify Explore Record data - Maths link (stats) Interpret & communicate/present results – English link</p>			
Spring 1	<p>ANIMALS, INCLUDING HUMANS</p> <ul style="list-style-type: none"> 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 Identify how plants and animals, including humans resemble their parents in many features. <p>Diet and Exercise https://www.tigtagworld.co.uk/mindmap/#/lessons/CLASS00362 The Human Skeleton https://www.tigtagworld.co.uk/mindmap/#/lessons/CLASS00331 Joints and Muscles https://www.tigtagworld.co.uk/mindmap/#/lessons/CLASS00332</p> <p>Ask questions Observe & Classify Research / Use secondary sources – History link</p> <p>Current affairs link: what we eat – meat, processed food – effect on our health and the environment</p>	<p>ANIMALS, INCLUDING HUMANS</p> <ul style="list-style-type: none"> describe the simple functions of the basic parts of the digestive system in humans construct and interpret a variety of food chains, identifying producers, predators and prey identify the different types of teeth in humans and their simple functions <p>The Digestive System https://www.tigtagworld.co.uk/mindmap/#/lessons/CLASS00333</p> <p>Food Chains https://www.tigtagworld.co.uk/mindmap/#/lessons/CLASS00348</p> <p>Food Webs https://www.tigtagworld.co.uk/mindmap/#/lessons/CLASS00349</p> <p>Teeth https://www.tigtagworld.co.uk/mindmap/#/lessons/CLASS00364</p> <p>Observe Research / Use secondary sources Explore Classify</p>	<p>PROPERTIES & CHANGES of MATERIALS</p> <ul style="list-style-type: none"> 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, oxidation and the action of acid on bicarbonate of soda. <p>Properties of Materials https://www.tigtagworld.co.uk/mindmap/#/lessons/CLASS00268 Characteristics of Water https://www.tigtagworld.co.uk/mindmap/#/lessons/CLASS00258 Characteristics of Air https://www.tigtagworld.co.uk/mindmap/#/lessons/CLASS00259 Separation by Evaporation https://www.tigtagworld.co.uk/mindmap/#/lessons/CLASS00276</p>	<p>LIGHT</p> <ul style="list-style-type: none"> 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 and to predict the size of shadows when the position of the light source changes. <p>Reflection https://www.tigtagworld.co.uk/mindmap/#/lessons/CLASS00306</p> <p>Shadows https://www.tigtagworld.co.uk/mindmap/#/lessons/CLASS00304</p> <p>White Light https://www.tigtagworld.co.uk/mindmap/#/lessons/CLASS00307</p> <p>Observe Explore Record data - Maths link (stats)</p> <p>Longer term study – how the length of shadows changes at different times of the year.</p>

				<p>Ask questions Make predictions Set up tests Observe Explore Record data – Maths link (stats) Interpret, Evaluate & communicate results - English link Research</p>	
	Spring 2		<p>ELECTRICITY</p> <ul style="list-style-type: none"> 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 <p>Series and Parallel Circuits https://www.tigttagworld.co.uk/mindmap/#/lessons/CLASS00291</p> <p>Conductors and Dangers of Electricity https://www.tigttagworld.co.uk/mindmap/#/lessons/CLASS00289</p> <p>Ask questions Make predictions Set up tests Observe Explore Classify Link to DT – design circuits</p>	<p>FORCES</p> <ul style="list-style-type: none"> 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 Describe, in terms of drag forces, why moving objects that are not driven tend to slow down. Understand that force and motion can be transferred through mechanical devices such as gears, pulleys, levers and springs. <p>Gravity https://www.tigttagworld.co.uk/mindmap/#/lessons/CLASS00298</p> <p>Action and Reaction https://www.tigttagworld.co.uk/mindmap/#/lessons/CLASS00299</p> <p>Gears and Pulleys https://www.tigttagworld.co.uk/mindmap/#/lessons/CLASS00300</p> <p>Ask questions Make predictions Set up tests Observe Record data - Maths link (stats) Interpret & communicate results – English link Evaluate Research Link to DT – Making timers / products with levers etc</p>	<p>LIVING THINGS, HABITATS</p> <ul style="list-style-type: none"> 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 Relate knowledge of plants to studies of all living things <p>Why Classify? https://www.tigttagworld.co.uk/mindmap/#/lessons/CLASS00353</p> <p>Classifying Living Things https://www.tigttagworld.co.uk/mindmap/#/lessons/CLASS00354</p> <p>Microorganisms https://www.tigttagworld.co.uk/mindmap/#/lessons/CLASS00360</p> <p>Research / Use secondary sources – History link Classify</p>

	Sum 1	<p>PLANTS (Y3)</p> <ul style="list-style-type: none"> 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 <p>Parts of a Plant</p> <p>https://www.tigtagworld.co.uk/mindmap/#/lessons/CLASS00338</p> <p>Reproduction</p> <p>https://www.tigtagworld.co.uk/mindmap/#/lessons/CLASS00339</p> <p>Fertilisation and Dispersal</p> <p>https://www.tigtagworld.co.uk/mindmap/#/lessons/CLASS00340</p> <p>Ask questions Make predictions Set up tests Observe & Classify Record data – Maths link (stats) Interpret & communicate results – English link</p> <p>Current Affairs link: how can we grow enough food to feed the growing</p>		<p>THE WATER CYCLE</p> <ul style="list-style-type: none"> identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature <p>Characteristics of Water https://www.tigtagworld.co.uk/mindmap/#/lessons/CLASS00258</p> <p>Characteristics of Air https://www.tigtagworld.co.uk/mindmap/#/lessons/CLASS00259</p> <p>Separation by Evaporation https://www.tigtagworld.co.uk/mindmap/#/lessons/CLASS00276</p> <p>Observe Research / Use secondary sources – History link</p> <p>Current affairs link: global warming – how has this changed the water cycle over time?</p>	<p>ANIMALS INCLUDING HUMANS</p> <ul style="list-style-type: none"> identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood (including the pulse and clotting) 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 <p>The Circulatory System</p> <p>https://www.tigtagworld.co.uk/mindmap/#/lessons/CLASS00335</p> <p>The Respiratory System</p> <p>https://www.tigtagworld.co.uk/mindmap/#/lessons/CLASS00334</p> <p>Drug Awareness</p> <p>https://www.tigtagworld.co.uk/mindmap/#/lessons/CLASS00363</p> <p>Ask questions Make predictions Set up tests Observe / Notice patterns Record data - Maths link (stats) Interpret, explain & communicate/ present results – English link Set up further comparative, fair tests Evaluate Research</p>

		<p>population of the world?</p>			
Sum 2		<p>LIGHT</p> <ul style="list-style-type: none"> 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 a solid object find patterns in the way that the size of shadows change <p>What is light?</p> <p>https://www.tigttagworld.co.uk/mindmap/#/lessons/CLASS00302</p> <p>The Sun as a light source</p> <p>https://www.tigttagworld.co.uk/mindmap/#/lessons/CLASS00305</p> <p>Light Sources</p> <p>https://www.tigttagworld.co.uk/mindmap/#/lessons/CLASS00303</p> <p>Ask questions Explore Observe & measure</p> <p>Longer term study: investigate how the size of shadows changes at different times of year.</p>	<p>LIVING THINGS & HABITATS</p> <ul style="list-style-type: none"> 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 Identify how animals and plants are suited to and adapt to their environment in different ways. <p>Classification Keys https://www.tigttagworld.co.uk/mindmap/#/lessons/CLASS00357</p> <p>Role of the Environment https://www.tigttagworld.co.uk/mindmap/#/lessons/CLASS00346</p> <p>Invertebrates https://www.tigttagworld.co.uk/mindmap/#/lessons/CLASS00355</p> <p>Vertebrates https://www.tigttagworld.co.uk/mindmap/#/lessons/CLASS00356</p> <p>Observe & Classify Research / Use secondary sources – History link</p>	<p>LIVING THINGS AND THEIR HABITATS</p> <ul style="list-style-type: none"> 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 <p>Life Cycles https://www.tigttagworld.co.uk/mindmap/#/lessons/CLASS00328</p> <p>Reproduction https://www.tigttagworld.co.uk/mindmap/#/lessons/CLASS00329</p> <p>ANIMALS INCLUDING HUMANS (PSHE)</p> <ul style="list-style-type: none"> describe the changes as humans develop to old age <p>Puberty - Taught alongside / within PSHE</p> <p>Life Cycles https://www.tigttagworld.co.uk/mindmap/#/lessons/CLASS00328</p> <p>Observe Research / Use secondary sources – History link Comparing / Noticing patterns</p>	

	Year 3	Year 4	Year 5	Year 6	
Key skills to progress – To work scientifically	<ul style="list-style-type: none"> ask relevant scientific questions use observations and knowledge to answer scientific questions set up a simple enquiry to explore a scientific question set up a test to compare two things set up a fair test and explain why it is fair make careful and accurate observations, including the use of standard units use equipment, including thermometers and data loggers to make accurate measurements gather, record, classify and present data in different ways to answer scientific questions use diagrams, keys, bar charts and tables using scientific language use findings to report in different ways including oral and written explanations, presentation draw conclusions and suggest improvements make a prediction with a reason identify differences, similarities and changes related to an enquiry 		<ul style="list-style-type: none"> plan different types of scientific enquiry control variables in an enquiry measure accurately and precisely using a range of equipment record data and results using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs use the outcome of test results to make predictions and set up a further comparative fair test report and present findings from an enquiry explain a conclusion from an enquiry explain causal relationships in an enquiry relate the outcomes from an enquiry to scientific knowledge in order to state whether evidence supports or refutes an argument or theory Read, spell and pronounce scientific vocabulary accurately. 		
Links to school values	<p>Growth – children learn through wonder and intrigue</p> <p>Compassion – compassionate and knowledgeable about the world in which we live.</p> <p>Honesty – To admit mistakes and suggest ways of rectifying them through investigations.</p> <p>Courage – Take risks when predicting and investigating through a variety of scientific enquiry.</p> <p>Hope – To find ways to save the planet and improve life whilst living sustainable lives.</p> <p>Love - compassionate and knowledgeable about the world in which we live.</p>				