

Woodlands School

SCIENCE CURRICULUM



#togetherwegrow

Marches Academy Trust 

Science

Our vision



Science at Woodlands stems around enabling access to learning through nurturing and by fostering curiosity in the minds of our pupils. We aim to challenge, stretch and inspire. We encourage all pupils to question the world around them. Not just that things work, but how they work and why it matters. We expect our pupils will make progress and achieve a qualification in Science that is relevant to them. This is achieved through the use of varied teaching strategies such as practical investigations, modelling, group work, discussion, debate and play.

KS3

The aim of KS3 Science is to equip pupils with the enthusiasm, curiosity, skills and the knowledge to successfully complete a qualification at KS4. Pupils will cover Biology, Chemistry and Physics topics in line with the national curriculum. This will include genetics, ecology, forces, energy, chemical reactions and Earth science.

KS4

In Key stage 4 the pupils will complete at least one qualification chosen specifically for their needs. Depending on the requirement of the individual pupil, qualifications available in science include the AQA Entry Level Qualification, which can lead to a GCSE in Biology.

The Big Picture

At Woodlands we believe that science has something to offer every pupil. The aim of KS3 Science is to equip pupils with the enthusiasm, curiosity, skills and the knowledge to successfully complete a qualification at KS4. Pupils will cover Biology, Chemistry and Physics topics in line with the national curriculum. This will include genetics, ecology, forces, energy, chemical reactions and Earth science.

Intent: Science at Woodlands stems around enabling access to learning through nurturing and by fostering curiosity in the minds of our pupils. We aim to challenge, stretch and inspire. We encourage all pupils to question the world around them. Not just that things work, but how they work and why it matters. We expect our pupils will make progress and achieve a qualification in Science that is relevant to them. This is achieved through the use of varied teaching strategies such as practical investigations, modelling, group work, discussion, debate and play

Implementation:

Pupils will experience engaging lessons that promotes learning for understanding. Using a logical order of objectives, we will use big ideas and mastery goals to equip pupils for success at GCSE. We will also track pupil progress as their understanding develops during KS3. During KS3 areas will be developed so that pupils can enter Key Stage 4 with a level of proficiency and confidence. Pupils will gain knowledge of individual concepts and the understanding to apply their knowledge to unfamiliar contexts. Using the big ideas principle, the generalisations, principles and models which connect concepts are how we believe pupils learn to see the world analytically, to explain phenomena and make predictions – all skills they need for their next stage of scientific learning.

Content is under 10 big idea headings: Forces, Electromagnetism, Energy, Waves, Matter, Reactions, Earth, Organisms, Ecosystems and Genes. Each idea contains four smaller topics: the building blocks for the big ideas.

It's easier for pupils to develop an understanding of a big idea by multiple interactions with the concepts within the idea. By connecting smaller ideas to more abstract ideas, pupils will be better prepared to apply these concepts when approaching an unfamiliar topic.

Each big idea topic contains four smaller topics that build in complexity. For example 'Waves', topics are ordered from simpler, more concrete topics 'Light' and 'Sound', to more abstract ones 'Wave properties' and 'Wave effects'. These have been created to avoid repetition, draw on various scientific skills and use different contexts.

Autumn Term

End of unit tests
End of year
Progress & checkpoint quizzes

Spring Term

End of unit tests
End of year
Progress & checkpoint quizzes

Summer Term

Progress & checkpoint quizzes
Past exam papers

Key assessments:

Pupils will take assessments and complete end of unit exam style questions.

Impact: Science is taught in progressively greater depth over the course of Key Stage 3. Outcomes are developed to be build upon during KS4. Science should enable pupils to:

- 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.

Science reflects the importance of spoken language in pupils' development across the whole curriculum—cognitively, socially and linguistically. The quality and variety of language that pupils hear and speak are key factors in developing their scientific vocabulary and articulating scientific concepts clearly and precisely. They will be assisted in making their thinking clear, both to themselves and others, we will ensure that pupils build secure foundations by using discussion to probe and remedy their misconceptions.



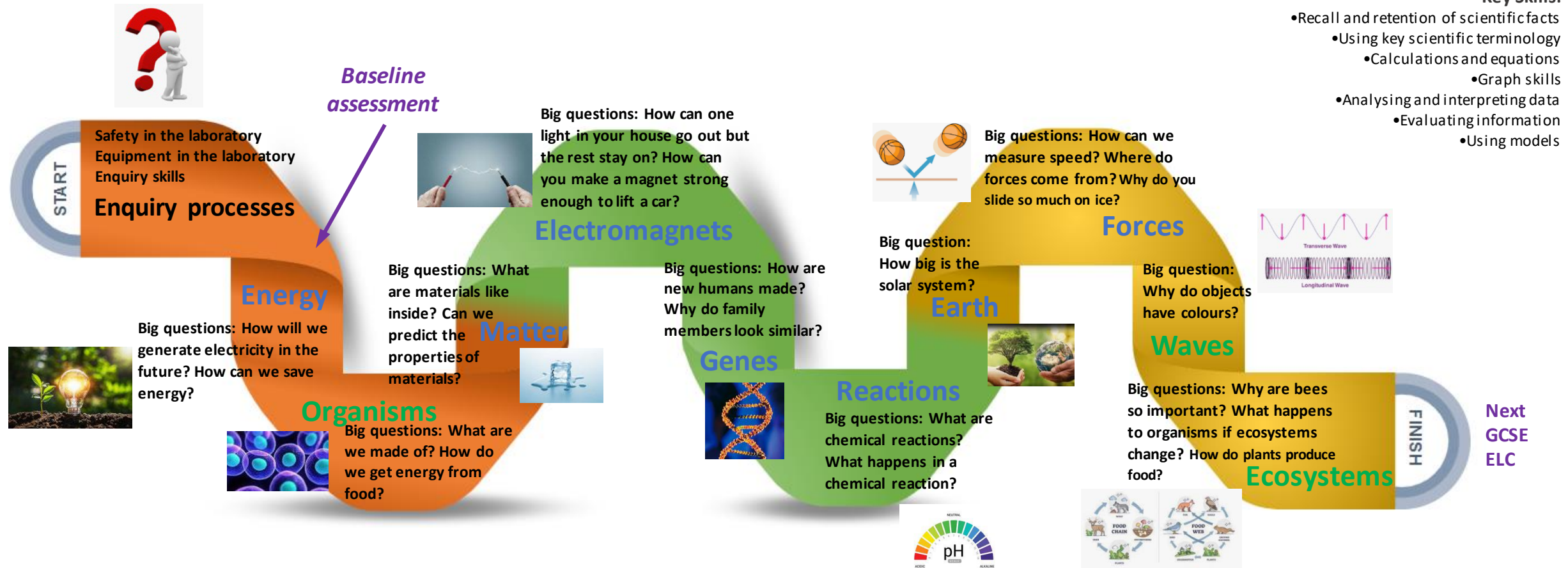
Middle School/Saplings Science Course Overview

What is my Learning Journey?



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Woodlands follow the AQA KS3 Activate Scheme of learning.



Useful websites and support

- KS3 Bitesize
- Kerboodle
- Oak Academy KS3 science
- CGP KS3 revision guides

Assessments:

- End of module tests
- End of year test
- Progress and checkpoint quizzes on Kerboodle
- Extended writing opportunities

The Big Picture

At Woodlands we believe that science has something to offer every pupil. The aim of KS3 Science is to equip pupils with the enthusiasm, curiosity, skills and the knowledge to successfully complete a qualification at KS4. Pupils will cover Biology, Chemistry and Physics topics in line with the national curriculum. This will include genetics, ecology, forces, energy, chemical reactions and Earth science.

Intent: Science at Woodlands stems around enabling access to learning through nurturing and by fostering curiosity in the minds of our pupils. We aim to challenge, stretch and inspire. We encourage all pupils to question the world around them. Not just that things work, but how they work and why it matters. We expect our pupils will make progress and achieve a qualification in Science that is relevant to them. This is achieved through the use of varied teaching strategies such as practical investigations, modelling, group work, discussion, debate and play. This is a linear qualification with an exam at the end of year 11.

Implementation:

Pupils will experience engaging lessons that promotes learning for understanding. Using a logical order of objectives. Pupils will gain knowledge of individual concepts and the understanding to apply their knowledge to unfamiliar contexts. Using the big ideas principle, the generalisations, principles and models which connect concepts are how we believe pupils learn to see the world analytically, to explain phenomena and make predictions – all skills they need for their next stage of scientific learning.

This Single Award, Entry Level Certificate qualification is to enable pupils to engage, explore, enjoy and succeed in science. By putting pupils at the heart of everything. Entry Level Certificates (ELCs) are nationally recognised qualifications which give students the opportunity to achieve a certificated award. The assessment is on demand so our pupils can complete assignments when they are ready, helping to keep them motivated. The ELC Science specification provides excellent progression to GCSE studies. The ELC provides flexibility, but on a clear progression pathway. It equips pupils with skills and knowledge transferable to both educational and career settings, and provides a worthwhile course for pupils from diverse backgrounds in terms of general education and lifelong learning. This qualification is linear. Linear means that pupils submit all components that form the assessment at the end of the course. Pupils will be entered for either ELC Science – Single Award. Pupils will submit a portfolio of work containing the appropriate number of Externally-set assignments (ESAs) and Teacher-devised assignments (TDAs). There are three levels of award available: Entry 1, Entry 2 and Entry 3. Entry 3 is the most demanding.

There are two different types of assessment. 1. Externally-set assignments (ESAs) consist of a short written test. 2. Teacher-devised assignments (TDAs) consist of a short piece of practical work. Single Award Students studying Entry Level Science – Single Award only submit evidence for three Teacher-devised assignments plus three externally-set assignments.

Autumn Term

End of unit tests
End of year
Progress & checkpoint quizzes

Spring Term

End of unit tests
End of year
Progress & checkpoint quizzes

Summer Term

Progress & checkpoint quizzes
Past exam papers
TDAs & ESAs

Key assessments:

Pupils will take assessments and complete end of unit exam style questions.

Impact: Science should enable pupils to:

- 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.

Science reflects the importance of spoken language in pupils' development across the whole curriculum – cognitively, socially and linguistically. The quality and variety of language that pupils hear and speak are key factors in developing their scientific vocabulary and articulating scientific concepts clearly and precisely. They will be assisted in making their thinking clear, both to themselves and others, we will ensure that pupils build secure foundations by using discussion to probe and remedy their misconceptions.



Upper School/Oaks Entry Level Certificate Science Course Overview

What is my Learning Journey?

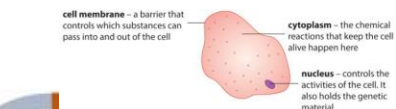


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Woodlands follow the AQA Entry Level Certificate Scheme of learning.

Key Skills:

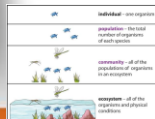
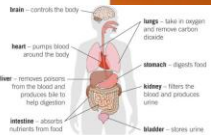
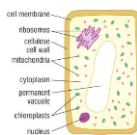
- Recall and retention of scientific facts
- Using key scientific terminology
- Calculations and equations
- Graph skills
- Analysing and interpreting data
- Evaluating information
- Using models



Baseline assessment

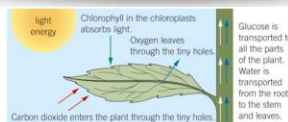
What does excretion mean?
What are the smallest structures in the body called?
What is the name for a group of organs?

C1: The human body



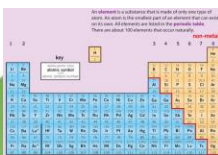
C2: Environment, evolution & inheritance

What is a producer?
Polar bears live in cold, icy places. Why do they have thick fur?
What does the word extinct mean?



C3: Elements, mixtures & compounds

How many elements are in a gold ring?
Are the elements in a mixture chemically joined?
What must happen to join two elements together to make a compound?



C4: Chemistry in our world

What is produced when two chemicals react?
A chemical has a pH of 4. Is it an acid or alkali?
What is the main gas in air?



C5: Energy, forces & the structure of matter

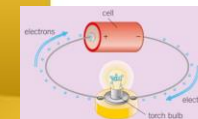
What type of energy store is a battery?
Does a kettle use conduction, convection, or both to heat water?
What can forces do to an object?

Energy store	Description	Example
chemical	the energy stored in food, fuels, or chemicals found in batteries.	fuel, food
kinetic	the energy stored in the movement of an object	a moving car, a planet
gravitational potential	the energy stored in an object when it has been raised above the ground	a book on a shelf
thermal	the energy stored in an object because of its temperature	a hot cup of tea
elastic (strain)	the energy stored in an object when it is squashed or stretched	a stretched spring



C6: Electricity, magnetism & waves

What is the definition of current and voltage?
What is an electromagnet?
Name another example of a transverse wave.



**Next
?????
It's
down
to you!**

Preparation for life!

- Consider the impacts of humans on ecosystems and organisms around the world
- Appreciate how understanding the menstrual cycle has led to contraception and fertility treatments
- Find out how chemical reactions can be used to make useful, everyday products
- Know what all materials are made up of
- Find out where our energy comes from and how we can be more energy efficient
- Understand our solar system and what we are planning to do
- Appreciate the changes that have happened for humans to evolve to where we are now and why we are so similar to other family members.
- Find out how we can make changes to save energy and what affect this has for the whole world.
- Understand what our body needs to function and how our body uses food as fuel.

Useful websites and support

- KS4 Bitesize
- Kerboodle
- Oak Academy KS4 science
- CGP KS3 revision guides

Assessments:

- End of module tests
- End of year test
- Progress and checkpoint quizzes on Kerboodle
- Extended writing opportunities

The Big Picture

At Woodlands we believe that science has something to offer every pupil. That's why we have a choice of science qualifications for Key Stage 4 – to suit students of all abilities and all aspirations. Our GCSE Biology is a clear straightforward course, with clear straightforward exams, so all our students can realise their potential.

Intent: Science at Woodlands stems around enabling access to learning through nurturing and by fostering curiosity in the minds of our pupils. We aim to challenge, stretch and inspire. We encourage all pupils to question the world around them. Not just that things work, but how they work and why it matters. We expect our pupils will make progress and achieve a qualification in Science that is relevant to them. This is achieved through the use of varied teaching strategies such as practical investigations, modelling, group work, discussion, debate and play. This is a linear qualification with an exam at the end of year 11.

Implementation: Biology is the science of living organisms and their interactions with each other and the environment. The study of biology involves collecting and interpreting information about the natural world to identify patterns and relate possible cause and effect. Biological information is used to help humans improve their own lives and strive to create a sustainable world for future generations. There are five core strands of the GCSE Biology course, covering a total of eighteen topics.

Pupils in science will experience a range of learning activities, both independent and grouped, as well as practical. They will be encouraged to research and ask questions about the topic they are learning. They will be able to safely use technology, to achieve this. Science should always be relatable to everyone's experience, and we will endeavour to relate learning back to real life experiences. Learning will enable pupils to recall and apply previous knowledge as well as expanding their knowledge base. Pupils should be helped to understand how, through the ideas of biology, the complex and diverse phenomena of the natural world can be described in terms of a small number of key ideas which are of universal application, and which can be illustrated in the separate topics set out below. These ideas include:

- Life processes depend on molecules whose structure is related to their function;
- The fundamental units of living organisms are cells, which may be part of highly adapted structures including tissues, organs and organ systems, enabling living processes to be performed effectively;
- Living organisms may form populations of single species, communities of many species and ecosystems, interacting with each other, with the environment and with humans in many different ways;
- Living organisms are interdependent and show adaptations to their environment;
- Life on Earth is dependent of photosynthesis in which green plants and algae trap light from the Sun to fix carbon dioxide and combine it with hydrogen from water to make organic compounds and oxygen;
- Organic compounds are used as fuels in cellular respiration to allow the other chemical reactions necessary for life;
- The chemicals in ecosystems are continually cycling through the natural world;
- The characteristics of a living organism are influenced by its genome and its interaction with the environment &;
- Evolution occurs by a process of natural selection and accounts both for biodiversity and how organisms are all related to varying degrees.

Autumn Term

End of unit tests
End of year
Progress & checkpoint quizzes

Spring Term

End of unit tests
End of year
Progress & checkpoint quizzes

Summer Term

Progress & checkpoint quizzes
Past exam papers
GCSE Biology Exam

Key assessments:

Pupils will take mock exams and complete end of unit exam style questions.

Impact: Biology is taught in progressively greater depth over the course of Key Stage 3 and Key Stage 4. GCSE outcomes build upon subject content which is typically taught at Key Stage 3. The GCSE in biology should enable pupils to:

- develop scientific knowledge and conceptual understanding of biology
- develop understanding of the nature, processes and methods of biology through different types of scientific enquiries that help them to answer scientific questions about the world around them
- develop and learn to apply observational, practical, modelling, enquiry and problem-solving skills, both in the laboratory, in the field and in other learning environments
- develop their ability to evaluate claims based on biology through critical analysis of the methodology, evidence and conclusions, both qualitatively and quantitatively.

Biology is studied in ways that help pupils to develop curiosity about the natural world, insight into how science works, and appreciation of its relevance to their everyday lives. The scope and nature of such study is broad, coherent, practical and satisfying, and thereby encourage pupils to be inspired, motivated and challenged by the subject and its achievements.



Upper School/Oaks GCSE Biology Course Overview

What is my Learning Journey?

Woodlands follow the AQA GCSE Biology Scheme of learning.

Key Skills:

- Recall and retention of scientific facts
- Using key scientific terminology
- Calculations and equations
- Graph skills
- Analysing and interpreting data
- Evaluating information
- Using models

START

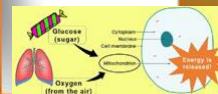


1: Cells & organisation

What are the differences between eukaryotic and prokaryotic cells?
How can stem cells be used in human medicine?
What factors affect how an enzyme works?
How can a stent prevent a heart attack?



Baseline
assessment



2: Disease & bioenergetics

What are communicable diseases and how can we prevent them?
How can your lifestyle affect your risk of developing many non-communicable diseases?
How do plants use the glucose they make during photosynthesis?
What is the difference between aerobic and anaerobic respiration?



What is homeostasis and why is it so important?
Why are reflex actions so important for survival?
How do hormones control responses, such as the way plants bend towards light, and the release of a mature egg in the human menstrual cycle?
What are the processes behind temperature control in animals?



3: Biological responses



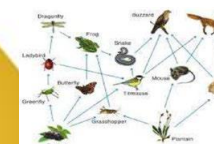
4: Genetics & reproduction

What is DNA, what is a genome, and why is it so important to be able to analyse the genome of an organism?
How are characteristics passed from parents to their offspring?
What is genetic engineering and what are the potential benefits and disadvantages of this technology?
How does evolution by natural selection take place and why are mutations important?



5: Ecology

What is adaptation and why is it so important?
Why is the cycling of materials in nature so vital to life on Earth?
What is global warming and why does it matter?
How can we make food production more efficient?



Mock exam
Exam

Revision

FINISH

Next
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Preparation for life!

- Consider the impacts of humans on ecosystems and organisms around the world
- Appreciate how understanding the menstrual cycle has led to contraception and fertility treatments
- Find out how chemical reactions can be used to make useful, everyday products
- Know what all materials are made up of
- Find out where our energy comes from and how we can be more energy efficient
- Understand our solar system and what we are planning to do
- Appreciate the changes that have happened for humans to evolve to where we are now and why we are so similar to other family members.
- Find out how we can make changes to save energy and what affect this has for the whole world.
- Understand what our body needs to function and how our body uses food as fuel.

Useful websites and support

- KS4 Bitesize
- Kerboodle
- Oak Academy KS science
- CGP KS3 revision guides

Assessments:

- End of module tests
- Required practicals
- Progress and checkpoint quizzes on Kerboodle
- Extended writing opportunities