Chadsgrove Curriculum Long Term Planning: Science

Curriculum Intent

Chadsgrove's Science curriculum is designed to ignite curiosity and to ensure that all pupils are provided with the opportunity to explore and understand the world in which they live whilst developing scientific skills and understanding. We aim to equip pupils with the knowledge, skills and scientific literacy that they need to participate as fully as possible in society. This document will outline the curriculum overview with reference to the Navigators and Pioneers Curriculum Pathways.

Due to the diverse needs and abilities of pupils, this Long Term Plan outlines the core content for each class, based upon the National Curriculum as well as using the EQUALS scheme of work. Additional resources are also outlined, including the STRATA 2019 scheme of work. Science content will be delivered through an adapted and personalised curriculum with content being delivered at an appropriate level for each pupil.

In addition to their Science lessons, pupils may be taught concepts in a cross curricular way, having access to Science throughout the curriculum for example through Forest School, topic work, sensory sessions, Science week activities and Curriculum Days.

Through research[1] carried out in school it has been highlighted how important inquiry based learning is for our pupils. The ethos of our Science curriculum is to give pupils the time and resources to be able to explore scientific concepts through practical experimentation, whilst offering opportunities to revisit prior learning, embed core concepts and develop knowledge and understanding. The research identified that this inquiry-based approach was successful in increasing engagement from pupils and supporting the development of transferable skills such as team work, making choices and independence. This Long Term Plan outlines the topics through which pupils should be given these opportunities. Through weaving scientific inquiry into a spiral curriculum that enables pupils to revisit topics and build and develop knowledge and understanding, we hope that we will not only support our pupils' scientific literacy but also develop their love, enjoyment and curiosity for Science and the world around them.

[1] Research conducted by Amy Hockey alongside University of Birmingham as part of MA Teaching Studies (2022)

Curriculum Implementation

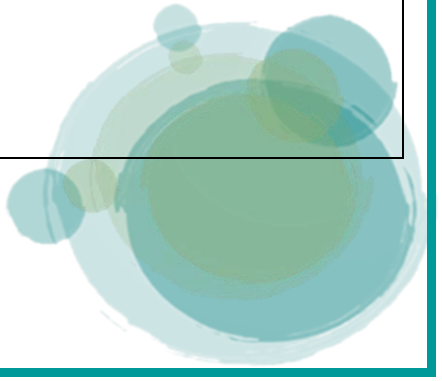
The Long Term Plan for each class links the EQUALS topics to the relevant National Curriculum content to allow Teachers to easily adapt, differentiate and extend learning. It also references the STRATA units which give further teaching ideas and activities. The overview contains the focus of each term; content and activities are as per Teachers' Medium Term Plans which enables activities to be matched appropriately to pupils' needs and ability levels.

In order to build a sequential curriculum that ensures pupils have the opportunity to revisit prior learning and embed core concepts it has been important to consider how we balance the content-rich National Curriculum with an appropriate pace of learning for our pupils.

This Long Term Plan ensures that any pupils progressing to Pioneers 2 will have covered all of the foundational content required to begin accredited work at Entry Level 2 or 3 for the WJEC Pathways Science Today Qualification. This also ensures that if pupils move between pathways they will not have gaps in their learning from changing the curriculum pathway they are following.

Through delivery of topics as laid out in the Long Term Plan, pupils will also have the opportunity to use a range of practical scientific methods, processes and skills through our curriculum. The table below demonstrates the progression of these practical skills, but at any time pupils may be working on skills from a previous or subsequent class. Lessons are tailored to individual pupils and their needs.

WORKING SCIENTIFICALLY		
Navigators 1	**Navigators 2 & 3**	**Pioneers 1**
• asking simple questions and recognising that they can be answered in different ways • observing closely, using simple equipment • performing simple tests • identifying and classifying • using their observations and ideas to suggest answers to questions • gathering and recording data to help in answering questions	• asking relevant questions and using different types of scientific enquiries to answer them • setting up simple practical enquiries, comparative and fair tests • making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers • gathering, recording, classifying and presenting data in a variety of ways to help in answering questions • recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables • reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions • using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions • identifying differences, similarities or changes related to simple scientific ideas and processes • using straightforward scientific evidence to answer questions or to support their findings	• planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary • taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate • recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs • using test results to make predictions to set up further comparative and fair tests • reporting and presenting 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 • identifying scientific evidence that has been used to support or refute ideas or arguments



Navigators 1	**Autumn**	**Spring**	**Summer**
2025-26	**People and Places**	**Amazing Animals**	**Out at Sea**
	EQUALS: Everyday Materials (2) Teeth and eating	**EQUALS: Animals including humans (3)** Variations and comparison with plants **EQUALS: Animals including humans (4)** Moving and Growing	**EQUALS: Seasonal Changes (2)** Keeping warm
	STRATA: Teeth **STRATA: Diet & Digestion** **National Curriculum: Animals including humans** • Describe the importance for humans of exercise, eating the right amounts of different types of food and hygiene	**STRATA: Plants** **STRATA: Energy – Living Things** **STRATA: Human Skeleton** **National Curriculum: Animals including humans** • 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 **National Curriculum: Living things and their habitats** • 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 • Describe how animals obtain their food using the idea of a simple food chain.	**STRATA: Energy – heat** **STRATA: Environment** **National Curriculum: Seasonal Changes** • Observe changes across the four seasons • Observe and describe weather associated with the seasons and how day length varies

Navigators 1	**Autumn**	**Spring**	**Summer**
2026-27	**All about me**	**Let's Build**	**Out and About**
	EQUALS: Animals including humans (1) Ourselves	**EQUALS: Everyday materials (1)** Sorting & using materials	**EQUALS: Plants (1)** Growing plants
	STRATA: Body Parts and Senses **National Curriculum: Animals including humans.** • To 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	**STRATA: Making new materials** **National Curriculum: Everyday materials** • Distinguish between an object and the material from which it is made • Identify and name a variety of everyday materials • Describe the simple properties of materials / compare and group • Identify and compare the suitability of a variety of everyday materials for particular uses • Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.	**STRATA: Plants** **National Curriculum: Plants** • Identify and name a variety of common wild and garden plants • Identify and describe the basic structure of a variety of flowering plants, including trees
2027-28	**Wonderful World**	**Perfect Plants**	**Journeys**
	EQUALS: Animals including humans (2) Health and growth	**EQUALS: Plants (2)** Helping plants grow well	**EQUALS: Seasonal Changes (1)** Light and dark
	STRATA: Environment **STRATA: Skeleton** **STRATA: Adaptation** **National Curriculum: Animals including humans** • Describe and compare the structure of a variety of common animals **National Curriculum: Living things and their habitats** • Explore and compare the differences between things that are living, dead, and things that have never been alive	**STRATA: Plants** **National Curriculum: Plants** • Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy • Observe and describe how seeds and bulbs grow into mature plants	**STRATA: Energy - Light** **National Curriculum: Seasonal Changes** • Observe changes across the four seasons • Observe and describe weather associated with the seasons and how day length varies

Navigators 2	**Autumn**	**Spring**	**Summer**
2025-26	**Marvellous Me**	**Rise of the Robots**	**Water**
	EQUALS: Animals including humans 2 Living things and their environments **EQUALS: Light** Light and shadow	**EQUALS: Electricity** Using electricity **EQUALS: Forces and Magnets 2** Electricity and magnetism	**EQUALS: Everyday Materials 2** Grouping and changing materials
	STRATA: Biology - Adaptation **National Curriculum: Animals including humans** • 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	**STRATA: Physics - Energy – Electricity** **National Curriculum: Electricity** • Identify common appliances that run on electricity • Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers • Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery • Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit • Recognise some common conductors and insulators, and associate metals with being good conductors	**STRATA: Physics - Solids, liquids and gases** **National Curriculum: States of matter** • 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

Navigators 2	Autumn	Spring	Summer
2026-27	**Our Environment**	**Jungle Beat**	**Around the world**
	EQUALS: Animals including humans 1 Plants and animals in local environment	**EQUALS: Rocks** Rocks and soils **EQUALS: Properties and changes in materials 3** **EQUALS: Materials and properties 3**	**EQUALS: Everyday materials 1** Characteristics of materials **EQUALS: Forces 2** Forces and movement
	STRATA: Biology - Environment **National Curriculum: Living things and their habitats** • Recognise that living things can be grouped in a variety of ways • Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment • Recognise that environments can change and that this can sometimes pose dangers to living things	**STRATA: Chemistry - Acid, Alkalis and Earth Science** **National Curriculum: Rocks** • 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	**STRATA: Physics - Forces** **National Curriculum: Forces and magnets** (focus on forces) • Compare how things move on different surfaces • Notice that some forces need contact between two objects, but magnetic forces can act at a distance

Navigators 2	**Autumn**	**Spring**	**Summer**
2027-28	**Our Bodies and Minds**	**Clever Construction**	**Pirates**
	EQUALS: Animals including humans 3 variation and classification **EQUALS: Sound** Sound and hearing	**EQUALS: Forces 1** Pushes and pulls **EQUALS: Forces and magnets 1** Forces and motion	**EQUALS: Properties and changes in materials 1** Grouping and classifying **EQUALS: Materials and properties 1**
	STRATA: Biology - Human Skeleton **STRATA: Physics - Energy - Sound** **National Curriculum: Animals including humans** • 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	**STRATA: Physics - Forces** **National Curriculum: Forces and magnets** (focus on magnets) • 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	**STRATA: Chemistry - Making new materials** **National Curriculum: Uses of everyday materials** • Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses • Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching

Navigators 3	Autumn	Spring	Summer
2025-26	**People**	**Recycling**	**Festivals and Food**
	EQUALS: Human body and life cycles	**EQUALS: Materials**	**EQUALS: Keeping Healthy**
	STRATA: SC1 Enquiry Contextualised **National Curriculum:** • Identify the basic structure and functions of the heart and blood vessels. • Explore the structure and basic functions of the digestive system in humans. • Identify the reproductive systems. • Determine the consequences of imbalances in the diet, including obesity, starvation and deficiency diseases. • Explore the impact of exercise on the human gas exchange system.	**STRATA: Materials** **National Curriculum:** • Investigate mixtures, including dissolving • Explore simple techniques for separating mixtures: filtration and evaporation. • Identify the properties of the different states of matter (solid, liquid and gas • Research the importance of recycling	**STRATA: Acids & Alkalis** **National Curriculum:** • Investigate Energy requirements and content required in a healthy daily diet. • Explore the role of respiration in supplying energy for the body. • Recognise the pH scale for measuring acidity/alkalinity

Navigators 3	**Autumn**	**Spring**	**Summer**
2026-27	**Victorian Britain**	**Life Cycles of Animals and Plants**	**The Seasons / Weather**
	EQUALS: Properties and changes in materials 2 Materials and properties	**EQUALS: Plants** Green plants	**EQUALS: Light (and sound)** Light and Sound **EQUALS: Earth and Space** The Earth & Beyond
	STRATA: Physics - Energy – Sound **STRATA: Physics - Forces** **National Curriculum: Sound** • Identify how sounds are made, associating some of them with something vibrating • Recognise that vibrations from sounds travel through a medium to the ear • Find patterns between the pitch of a sound and features of the object that produced it • Find patterns between the volume of a sound and the strength of the vibrations that produced it • Recognise that sounds get fainter as the distance from the sound source increases	**STRATA: Biology – Plants** **National Curriculum: Plants** • Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers • Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant • Investigate the way in which water is transported within plants • Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal	**STRATA: Physics - Energy – Light** **STRATA: Physics - Space** **National Curriculum: Light** • Recognise that they need light in order to see things and that dark is the absence of light • Notice that light is reflected from surfaces • Recognise that light from the sun can be dangerous and that there are ways to protect their eyes • Recognise that shadows are formed when the light from a light source is blocked by an opaque object • Find patterns in the way that the size of shadows change

Navigators 3	Autumn	Spring	Summer
2027-28	**Digital Photography**	**Change**	**Water**
	EQUALS: Light	**EQUALS: States of Matter & Materials 2**	**EQUALS: Earth and Space – Weather & Seasons**
	STRATA: Physics – Light and Vision	**STRATA: Chemistry – Changes and Reactions**	**STRATA: Chemistry – Earth Chemistry & The Water Cycle**
	National Curriculum: Light • Investigate the similarities and differences between light waves and waves in matter • Explore the transmission of light through materials • Identify the refraction of light and the human eye • Explore the effects of light: colour and the visible spectrum, transmission of light through filters • Investigate the human eye and camera; corrections for vision using lenses	**National Curriculum: Chemical Reactions** • Identify the properties of the different states of matter (solid, liquid and gas) • Explore changes of state through practical experiments • Explore combustion, thermal decomposition and oxidation • Define acids and alkalis • Use the pH scale for measuring acidity/alkalinity and indicators • Explore physical changes such as changes of state and dissolution are reversible, and chemical changes are not	**National Curriculum: Earth Systems** • Investigate the composition of the Earth • Identify the structure of the Earth • Explore the rock cycle and the formation of igneous, sedimentary and metamorphic rocks • Investigate the carbon cycle • Investigate the production of carbon dioxide by human activity and the impact on climate • Investigate mixtures, including dissolving, filtration, evaporation, distillation and chromatography

Pioneers 1	**Autumn**	**Spring**	**Summer**
2025-26	**Africa**	**Our Community / Britain**	**Celebrations and Food and Drink**
	EQUALS: Living things and their environment	**EQUALS: Variation and classification**	**EQUALS: Light & Sound**
	National Curriculum: Living things and habitats • 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 (this builds on knowledge from Year 4 which can be revisited if necessary)	**National Curriculum: Evolution and inheritance** • Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago • Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents • Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution	**National Curriculum: Light** • 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

Pioneers 1	**Autumn**	**Spring**	**Summer**
2026-27	**Victorian Britain**	**The Human Body**	**Asia**
	EQUALS: Electricity and magnetism	**EQUALS: Keeping Healthy**	**EQUALS: Green plants**
	National Curriculum: Electricity • Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in a circuit • Compare and give reasons for the variation in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches • Use recognized symbols when representing a simple circuit in a diagram	**National Curriculum: Animals including humans** • 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 ways in which nutrients and water are transported within animals, including humans	**National Curriculum: Living things and their habitats** • Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird • Describe the life process of reproduction in some plants and animals

Pioneers 1	**Autumn**	**Spring**	**Summer**
2027-28	**How Things Move and Work**	**Mysteries / Time Travel**	**Rivers and Coasts**
	EQUALS: Forces and motion	**EQUALS: Earth and Beyond**	**EQUALS: Grouping and classifying materials and their properties** Extension: **3.3B Changing materials and their properties**
	National Curriculum: Forces • 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	**National Curriculum: Earth and Space** • Describe the movement of the Earth and other planets relative to the sun in the solar system • Describe the movement of the moon relative to the Earth. • Describe the sun, Earth and moon as approximately spherical bodies • Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky	**National Curriculum: Properties and changes of materials** • Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets • Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution • Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating • Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic • Demonstrate that dissolving, mixing and changes of state are reversible changes

Pioneers 2

Pupils in Pioneers 2 work towards an Entry Level Science Qualification. Pupils are encouraged to develop their scientific knowledge, skills and understanding enabling to achieve a WJEC Entry Pathways: Science Today accreditation at either Entry 2 or Entry 3. Pupils will be taught content from 2 units each year with the aim so that those in Pioneers 2 for 2 years will gain an Award (8 or more credits) and those in the class for 2+ years will gain a certificate (13 or more credits).

This implementation plan will be updated on a yearly basis to reflect the current pupils in the class, their interests and our partnership with Bromsgrove School.

2025-26	**Autumn**	**Spring**	**Summer**
WJEC Module	**Food and Health** (Credit value 4) **Making Useful Compounds** (Credit value 3)	**Food and Health** (Credit value 4) **Making Useful Compounds** (Credit value 3) Pupils who have not completed this module can provide evidence towards **Working as Part of a Group** (Credit value 2) though their Science Week workshops	**Food and Health** (Credit value 4) **Making Useful Compounds** (Credit value 3) Once moderated work is complete, pupils will be working towards developing understanding of carrying out investigations
Bromsgrove School Project	**Autumn 1:** Team Building – making toothpaste **Autumn 2:** Practical Session 1 – Making Useful Compounds	**Spring 1:** Practical Session 2 – Making Useful Compounds **Spring 2:** Science Week Workshops	**Summer 1:** Practical Session 3 – Making Useful Compounds **Summer 2:** Saturday Science Event

Curriculum Impact

Our Science curriculum gives pupils access to a fun, engaging, high quality Science education that provides pupils with the foundations for understanding the world that will support them in their next steps, whether that be their next class at Chadsgrove, an alternative education setting or life beyond school.

Through learning Science pupils will have had the opportunity to access the fundamentals of the National Curriculum, and will have:

- experienced and observed phenomena, looked more closely at the natural and humanly-constructed world around them
- been encouraged to be curious and ask questions about what they noticed
- developed their understanding of scientific ideas by using different types of scientific enquiry to answer their own questions, including observing changes over a period of time, noticing patterns, grouping and classifying things, carrying out simple comparative tests
- been exposed to simple scientific language to talk about what they have found out
- been encouraged to communicate their ideas to a range of audiences in a variety of practical experiences
- explored secondary sources of information with them such as books, photographs and videos

Pupils will also have had the opportunity to use a range of practical scientific methods, processes and skills throughout the Science curriculum. We aim to equip all of our pupils with the appropriate scientific literacy that they can navigate the world around them to the best of their abilities.

Pupils' progress in Science will be monitored continuously through formative assessment. Progress will be recorded using Chadsgrove P Steps on our school system, SOLAR.

Pupils in Pioneers 2 aim to have achieved an Entry Level Qualification in Science at either Entry Level 2 or 3 before they move to Post-16. During the WJEC Pathways Science Today accreditation they will have developed key scientific skills including:

- knowledge and understanding of key areas of Science and its application
- competence and confidence in a variety of practical, and problem-solving skills
- scientific enquiry and modelling skills and understanding in laboratory, and work-related contexts
- understanding of the relationships between data, evidence and explanations
- understanding of how society makes decisions about scientific issues
- communication, mathematical and technological skills in scientific contexts