SCIENCE



OUR APPROACH

At Columbus, we believe Science is an engaging and fundamental subject that allows every student to explore, question, and understand the world around them. Our inclusive Science curriculum is specifically designed to facilitate fun and practical learning activities, to develop problem-solving skills and foster a natural curiosity about the environment.

Introduction to the aims of the curriculum

Our Science curriculum is carefully planned and delivered to be broad, balanced, highly differentiated, and personalised to meet the individual needs of our learners. Through hands-on investigations, sensory explorations, and accessible experiments, we enable students to engage with scientific concepts at their own pace and level. We prioritise active participation and discovery, ensuring that every child can experience the wonder of science, build foundational knowledge, and develop critical thinking skills that prepare them for life.

SCIENCE

Aims of the Curriculum

1. Promote Exploration and Understanding of the World
   - Encourage students to observe, investigate, and ask questions about natural phenomena.
   - Develop an understanding of key scientific concepts related to living things, materials, energy, and forces.
   - Foster curiosity and a desire to learn about how the world works.
2. Develop Practical and Problem-Solving Skills
   - Engage students in hands-on experiments and practical activities.
   - Encourage the development of problem-solving skills through scientific inquiry.
   - Improve observation, prediction, and recording skills in an accessible format.
3. Enhance Sensory Engagement and Awareness
   - Provide multi-sensory experiences to explore scientific concepts (e.g., feeling different materials, observing plant growth, exploring light and sound).
   - Enhance sensory processing and integration through scientific investigations.
   - Develop an awareness of their own body and senses.
   - Develop the use of the senses using our specialist rooms e.g. sensory room and the immersive room.
4. Foster Independence and Life Skills
   - Encourage independent participation in scientific activities and investigations.
   - Develop skills in following instructions and routines in a practical science setting.
   - Enhance focus, attention, and perseverance in conducting experiments and observations.
   - Promote safe practices during scientific exploration.
5. Ensure Access and Inclusion
   - Adapt science activities, equipment, and resources to be accessible to all levels of ability, including those working within the Engagement Model.
   - Utilise highly differentiated instruction, visual supports, and adapted methodologies to meet specific needs.
   - Promote equal opportunities for all students to participate fully and meaningfully in scientific discovery.
   - Encourage students to leverage technology for hands-on scientific inquiry, enabling them to research, document, analyse, and effectively present their experimental findings.
6. Provide Enjoyment and Motivation
   - Offer engaging, stimulating, and personally relevant science activities that promote active participation.
   - Cater to individual interests and strengths, fostering a positive attitude towards scientific learning.
   - Provide a sense of achievement and joy through successful experimentation and discovery.
7. Promote Environmental Awareness
   - Develop an understanding of the importance of looking after our planet and beyond.
   - Encourage responsible attitudes towards the environment and living things.

SCIENCE

Summary

1. Purpose and Aims:
    - Equip students with foundational scientific knowledge and problem-solving skills.
    - Promote curiosity, exploration, and an understanding of the natural and physical world.
    - Enhance sensory engagement and practical skills through hands-on science.
    - Foster independence, critical thinking, and environmental responsibility.
    - Ensure inclusive, accessible, and enjoyable science experiences for all students.
2. Approach and Methodology:
    - Broad, balanced, highly differentiated, and personalised curriculum tailored to individual needs and EHCPs (Education, Health and Care Plans), including for Engagement Model students.
    - Emphasis on fun, practical, and multi-sensory learning activities.
    - Coverage of key scientific subjects: Energy, Materials (solids and liquids), Plants, Animals and Living Things (and their habitats), My Body and My Senses, Forces and Magnets, and Looking after our Planet and Beyond.
    - Adaptations for accessibility, including modified experiments and accessible resources.

3 Cross curricular links:

- Science interweaves with and strengthens other academic skills. It's a natural fit for boosting literacy, as students engage with scientific texts and articulate their findings through writing. It deepens mathematical understanding by providing practical contexts for exploring numbers, shapes, space, and measurement. Moreover, science is a powerful platform for developing computing skills, whether that's recording information, analyzing data, or utilising technology as a research tool. Ultimately, science serves as a gateway for students to cultivate individual communication skills e.g use of key signs, symbols or speech to discuss scientific knowledge.

The Bridge Trust Columbus

SCIENCE

CURRICULUM OVERVIEW

Subject Specific Skill	End Point	EYFS / KS1	KS2	KS3	KS4 / KS5
My body and My senses	I know the name of the different parts of the body and what the different senses in my body do.	• Pupils can join in with action songs about their body. • Gradually gain control of their whole body through continual practice of large movements, such as waving, kicking, rolling, crawling and walking. • Clap and stamp to music. Develop manipulation and control. • Use all their senses in hands-on exploration of natural materials • Pupils can point to the main body parts (head, arms, legs, stomach) on request with visual support. • Pupils can use their senses and name them.	• Pupils can name external body parts. • Pupils can explore senses and responses. • Pupils can match body parts to senses.	• Pupils can name some internal and external body parts. • Pupils can predict what sense they will use. • Pupils will explore how their external and internal senses are important for survival.	• Pupils can label the different parts of the body and understand what they do • Pupils can identify the difference between eyes, ears, smell, taste and understand what part of the body relates to each sense.
		Engagement model Exploration: Pupils explore using different parts of their body and different senses. Realisation: Pupils show realisation when using different parts of their body and senses. Anticipation: Pupils are aware of their body parts and senses by anticipation of the experiences available to them. Persistence: Pupils are persistent with their exploration and return again and again to the experience. Initiation: Pupils reach, or indicate in their preferred method of communication that they want to explore the experience.			

The Bridge Trust Columbus

SCIENCE

CURRICULUM OVERVIEW

Subject Specific Skill	End Point	EYFS / KS1	KS2	KS3	KS4 / KS5
My body and My senses	I know how to explain how some functions work within the body and understand the changes in my body as I grow	• Pupils look at themselves then and now. • Pupils start to notice changes in their bodies when they exercise.	• Pupils can identify how their bodies react to different activities to keep them healthy, for example exercise heart pumping faster. • Pupils can put the stages of life in order. • Pupils can communicate when they are feeling unwell.	• Pupils can identify different ways to keep healthy. • Pupils can describe two key changes that happen as we get older. • Pupils know when they are not well and can think of some ways to feel better.	• Pupils understand that the heart pumps blood, The lungs breath in air, The muscles help us move, Bones are there to protect and support, The brain helps us think and make decisions, Nerves help us feel things i.e. pain, cold etc • Pupils understand the functions of the organs in the body. • Pupils start to understand substance abuse and ways to keep themselves healthy
		Engagement model **Exploration:** Pupils show an interest and curiosity with experiences of their body parts and senses. **Realisation:** Pupils interact with objects using their body parts and senses. **Anticipation:** Pupils are aware of their body parts and senses by anticipation of the experiences available to them. **Persistence:** Pupils are persistent with their exploration and return again and again to the experience. **Initiation:** Pupils reach, or indicate in their preferred method of communication that they want to explore the experience.			

The Bridge Trust Columbus

SCIENCE

CURRICULUM OVERVIEW

Subject Specific Skill	End Point	EYFS / KS1	KS2	KS3	KS4 / KS5
Animals, Living things and their habitats	I know how to explain where animals live, and why they live there, what animals eat and how they obtain their food, explaining what a food chain is.	• I know what an animal is. • Pupils can label the parts of an animal • Pupils can match animals to their habitats.	• Pupils will be able to sort animals into simple groups. • Pupils will recognise that different animals live in different habitats • Pupils can match a food to the animal that eats it	• Pupils will notice some similarities and differences between living things, where they live and how to group them. • Pupils explore how different living things are adapted for their habitat • Pupils can sort animals meat eaters, plant eaters, or both • Pupils can explore how animals get their food • Pupils can draw or describe a simple food chain	• Pupils understand the difference between animals in the wild and animals we keep as pets. • Pupils understand how we care for our pets and keep them safe • Pupils understand the food chain and how animals get food from different sources. • Pupils understand the 4 stages i.e. the egg being laid, the egg hatching/caterpillar, the Chrysalis and the butterfly
		Engagement model Exploration: Pupils explore different animals and animal sounds/textures and smells. Realisation: Pupils recognise and respond to familiar animals/animal sounds/textures and smells Anticipation: Pupils anticipate what animal will be shown to them when they hear the animal sound/texture or smell. Persistence: Pupils will persist and maintain attention when experiencing animal sounds/textures or smells. Initiation: Pupils vocalise or look to a favoured animal when given a choice of two.			

The Bridge Trust Columbus

SCIENCE

CURRICULUM OVERVIEW

Subject Specific Skill	End Point	EYFS / KS1	KS2	KS3	KS4 / KS5
Animals, Living things and their habitats	I know how to explain the 5 welfare needs of all living things and that all living things have offspring which grow into adults and ultimately die.	• Pupils will role play caring for an animal. • Pupils can order pictures of animals at different developmental stages.	• Pupils can understand that all animals eat something to survive • Pupils can match a baby animal to the adult • Pupils can understand that all living things need food and water	• Pupils can order an animal growing from baby to adult • Pupils can describe an ideal environment for an animal	• Pupils understand how animals survive the Winter? Migration of birds. Etc • Pupils will understand what animals need to function. Pupils can demonstrate how to care for animals. • Pupils can list what animals need to survive. • Pupils understand what living things need to thrive
		Engagement model Exploration: Pupils explore different animals and animal sounds/textures and smells. Realisation: Pupils recognise and respond to familiar animals/animal sounds/textures and smells Anticipation: Pupils anticipate what animal will be shown to them when they hear the animal sound/texture or smell. Persistence: Pupils will persist and maintain attention when experiencing animal sounds/textures or smells. Initiation: Pupils vocalise or look to a favoured animal when given a choice of two.			

The Bridge Trust Columbus

SCIENCE

CURRICULUM OVERVIEW

Subject Specific Skill	End Point	EYFS / KS1	KS2	KS3	KS4 / KS5
Animals, Living things and their habitats	I know how to describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.	• Pupils understand what constitutes exercise. • Pupils recognise different types of exercise. • Pupils can identify a healthy option from a choice of two foods.	• Pupils can group unhealthy and healthy foods and activities • Pupils can feel their heart beating and their breathing and recognise the change after exercise.	• Pupils can describe a healthy diet • Pupils can describe the benefits of exercise	• Pupils can describe a healthy diet in relation to the food groups and understand healthy portions. • Pupils understand the effects of exercise on their body - Short and long term

Engagement model

Exploration: Pupils explore how their body moves, food tastes/feels and hygiene routines by reaching out to touch, using body language and turning their head to explore different objects.

Realisation: Pupils display a consistent reaction to a familiar/favoured object/ sensory story

Anticipation: Pupils anticipate food, exercise or hygiene routines.

Persistence: Pupils will persist and maintain attention throughout a food, exercise or hygiene routines

Initiation: Pupils indicate a desire to taste, touch food, move their body or engage in a hygiene routine.

The Bridge Trust Columbus

SCIENCE

CURRICULUM OVERVIEW

Subject Specific Skill	End Point	EYFS / KS1	KS2	KS3	KS4 / KS5
Plants	I know how to identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers	• Pupils can identify different parts of plants and trees. • Pupils understand that different plants and trees have different features.	• Pupils know the difference between a plant and an animal. • Pupils know that plants grow from a seed. • Pupils understand that different plants and trees produce different flowers, fruits, nuts, vegetables, grain, etc.	• Pupils know the key features of a plant. • Pupils know what plants need to grow and keep healthy • Pupils know some examples of trees and plants in the ecosystem e.g. trees help us to breathe • Pupils know that all living things die. • Pupils will be able to record in a simple bean diary	• Pupils know the functions of different plants. • Pupils know the relationship between seeds and plants.Pupils can identify the key functions of the features of a plant. • Pupils are able to grow plants successfully, identifying the key requirements to ensure the plant thrives • Pupils can demonstrate how to grow plants and use them in cooking. • Pupils understand that plants grow in different seasons for human consumption
		Engagement model Exploration: Pupils will explore parts of plants, flowers, soil, water and seeds. Realisation: Pupils will respond and react to familiar plant based objects including food. Anticipation: Pupils will anticipate and show awareness of familiar plant based songs or objects. Persistence: Pupils will join in with repeated phrases and indicate a desire to repeat an activity Initiation: Pupils indicate a desire to initiate a science activity.			

The Bridge Trust Columbus

SCIENCE

CURRICULUM OVERVIEW

Subject Specific Skill	End Point	EYFS / KS1	KS2	KS3	KS4 / KS5	
Plants	I know how to explore the life cycle and requirements of plants for life and growth (air, light, water, nutrients from soil, pollination, seed formation and seed dispersal and room to grow)	• Pupils know that plants need water and sunlight to live. • Pupils can describe the key features of the life cycle of a plant. • Pupils understand the need to respect and care for the natural environment and all living things.	• Pupils understand the life cycle of a plant. • Pupils know that some plants produce food • .Pupils know that plants and trees are important for living things.	• Pupils know that plants need carbon dioxide and give off oxygen and animals need oxygen and give off carbon dioxide.	• Pupils will understand the process of pollination and seed dispersal. • Pupils understand that plants and trees use water and carbon dioxide along with sunlight to produce their food and give off oxygen as a by-product.	
		Engagement model **Exploration:** Pupils will explore parts of plants, flowers, soil, water and seeds. **Realisation:** Pupils will respond and react to familiar plant based objects including food. **Anticipation**: Pupils will anticipate and show awareness of familiar plant based songs or objects. **Persistence:** Pupils will join in with repeated phrases and indicate a desire to repeat an activity **Initiation:** Pupils indicate a desire to initiate a plant science activity				

The Bridge Trust Columbus

SCIENCE

CURRICULUM OVERVIEW

Subject Specific Skill	End Point	EYFS / KS1	KS2	KS3	KS4 / KS5
Energy	I know that there are different types of energyI know how how light behavesI know how to recognise the dangers of different types of energyI understand that sound is a form of energy	• Pupils can describe what they see, hear and feel whilst outside • Pupils will observe light and dark. • Pupils know that heat and electricity can be dangerous • Pupils can create sounds using toys and other classroom objects.	• Pupils can describe energy being used in different ways, e.g. torch, computer, gas hob.To observe light, dark, shadows and reflection • Pupils will sort objects into things that create light and things that do not • Pupils can sort dangerous activities and safe ones • Pupils can create sounds using a range of different objects and materials.	• Pupils can group different to types of energy (e.g. fire-thermal, wind up toy - mechanical, ipad - electrical) • Pupils can predict what shadows an object will create • Pupils can experiment with light and predict outcomes • Pupils can use forms of energy safely (e.g. plugging in a charger, cooking). • Pupils can experiment and predict the sounds made by different materials and adapt them to change the sound.	• Pupils are able to Identify different light sources, including the sun. • Pupils will know that darkness is the absence of light. • Pupils will understand the different types of safe and unsafe energy. I.E. Gas cookers, keep electrical items away from water. • Pupils will be able to identify a sound source when hearing different sounds. • Pupils learn ways to save energy and can demonstrate this. • Pupils can demonstrate how to use appliances that require energy safely. • Pupils can list ways to use energy safely
		Engagement model Exploration: Pupils explore the different sounds around them and discriminate between sounds. They also explore different light sources. Realisation: Pupils recognise and respond to when a sound stops/starts or when a light is turned on or off. Anticipation: Pupils anticipate what will happen next, when a light or sound is stopped in a game (of on/off). Persistence: Pupils will persist and maintain attention during a game with lights/and or sounds. Initiation: Pupils vocalise, touch or look using a switch to control a light or sound			

The Bridge Trust Columbus

SCIENCE

CURRICULUM OVERVIEW

Subject Specific Skill	End Point	EYFS / KS1	KS2	KS3	KS4 / KS5
Materials Solids and liquids	I know how to compare and group materials together, according to whether they are solids, liquids or gasesI know how to observe that some materials change state when they are heated or cooled.I know that materials are used for purposes suited to their properties	• Pupils know that water can have different states. • Pupils can group materials with similar properties. • Pupils can group materials with similar properties.	• Pupils know that heating or cooling water will change its state. • Pupils know that some objects can float or sink and can experiment to find out. • Pupils can sort materials into basic groups - plastic, wood and know that materials can be human made or natural • Pupils can use vocabulary to describe the features of different materials. • Pupils will observe changing states for example melting • Pupils can identify a range of weather conditions	• Pupils know some different vocabulary to describe the changing of states, for example freezing • Pupils can describe a material and identify what material an object is made from. • Pupils can describe a material and identify what material an object is made from. (objects to be found indifferent environments)	• Pupils know the different states of water. • Pupils can accurately predict which objects sink and float. • Pupils can predict what changes can occur when different materials are left outside or put in the freezer. To understand what happens when cooking an egg or melting chocolate. • Pupils understand the difference between a solid, a liquid and a gas. • Pupils can use accurate vocabulary to describe materials. • Pupils understand and can describe how some materials can change state and under what circumstances.
		Engagement model Exploration: Pupils will explore different materials in different states and also during changes eg. cooling/ warming up. Realisation: Pupils will experience materials during their changing states. Anticipation: Pupils will anticipate and show awareness of familiar materials. Persistence: Pupils will persist when exploring a range of materials in different states. Initiation: Pupils will reach for or indicate with their preferred form of communication that they want to explore a material.			

The Bridge Trust Columbus

SCIENCE

CURRICULUM OVERVIEW

Subject Specific Skill	End Point	EYFS / KS1	KS2	KS3	KS4 / KS5
Forces and magnets	I I know how to comment on what I see happening.I I know what force is happening when observing an action, from the 7 forces:Friction Force.Gravity Force.Applied Force.Drag Force.Buoyant forceMagnetic Force.Spring Force	• Explore and talk about different forces they can feel. • Explore natural materials, indoors and outside. • Experience natural phenomena.	• Pupils will experiment with objects that can be pushed and pulled and what happens when you change a surface • Pupils engage in a range of parachute games • Pupils will experiment with objects to see if they float or sink • Pupils will experiment with a range of magnets and materials • Pupils will observe a range of objects that contain springs	• Pupils can describe if if an object is pushed or pulled Pupils will predict if objects move faster or slower on different surfaces • Pupils will observe the effect of things falling to the floor • Pupils will make a range of parachutes and order them from best to worst • Pupils will make boats using different materials and observe the results • Pupils will be able to identify if an object is magnetic • Pupils will explore the effects of using objects with springs in different ways.	• Pupils will explore different ways to change the speed of an object - I.E Gradient, surfaces, size of initial force. • Pupils are able to predict what will happen when things fall to the floor. • Pupils will explore how changing the shape of an object can affect buoyancy. • Pupils will understand that magnets either repel or attract. • Pupils will understand how to make a spring expand or contract.
		Engagement model **Exploration:** Pupils explore the different forces around them, through pushing and pulling (playing with cars, swings), floating sinking, magnets, bouncing, rolling, dropping of objects etc. **Realisation**: Pupils recognise and respond when a familiar object reacts in a familiar way (using one of the 7 forces). **Anticipation**: Pupils anticipate what will happen next, when a familiar object reacts in a familiar way (using one of the 7 forces). **Persistence:** Pupils will persist and maintain attention during exploration of objects. **Initiation:** Pupils will reach for or indicate with their preferred form of communication that they want to explore an object.			

The Bridge Trust Columbus

SCIENCE

CURRICULUM OVERVIEW

Subject Specific Skill	End Point	EYFS / KS1	KS2	KS3	KS4 / KS5
Looking after our Earth and beyond	I know how to recognise the impact people have on planet Earth and how we can look after our planetI know how to develop an understanding of planets and our solar systemI know how to describe how humans travel to space and why	• Pupils know what rubbish is. • Pupils know how to put rubbish in the bin and what to do if there are no bins. • Pupils know how to sort rubbish so it can be recycled. • Pupils recognise that we see the sun during the day and stars during the night.	• Pupils know that there are different types of rubbish. • Pupils know where to put rubbish in all environments. • Pupils will help to tidy up their playground • Pupils know that rubbish left in the environment can be a danger to animals. • Pupils know that we live on planet Earth • Pupils know that the sun provides heat and light. • Pupils know that the Earth rotates, causing day time and night time.	• Pupils know that rubbish can be recycled and reused. • Pupils understand that recycled objects are made from recycled materials, such as paper and plastic bottles. • Pupils know that rubbish should be sorted into different bins and recycled, for example paper. • Pupils know there are 8 planets in the solar system, 1 star called the sun in our solar system, 1 moon around Earth and millions of stars out in space. • Pupils know that humans can travel and work in space.	• Pupils know where to take things to be recycled. • Pupils know how to sort rubbish into recycled groups. • Pupils will understand the process of reduce - reuse - recycle. • Pupils understand that the planets orbit the sun and the moon orbits the earth • .Pupils will be able to identify how people travel to space and what they have learnt.
		Engagement model Exploration: Pupils will explore objects that represent planets and space travel. They will also explore recycled materials. They will explore a space scene in the immersive room. Realisation: Pupils recognise and respond when immersed in a space scene. Anticipation: Pupils will anticipate and place recycled materials in containers. Persistence: Pupils will persist with putting recycled materials in containers Initiation: Pupils will reach for or indicate with their preferred form of communication that they want to explore an object.			