Nancealverne School Curriculum Offer Science
Curriculum Map Key Stage 1—Year 1

Intent: At Nancealverne the teaching of Science aims to provide students with the skills and **foundations to help in understanding the world around them**. Students should be supported to develop a sense of **excitement and curiosity** about the world around them and develop the **reasoning**, **early thinking and communication skills to explain their ideas** and the observations they make. At key stage 1 the intent is to instill in pupils the **excitement to observe** and the **confidence to communicate** their **growing conceptual understanding**. Learners will be provided with the experience to observe phenomena, looking more closely at the natural and humanly constructed world around them. They will be encouraged to ask questions about what they notice. They will explore 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, and finding things out using secondary sources of information.

Working Scientifically

During Key Stage 1, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the program of study content:

- 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

Biology—Plants and animals (including humans)
The focus is for students to observe and look more closely at the natural and humanly constructed world around them. Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. Identify and describe the basic structure of a variety of common flowering plants, including trees. 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. Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets). Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.

Skills Progression / Impact

Pathway 1 (Engagement Step 1 – 2) Opens eyes for brief period of time when encountering stimulating events Accepts hands being guided over textural experiences Explores a desired object for up to 10 seconds Watches their own hands as they move towards an object Directs their body movements towards a member of staff when engaging in an activity
Pathway 2 (Engagement Step 4-5) Explores objects using a range of body parts when given appropriate items Points at objects/people with their fingers/ eyes when interested in them Maintains interest in pictures for a minute while the content is named Explores a range of natural objects and tests through manipulation Asks questions through symbols/rough signs
Pathway 3/4 (ES 6 - Progression Step 1) Communicates the similarities between a new object and a familiar one Demonstrates obvious enthusiasm with a new/ unfamiliar object Moves around new stimulus, communicating something they observe Begins to ask simple questions, who, what where Notices and responds to plants in their local environment Begins to group things that are plants Names a range of common animals Points to parts of their body when asked

Chemistry—Everyday Materials
Distinguish between an object and the material from which it is made
Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock
Describe the simple physical properties of a variety of everyday materials
Compare and group together a variety of everyday materials on the basis of their simple physical properties

Skills Progression / Impact

Reacts to physical contact/textures with minor physiological changes Reaches for visually appealing objects Grasps objects intentionally when they have been placed in their hands Reacts excitedly to an activity when offered a variety of tactile experiences Transfers from one hand to the other
Explores objects by sliding, tearing , shaking, scrunching or banging them when given appropriate items Manipulates materials in increasingly complex ways when given intricate objects Repeats an action in order to obtain a similar effect Feels the temperature of food before and then after it has been heated
Identifies a simple change, e.g. colour Shows peer a new/unfamiliar object, communicating something they know about it Sorts materials into simple groups Identifies textures of materials after verbal prompts Selects objects according to function, or property (big, hard) Puts objects they have tested into a group Anticipates the end result of an activity e.g. some objects will float Helps to carry out a simple test.

Physics — Seasonal changes
- observe changes across the 4 seasons
- observe and describe weather associated with the seasons and how day length varies.

Skills Progression / Impact

Responds to pleasant smells/tastes with sucking motions Turns head to follow stimulating experiences Localises music regularly without prompting by a member of staff Holds their head steady when looking at a different/ new event
Attends to changes pointed out by a member of staff in their environment Handles hot/cold objects with interest when provided with a variety of temperatures Uses common/familiar objects functionally Notices changes of sound in the environment
Chooses pictures to go on a weather diary Notices clouds Notices leaves falling from trees/trees sometimes have no leaves Notices changes in weather and starts to describe as hot/cold Identifies things you might see in winter/summer

Implementation Year A

Impact

Students are prepared for the next stage of their Science pathway and are ready to:

Students are ready to explore and compare the differences between living things.
Learn that most living things live in habitats to which they are suited
Begin to identify and name a variety of plants and animals in their habitats, including microhabitats
Explore how animals obtain their food from plants and other animals
Ready to explore plants closely and watch them grow over time.
To begin to notice that animals, including humans, have offspring which grow into adults
To find out about and describe the basic needs of animals, including humans, for survival (water, food and air)
To describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene

Able to begin to identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses
To find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching

Nancealverne School Curriculum Offer Science
Curriculum Map Key Stage 1—Year 2

Intent: At Nancealverne the teaching of Science aims to provide students with the skills and **foundations to help in understanding the world around them**. Students should be supported to develop a sense of **excitement and curiosity** about the world around them and develop the **reasoning, early thinking and communication skills to explain their ideas** and the observations they make. At key stage 1 the intent is to instill in pupils the **excitement to observe** and the **confidence to communicate** their **growing conceptual understanding**. Learners will be provided with the experience to observe phenomena, looking more closely at the natural and humanly constructed world around them. They will be encouraged to ask questions about what they notice. They will explore 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, and finding things out using secondary sources of information.

Working Scientifically

During Key Stage 1, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- 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

Biology—Living things, including humans and their habitats

Students should be taught to:
- explore and compare the differences between things that are living, dead, and things that have never been alive
- 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
- identify and name a variety of plants and animals in their habitats, including microhabitats
- describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food
- notice that animals, including humans, have offspring which grow into adults
- find out about and describe the basic needs of animals, including humans, for survival (water, food and air)
- describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene

Skills Progression / Impact

Pathway 1 (Engagement Step 1 – 2)
Opens eyes for brief period of time when encountering stimulating events
Accepts hands being guided over textural experiences
Explores a desired object for up to 10 seconds
Watches their own hands as they move towards an object
Directs their body movements towards a member of staff when engaging in an activity

Pathway 2 (Engagement Step 4-5 Investigation and Discovery)
Explores objects using a range of body parts when given appropriate items
Points at objects/people with their fingers/eyes when interested in them
Maintains interest in pictures for a minute while the content is named
Explores a range of natural objects and tests through manipulation
Asks questions through symbols/rough signs

Pathway 3/4 (ES 6 - Progression Step 2)
Communicates the similarities between a new object and a familiar one
Demonstrates obvious enthusiasm with a new/ unfamiliar object
Begins to ask simple questions, who, what where
Names a range of common animals
Points to parts of their body when asked
Draws a person with a head
Anticipates things they will see outside e.g bird
Points out things they find when exploring a habitat

Chemistry—Uses for everyday materials

Students to be taught:
- to identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses.
- to find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.

Skills Progression / Impact

Reacts to physical contact/textures with minor physiological changes
Reaches for visually appealing objects
Grasps objects intentionally when they have been placed in their hands
Reacts excitedly to an activity when offered a variety of tactile experiences
Transfers from one hand to the other

Explores objects by sliding, tearing , shaking, scrunching or banging them when given appropriate items
Manipulates materials in increasingly complex ways when given intricate objects
Repeats an action in order to obtain a similar effect
Feels the temperature of food before and then after it has been heated

Identifies a simple change, e.g. colour
Shows peer a new/unfamiliar object, communicating something they know about it
Sorts materials into simple groups
Identifies textures of materials after verbal prompts
Selects objects according to function, or property (big, hard)
Puts objects they have tested into a group
Anticipates the end result of an activity e.g. some objects will float
Helps to carry out a simple test
Experiments with a material to see if it is suitable for a specific task.

Biology—Plants

Students should be taught:
- to observe and describe how seeds and bulbs grow into mature plants
- to find out and describe how plants need water, light and a suitable temperature to grow and stay healthy

Skills Progression / Impact

Responds to pleasant smells/tastes with sucking motions
Turns head to follow stimulating experiences
Localises music regularly without prompting by a member of staff
Holds their head steady when looking at a different/new event

Attends to changes pointed out by a member of staff in their environment
Handles hot/cold objects with interest when provided with a variety of temperatures
Uses common/familiar objects functionally
Notices changes of sound in the environment

Notices plants in their own environment and differentiates between flowers, leaves, trees and other plants
Collects different leaves with assistance
Points to parts of a plant when asked
Compares results of growing seeds in two different places
Suggests ways they can help a plant to grow

Implementation Year B

Impact

Students are prepared for the next stage of their Science pathway and are ready to:

Students are ready to explore and compare the differences between living things.
Learn that most living things live in habitats to which they are suited
Begin to identify and name a variety of plants and animals in their habitats, including microhabitats
Explore how animals obtain their food from plants and other animals
Ready to explore plants closely and watch them grow over time.
To begin to notice that animals, including humans, have offspring which grow into adults
To find out about and describe the basic needs of animals, including humans, for survival (water, food and air)
To describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene

Able to begin to identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses
To find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching

Nancealverne School Curriculum Offer Science
Curriculum Map Key Stage 2—Year 3

Intent: At Nancealverne the teaching of Science aims to provide students with the **skills and foundations to help in understanding the world around them**. Students should be supported to develop a sense of **excitement and curiosity** about the world around them and develop the **reasoning, rational thinking and communication skills to explain their ideas** and the observations they make. At **Key Stage 2** the intent is to enable pupils to **experience and observe phenomena**, looking more closely at the natural and humanly constructed world around them. They should be encouraged to **be curious** and be provided **with the communication skills to ask questions** about what they notice. They should be helped to develop 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, and finding things out using secondary sources of information.

Working Scientifically

During key Stage 2, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- Ask relevant questions and use different types of scientific enquiry to answer them.
- Set up simple practical enquiries, comparative and fair tests
- Make systematic and careful observations and where appropriate take accurate measurements (using thermometers and data loggers)
- Gather, record, classify and present data in a variety of ways to help in answering questions
- Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
- Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
- Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions
- identify differences, similarities or changes related to simple scientific ideas and processes
- Use straightforward scientific evidence to answer questions or to support their findings.

Biology—Plants

Students should be taught to:
- 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

they cannot make their own food; they get nutrition from what they eat

Animals including humans

- identify that animals, including humans, need the right types and amount of nutrition, and that
- identify that humans and some other animals have skeletons and muscles for support, protection and movement

Skills Progression / Impact

Pathway 1 (Engagement Step 1 – 3)
Opens eyes for brief period of time when encountering stimulating events
Accepts hands being guided over textural experiences
Explores a desired object for up to 10 seconds
Watches their own hands as they move towards an object
Directs their body movements towards a member of staff when engaging in an activity

Pathway 2 (Engagement Step 5-6 Investigation and discovery)
Explores a range of natural objects
Explores their environment inquisitively
Communicates about changes they notice
Picks objects off the floor to examine them more closely Asks questions about new/unfamiliar objects
Suggests what to do with an object they have not seen before

Pathway 3/4 (Progression Step 2-3)
Compares results of growing plants in different places
Points to parts of a plant when asked
Sequences a simple life cycle of a plant
Names main parts of a human body
Gives animals including humans more than one attribute e.g. birds have feathers and fly
Names a range of pets/farm/wild animals
Communicates about different food that animals eat
Sequences a series of five pictures showing the human life cycle
Identifies similarities and differences

Physics —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 properties

Forces and magnets

- compare how things move on different surfaces
- notice that some forces need contact between 2 objects, but magnetic forces can act at a distance
- 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 2 poles
- predict whether 2 magnets will attract or repel each other, depending on which poles are facing

Skills Progression / Impact

Reacts to physical contact/textures with minor physiological changes
Reaches for visually appealing objects
Grasps objects intentionally when they have been placed in their hands
Reacts excitedly to an activity when offered a variety of tactile experiences
Transfers from one hand to the other

Notices changes of sound in the environment
Notices visual changes in a familiar room
Repeats and action to obtain a similar effect
Requests new colour when painting
Demonstrates an understanding of how electronic objects work e.g. pressing a switch to cause an effect
Interacts with objects logically e.g. presses a button/ switch

Creates shadows using shapes and watches them change
Recalls some sources of light
Recognise that objects cannot be seen in the darkness
Draws direction of light from different sources
Investigates the change in position of a shadow
Gives simple explanation why something will happen
Sorts objects using a magnet
Makes predictions about whether a material might be magnetic
Observes which object moves the shortest/furthest distance down a slope
Finds items in the environment that create more friction

Chemistry — 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

Skills Progression / Impact

Responds to pleasant smells/tastes with sucking motions
Turns head to follow stimulating experiences
Localises music regularly without prompting by a member of staff
Holds their head steady when looking at a different/new event

Finds an object that is similar/different
Indicates they wish to feel a texture
Demonstrates pleasure in finding objects in picture books that relate to a question.
Mixes substance in water and comments on what they see
Investigates to find an object to meet their needs

Describes rocks using appropriate terms e.g. rough, hard, shiny, smooth
Identifies differences between a group of rocks
Lists living/non-living things they find in soil
Observes and comments on the effects of natural elements on rocks/soil e.g. wind and water
Uses a magnifying glass to examine something more closely
Makes picture representations of what they have done/seen

Implementation Outline

Impact

Students are prepared for the next stage of their Science pathway and are ready to:

Students will be more able to make links between phenomena and groups e.g. Recognizing that living things can be categorized and grouped, or recognizing the link between teeth and their function.

Students will be ready to build in their understanding of forces to include a simple understanding of electricity and sound.
Students will develop their skills and understanding to control both sounds and electricity.

Students will be ready to build on their understanding of matter and will be ready to explore the states of matter (solid, liquid and gas) and begin to explore how temperature can effect this.

Nancealverne School Curriculum Offer Science
Curriculum Map Key Stage 2—Year 4

Intent: At Nancealverne the teaching of Science aims to provide students with the **skills and foundations to help in understanding the world around them**. Students should be supported to develop a sense of **excitement and curiosity** about the world around them and develop the **reasoning, rational thinking and communication skills to explain their ideas** and the observations they make. At **Key Stage 2** the intent is to enable pupils to **experience and observe phenomena**, looking more closely at the natural and humanly constructed world around them. They should be encouraged to **be curious** and be provided **with the communication skills to ask questions** about what they notice. They should be helped to develop 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, and finding things out using secondary sources of information.

Working Scientifically

During key Stage 2, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- Ask relevant questions and use different types of scientific enquiry to answer them.
- Set up simple practical enquiries, comparative and fair tests
- Make systematic and careful observations and where appropriate take accurate measurements (using thermometers and data loggers)
- Gather, record, classify and present data in a variety of ways to help in answering questions
- Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
- Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
- Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions
- identify differences, similarities or changes related to simple scientific ideas and processes
- Use straightforward scientific evidence to answer questions or to support their findings.

Biology—Living Things and their habitats

Students should be taught to:
- recognise that living things can be grouped in a variety of ways
- explore and use classification keys to help group, identify and name 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

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 a

Physics—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

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

Chemistry — 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

Skills Progression / Impact

Pathway 1 (Engagement Step 1 – 3)	Reacts to physical contact/textures with minor physiological changes	Responds to pleasant smells/tastes with sucking motions
Opens eyes for brief period of time when encountering stimulating events	Reaches for visually appealing objects	Turns head to follow stimulating experiences
Accepts hands being guided over textural experiences	Grasps objects intentionally when they have been placed in their hands	Localises music regularly without prompting by a member of staff
Explores a desired object for up to 10 seconds	Reacts excitedly to an activity when offered a variety of tactile experiences	Holds their head steady when looking at a different/new event
Watches their own hands as they move towards an object	Transfers from one hand to the other	
Directs their body movements towards a member of staff when engaging in an activity		
Pathway 2 (Engagement Step 5-6 Investigation and discovery)	Notices changes of sound in the environment	Finds an object that is similar/different
Explores a range of natural objects	Notices visual changes in a familiar room	Indicates they wish to feel a texture
Explores their environment inquisitively	Repeats and action to obtain a similar effect	Demonstrates pleasure in finding objects in picture books that relate to a question.
Communicates about changes they notice	Requests new colour when painting	Mixes substance in water and comments on what they see
Picks objects off the floor to examine them more closely Asks questions about new/unfamiliar objects	Demonstrates an understanding of how electronic objects work e.g. pressing a switch to cause an effect	Investigates to find an object to meet their needs
Suggests what to do with an object they have not seen before	Interacts with objects logically e.g. presses a button/ switch	
Pathway 3/4 (Progression Step 2-4)	Investigates how to make/stop a sound	Describes how the temperature of water feels in simple terms
Names and labels main parts of the face	Describes a difference in volume when they pluck a string near their ear and further away	Predicts what will happen to items put in/taken from a freezer
Indicates that animals have blood, bones and skin	Observes and makes comments about how a variety of instruments vibrate when hit	Lists solids/liquids
Names a range of pets/farm/wild animals	Indicates that a battery in needed to provide power	Lists ways to heat/cool something
Compares or matches the body shape and skeleton of different animals	Sorts objects into groups showing how electricity is used, e.g. lights, heats, moves	Suggests something they can turn from a solid to a liquid / liquid to a solid
Explain how different parts of their body move, including mouth an teeth	Identifies the metal and plastic parts of a plug and demonstrates how to hold safely when plugging in	Explains how to change the state of water
Understands some factors that might determine where an animal might be found e.g. flippers	Creates a simple electrical circuit using cells, bulbs, buzzers and wires with support	Uses the terms solid and liquid accurately
Communicates about different food that animals eat and groups animals accordingly		
Classifies living things into simple groups using physical features		
Matches a variety of living things to their habitat		

Implementation Outline

Impact

Students are prepared for the next stage of their Science pathway and are ready to:

Students will be ready to use their developing scientific thinking of classifying, grouping and making links to begin to explore similarities and differences in the life-cycles of living things

Students will be ready to build in their understanding of forces to include a simple understanding of electricity and sound.
Students will develop their skills and understanding to control both sounds and electricity.

Students will be ready to begin using their understanding of the properties of materials to mix, separate and combine materials to change them permanently.

Nancealverne School Curriculum Offer Science
Curriculum Map Key Stage 2—Year 5

Intent: At Nancealverne the teaching of Science aims to provide students with the **skills and foundations to help in understanding the world around them**. Students should be supported to develop a sense of **excitement and curiosity** about the world around them and develop the **reasoning, rational thinking and communication skills to explain their ideas** and the observations they make. At **Key Stage 2** the intent is to enable pupils to **experience and observe phenomena**, looking more closely at the natural and humanly constructed world around them. They should be encouraged to **be curious** and be provided **with the communication skills to ask questions** about what they notice. They should be helped to develop 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, and finding things out using secondary sources of information.

Working Scientifically

During key Stage 2, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- Ask relevant questions and use different types of scientific enquiry to answer them.
- Set up simple practical enquiries, comparative and fair tests
- Make systematic and careful observations and where appropriate take accurate measurements (using thermometers and data loggers)
- Gather, record, classify and present data in a variety of ways to help in answering questions
- Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
- Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
- Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions
- identify differences, similarities or changes related to simple scientific ideas and processes
- Use straightforward scientific evidence to answer questions or to support their findings.

Biology—Living Things and their habitats

Students should be taught to:

- 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

Animals including humans

- describe the changes as humans develop to old age

Skills Progression / Impact

Pathway 1 (Engagement Step 1 – 3)
Opens eyes for brief period of time when encountering stimulating events
Accepts hands being guided over textural experiences
Explores a desired object for up to 10 seconds
Watches their own hands as they move towards an object
Directs their body movements towards a member of staff when engaging in an activity

Pathway 2 (Engagement Step 5-6 Investigation and discovery)
Explores a range of natural objects
Explores their environment inquisitively
Communicates about changes they notice
Picks objects off the floor to examine them more closely Asks questions about new/unfamiliar objects
Suggests what to do with an object they have not seen before

Pathway 3/4 (Progression Step 2-5)
Names and labels main parts of the face
Indicates that animals have blood, bones and skin
Names a range of pets/farm/wild animals
Compares or matches the body shape and skeleton of different animals
Explain how different parts of their body move, including mouth an teeth
Understands some factors that might determine where an animal might be found e.g. flippers
Communicates about different food that animals eat and groups animals accordingly
Classifies living things into simple groups using physical features
Matches a variety of living things to their habitat
Orders simple life cycles
Recognise that all living things produce their own kind

Physics —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

Skills Progression / Impact

Reacts to physical contact/textures with minor physiological changes
Reaches for visually appealing objects
Grasps objects intentionally when they have been placed in their hands
Reacts excitedly to an activity when offered a variety of tactile experiences
Transfers from one hand to the other

Notices changes of sound in the environment
Notices visual changes in a familiar room
Repeats and action to obtain a similar effect
Requests new colour when painting
Demonstrates an understanding of how electronic objects work e.g. pressing a switch to cause an effect
Interacts with objects logically e.g. presses a button/ switch

Points to sea/land on a globe
Names some planets, the sun and moon and describes them as spheres
Describes the changes in shadows throughout the day and gives simple reasons why
Recognises that the sun is a star and provides light and warmth
Compares and discusses pictures of different planets
Responds to the term gravity when commenting on an object falling to the ground
Identifies a simple lever/mechanism and describe what it does

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 incl uding levers, pulleys and gears allow a smaller force to have a greater effect

Chemistry — 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
- use comparative and fair tests, to give reasons 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 and the action of acid on bicarbonate of soda

Skills Progression / Impact

Responds to pleasant smells/tastes with sucking motions
Turns head to follow stimulating experiences
Localises music regularly without prompting by a member of staff
Holds their head steady when looking at a different/new event

Finds an object that is similar/different
Indicates they wish to feel a texture
Demonstrates pleasure in finding objects in picture books that relate to a question.
Mixes substance in water and comments on what they see

Describes how the temperature of water feels in simple terms
Predicts what will happen to items put in/taken from a freezer
Lists solids/liquids
Lists ways to heat/cool something
Suggests something they can turn from a solid to a liquid / liquid to a solid
Explains how to change the state of water
Uses the terms solid and liquid accurately
Records temperatures and recognises it as a factor when changing water to ice/steam

Implementation Outline

Impact

Students are prepared for the next stage of their Science pathway and are ready to:

Students will be ready to give reasons for their classifications and extend their grouping and linking skills to the concept of evolution. Students will also be ready to develop a wider knowledge of the internal functions of the body and the impact that lifestyle can have on them.

Students will use their developing understanding of forces to make simple predictions about the scientific concepts of light and electricity, including: predicting the journey of light from its source to our eyes (travelling in a straight line) and linking volume and brightness in an electrical circuit with the voltage/number of cells.

Nancealverne School Curriculum Offer Science
Curriculum Map Key Stage 2—Year 6

Intent: At Nancealverne the teaching of Science aims to provide students with the **skills and foundations to help in understanding the world around them**. Students should be supported to develop a sense of **excitement and curiosity** about the world around them and develop the **reasoning, rational thinking and communication skills to explain their ideas** and the observations they make. At **Key Stage 2** the intent is to enable pupils to **experience and observe phenomena**, looking more closely at the natural and humanly constructed world around them. They should be encouraged to **be curious** and be provided **with the communication skills to ask questions** about what they notice. They should be helped to develop 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, and finding things out using secondary sources of information.

Working Scientifically

During key Stage 2, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- Ask relevant questions and use different types of scientific enquiry to answer them.
- Set up simple practical enquiries, comparative and fair tests
- Make systematic and careful observations and where appropriate take accurate measurements (using thermometers and data loggers)
- Gather, record, classify and present data in a variety of ways to help in answering questions
- Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
- Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
- Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions
- identify differences, similarities or changes related to simple scientific ideas and processes
- Use straightforward scientific evidence to answer questions or to support their findings.

Biology—Living Things and their habitats

Students should be taught to:

- 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

Animals including humans

- 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

Physics — Light

- 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

Electricity

- 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

Biology — 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

Skills Progression / Impact

Biology—Living Things and their habitats	Physics — Light	Electricity / Biology — Evolution and Inheritance
Pathway 1 (Engagement Step 1 – 3) Opens eyes for brief period of time when encountering stimulating events Accepts hands being guided over textural experiences Explores a desired object for up to 10 seconds Watches their own hands as they move towards an object Directs their body movements towards a member of staff when engaging in an activity	Reacts to physical contact/textures with minor physiological changes Reaches for visually appealing objects Grasps objects intentionally when they have been placed in their hands Reacts excitedly to an activity when offered a variety of tactile experiences Transfers from one hand to the other	Responds to pleasant smells/tastes with sucking motions Turns head to follow stimulating experiences Localises music regularly without prompting by a member of staff Holds their head steady when looking at a different/new event
Pathway 2 (Engagement Step 5-6 Investigation and discovery) Explores a range of natural objects Explores their environment inquisitively Communicates about changes they notice Picks objects off the floor to examine them more closely Asks questions about new/unfamiliar objects Suggests what to do with an object they have not seen before	Notices changes of sound in the environment Notices visual changes in a familiar room Repeats and action to obtain a similar effect Requests new colour when painting Demonstrates an understanding of how electronic objects work e.g. pressing a switch to cause an effect Interacts with objects logically e.g. presses a button/switch	Notices self in a mirror Finds an object that is similar/different Responds to something new with questions Demonstrates pleasure in finding objects in picture books that relate to a question. Understand the correct action when asked to taste/smell
Pathway 3/4 (Progression Step 2-5) Names and labels main parts of the face Indicates that animals have blood, bones and skin Names a range of pets/farm/wild animals Compares or matches the body shape and skeleton of different animals Explain how different parts of their body move, including mouth an teeth Understands some factors that might determine where an animal might be found e.g. flippers Communicates about different food that animals eat and groups animals accordingly Classifies living things into simple groups using physical features Matches a variety of living things to their habitat Orders simple life cycles Recognise that all living things produce their own kind	Creates shadows using shapes and watches them change Recalls some sources of light Recognise that objects cannot be seen in the darkness Draws direction of light from different sources Investigates the change in position of a shadow Indicates that a battery in needed to provide power Sorts objects into groups showing how electricity is used, e.g. lights, heats, moves Identifies the metal and plastic parts of a plug and demonstrates how to hold safely when plugging in Creates a simple electrical circuit using cells, bulbs, buzzers and wires with support	Sorts objects using simple equipment, e.g. a magnet Shows an understanding of how electronic objects work Notices clouds Notices leaves falling from trees/trees sometimes have no leaves Notices changes in weather and starts to describe as hot/cold Identifies things you might see in winter/summer

Implementation Outline

Impact

Students are prepared for the next stage of their Science pathway and are ready to:

Students will be ready to use their developing scientific thinking of classifying, grouping and making links to begin to explore similarities and differences in the life-cycles of living things

Students will be ready to build in their understanding of forces to include a simple understanding of electricity and sound.
Students will develop their skills and understanding to control both sounds and electricity.

Students will be ready to begin using their understanding of the properties of materials to mix, separate and combine materials to change them permanently.

Nancealverne School Curriculum Offer Science
Curriculum Map Key Stage 3 —Biology Year 7-8—Palm

Intent: At Nancealverne the teaching of Science aims to provide students with the **skills and foundations to help in understanding the world around them**. Students should be supported to develop a sense of **excitement and curiosity** about the world around them and develop the **reasoning, rational thinking and communication skills to explain their ideas** and the observations they make. At key stage 3 the intent is to enable pupils develop a **deeper understanding of scientific ideas** in the subjects of **Chemistry**, **Biology** and **Chemistry**. Learners will be supported to **develop reasoning skills to make observations and recognise patterns** using the scientific knowledge and understanding they have been taught. Learners will be encouraged to **test ideas** and use the observations and understanding gained from these tests to communicate reasoning and generate further scientific questions.

Working Scientifically

During key Stage 3, pupils should be supported to work scientifically across biology, chemistry and physics. This should include the areas of:

Scientific Attitudes
- pay attention to objectivity and concern for accuracy and repeatability
- understand that scientific theories are develop through testing predictions and evaluating results
- evaluate risks

Experimental skills and investigation
- ask questions and develop a line of enquiry based on observations and prior knowledge and experience
- make predictions using scientific knowledge and understanding
- select, plan and carry out the most appropriate types of scientific enquiries to test predictions
- use appropriate techniques, apparatus, and materials during fieldwork and laboratory work.
- make and record observations and measurements; and evaluate the reliability of methods and suggest possible improvements

Measurement, Analyses and Evaluation
- use and derive simple equations and carry out appropriate calculations
- apply mathematical skills to calculate results
- present observations and data using appropriate methods, including tables and graphs
- interpret observations and data, including identifying patterns and using observations, measurements and data to draw conclusions

Biology—Structure and functions of Living Organisms

The skeletal and muscular systems, including teeth
- the structure and functions of the human skeleton, to include support, protection, movement and making blood cells
- biomechanics – the interaction between skeleton and muscles, including the measurement of force exerted by different muscles
- the function of muscles and examples of antagonistic muscles

Nutrition, Digestion and Health, including Gas Exchange
- the content of a healthy human diet: carbohydrates, lipids (fats and oils), proteins, vitamins, minerals, dietary fibre and water, and why each is needed
- calculations of energy requirements in a healthy daily diet
- the consequences of imbalances in the diet, including obesity, starvation and deficiency diseases
- The structure, function and mechanism of gas exchange system and the impact of exercise, asthma and smoking

Skills Progression / Impact

Pathway 1 (Engagement Step 1 – 5)
Opens eyes for brief period of time when encountering stimulating events
Accepts hands being guided over textural experiences
Explores a desired object for up to 10 seconds
Watches their own hands as they move towards an object
Directs their body movements towards a member of staff when engaging in an activity
Explores a range of natural objects
Explores their environment inquisitively

Pathway 2 (Engagement Step 6 Investigation and discovery-Progression Step 2)
Communicates about changes they notice
Points to main features of a face when asked
Recognises main body parts
Identifies humans needs—food/drink
Identifies that animals have blood, bones and skin
Demonstrates how different parts of their bodies move

Pathway 3/4 (Progression Step 3-8)
Names and labels main external parts of the body
Explains how different parts of their bodies are moving i.e. bending
Compares and matches body shapes of skeleton to matching animals
Lists what all animals and humans need to live (air, food, water)
Describes the importance of exercise, balanced diet and hygiene in humans
Identifies, names and labels the different teeth and their function
Recognise that animals including humans need a certain amount of different nutrition
Names and labels parts of the human skeleton
Describes and simply explains the purpose of the skeleton in humans and some animals
Explores what benefit each food groups have to the human body
Names and labels the organs which are protected by different parts of the skeleton, e.g. ribs
Simply describes the process of food digestion using given vocabulary
Describes the effects of diet, exercise, drugs and lifestyle on how the body functions

Biology — Materials Cycles and Energy—Photosynthesis

- the reactants in, and products of, photosynthesis, and a word summary for photosynthesis
- the dependence of almost all life on Earth on the ability of photosynthetic organisms, such as plants and algae, to use sunlight in photosynthesis to build organic molecules that are an essential energy store and to maintain levels of oxygen and carbon dioxide in the atmosphere
- the adaptations of leaves for photosynthesis

Skills Progression / Impact

Reacts to physical contact/textures with minor physiological changes
Reaches for visually appealing objects
Grasps objects intentionally when they have been placed in their hands
Reacts excitedly to an activity when offered a variety of tactile experiences
Transfers from one hand to the other

Identifies that leaves grow on plants
Collects different leaves with assistance
Observes results of putting a plant in the dark
Compares results of growing seeds in two place
Observes the shapes of leaves and gives a single property
Points to parts of a plant when they are named
Identifies that some plants give us food
Compares leaves and identifies the difference

Describes a leaf or flower giving more than two attributes
Simply describes the role of different parts of a plant
Records the different types of vegetation in one place, e.g. the grounds around the setting over a period of time
Describes the basic needs of plants for survival and the impact of changing these and the main changes as seeds and bulbs grow into mature plants
Relates the term "photosynthesis" to plant nutrients and growth
Identifies that photosynthesis happens to every plant
Demonstrates a basic understanding of the relationship between plants using carbon dioxide and creating oxygen
Names, locates and describes the functions of the main parts of plants, including those involved in reproduction

Biology — Interactions and Interdependencies

Relationships in an Ecosystem
- 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

Skills Progression / Impact

Responds to pleasant smells/tastes with sucking motions
Turns head to follow stimulating experiences
Localises music regularly without prompting by a member of staff
Holds their head steady when looking at a different/new event

Recognises differences between themselves and a peer
Notices that some animals have similar features e.g. beaks
Examines fossils using a magnifying glass
Names parts of an animal using the correct terms, e.g. fin, beak, tail, etc.
Suggests why an animal has a specific feature, e.g. a polar bear has thick fur to keep warm
Classifies pictures of animals by putting them into simple groups, e.g. has a beak, tail, swims

Compares obvious characteristics of dinosaurs
Identifies similar features when comparing photos of their own family
Recognises that all living things produce their own kind
Suggests how different parts of an animal helps them to survive
Creates a simple three tier family tree
Identifies animals from the same habitat and lists similar adaptations they have made to survive there
Suggests how palaeontologists find out about things which have lived long ago
Identifies how different living things have adapted to their environment
Recognises that fossils are a record of evolution
Suggest why an animal has evolved a certain feature, e.g. giraffe's neck
Recognises that offspring are not identical to their parents and can give examples to back up their view

Implementation Outline

Year A	Year B	Year A	Year B

Impact

Students are prepared for the next stage of their Science pathway and are ready to:

Students will have experience of skills and knowledge to prepare for ASDAN accredited Short Course modules in Biology—'Human Machine—Health, Medicine and Disease'

Students will have experience of skills and knowledge to prepare for ASDAN accredited Short Course modules in Biology—'Human Machine' and 'Performance in Sport—Health'

Students will have experience of skills and knowledge to prepare for ASDAN accredited Short Course modules in Biological challenges—'Living World—Evolution and Ecosystems

Nancealverne School Curriculum Offer Science
Curriculum Map Key Stage 3 —Biology Year 8-9—Elm

Intent: At Nancealverne the teaching of Science aims to provide students with the **skills and foundations to help in understanding the world around them**. Students should be supported to develop a sense of **excitement and curiosity** about the world around them and develop the **reasoning, rational thinking and communication skills to explain their ideas** and the observations they make. At key stage 3 the intent is to enable pupils develop a **deeper understanding of scientific ideas** in the subjects of **Chemistry**, **Biology** and **Chemistry**. Learners will be supported to **develop reasoning skills to make observations and recognise patterns** using the scientific knowledge and understanding they have been taught. Learners will be encouraged to **test ideas** and use the observations and understanding gained from these tests to communicate reasoning and generate further scientific questions.

Working Scientifically

During key Stage 3, pupils should be supported to work scientifically across biology, chemistry and physics. This should include the areas of:

Scientific Attitudes
- pay attention to objectivity and concern for accuracy and repeatability
- understand that scientific theories are develop through testing predictions and evaluating results
- evaluate risks

Experimental skills and investigation
- ask questions and develop a line of enquiry based on observations and prior knowledge and experience
- make predictions using scientific knowledge and understanding
- select, plan and carry out the most appropriate types of scientific enquiries to test predictions
- use appropriate techniques, apparatus, and materials during fieldwork and laboratory work.
- make and record observations and measurements; and evaluate the reliability of methods and suggest possible improvements

Measurement, Analyses and Evaluation
- use and derive simple equations and carry out appropriate calculations
- apply mathematical skills to calculate results
- present observations and data using appropriate methods, including tables and graphs
- interpret observations and data, including identifying patterns and using observations, measurements and data to draw conclusions

Biology—Structure and functions of Living Organisms (studenets should be taught about)
Cells, Organisation and Reproduction
- cells as the fundamental unit of living organisms, including how to observe, interpret and record cell structure using a light microscope
- the functions parts of the of the cell and the hierarchical organisation of multicellular organisms
- the similarities and differences between plant and animal cells
- reproductions in humans (include the effect of maternal lifestyle) and reproduction in plants

Nutrition, Digestion and Health
- the content of a healthy human diet: carbohydrates, lipids (fats and oils), proteins, vitamins, minerals, dietary fibre and water, and why each is needed
- the tissues and organs of the human digestive system, including adaptations to function and how the digestive system digests food (enzymes simply as biological catalysts)
- the importance of bacteria in the human digestive system
- plants making carbohydrates in their leaves by photosynthesis and gaining mineral nutrients and water from the soil via their roots

Skills Progression / Impact

Pathway 1 (Engagement Step 1 – 5)
Opens eyes for brief period of time when encountering stimulating events
Accepts hands being guided over textural experiences
Explores a desired object for up to 10 seconds
Watches their own hands as they move towards an object
Directs their body movements towards a member of staff when engaging in an activity

Pathway 2 (Engagement Step 6 Investigation and discovery-Progression Step 2)
Suggests what to do with an object they have not seen before
Explores a range of natural objects
Explores their environment inquisitively
Communicates about changes they notice
Picks objects off the floor to examine them more closely Asks questions about new/unfamiliar objects
Suggests what to do with an object they have not seen before

Pathway 3/4 (Progression Step 3-8)
Identifies that humans grow and have babies
Names and locates parts of the body, including senses
Orders a simple life cycle
Describes the main changes of young animals and humans as they grow up
Recognises that animals including humans need a certain amount of different types of nutrition
Identifies physical differences between females and males
Explores what benefit each food groups have to the human body
Names and labels the organs which are protected by different parts of the skeleton, e.g. ribs
Simply describes the process of food digestion using given vocabulary
Records the general order of the main changes that girls and boys experience in puberty
Identifies that puberty occurs so that the reproductive organs can become functional
Lists technical and popular names for male and female organs
Describes the function of the blood, blood vessels and heart
Names and describes the functions of the main parts of the circulatory system

Biology — Materials Cycles and Energy—Cellular Respiration
- aerobic and anaerobic respiration in living organisms, including the breakdown of organic molecules to enable all the other chemical processes necessary for life
- a word summary for aerobic respiration
the process of anaerobic respiration in humans and micro-organisms, including fermentation, and a word summary for anaerobic respiration
- the differences between aerobic and anaerobic respiration in terms of the reactants, the products formed and the implications for the organism

Skills Progression / Impact

Reacts to physical contact/textures with minor physiological changes
Reaches for visually appealing objects
Grasps objects intentionally when they have been placed in their hands
Reacts excitedly to an activity when offered a variety of tactile experiences
Transfers from one hand to the other

Points to main features of a face when asked
Recognises main body parts
Identifies humans needs—food/drink
Identifies that animals have blood, bones and skin
Identifies that their hair and nails will grow
Demonstrates how different parts of their bodies move

Explains how they know they grow
Names and locates parts of the body, including senses
Describes the main changes of young animals and humans as they grow up
Lists what all animals and humans need to live, e.g. air, food, water
Recognises that animals including humans need a certain amount of different types of nutrition
Describes the basic needs of animals for survival and the main changes as young animals, including humans, grow into adults
Explores what benefit each food groups have to the human body
Names and describes the functions of the main parts of the digestive system
Simply describes the process of food digestion using given vocabulary
Describes the effects of diet, exercise, drugs and lifestyle on how the body functions

Biology — Genetics and Evolution
-heredity as the process by which genetic information is transmitted from one generation to the next
-Explore prominent scientists and the DNA models they developed
differences between species
- the variation between individuals within a species being continuous or discontinuous, to include measurement and graphical representation of variation
- the variation between species and between individuals of the same species meaning some organisms compete more successfully, which can drive natural selection
- changes in the environment which may leave individuals within a species, and some entire species, less well adapted to compete successfully and reproduce, which in turn may lead to extinction
- the importance of maintaining biodiversity

Skills Progression / Impact

Responds to pleasant smells/tastes with sucking motions
Turns head to follow stimulating experiences
Localises music regularly without prompting by a member of staff
Holds their head steady when looking at a different/new event

Recognises their family in photographs and videos
Recognises differences between themselves and a peer
Notices that some animals have similar features e.g. beaks
Names parts of an animal using the correct terms, e.g. fin, beak, tail, etc.
Suggests why an animal has a specific feature, e.g. a polar bear has thick fur to keep warm
Classifies pictures of animals by putting them into simple groups, e.g. has a beak, tail, swims

Identifies similar features when comparing photos of their own family
Points out the differences in offspring to the parent animal, e.g. colours of kittens in a litter
Recognises that all living things produce their own kind
Suggests how different parts of an animal helps them to survive
Describe how some familiar things change over time/generations
Creates a simple three tier family tree
Uses food chains to understand the importance of the biodiversity of a habitat
Identifies how different living things have adapted to their environment
Defines the term evolution
Raises and answers questions about local living things and their habitats
Recognises that offspring are not identical to their parents and can give examples to back up their view

Implementation Outline

Year A	Year B	Year A	Year B

Impact

Students are prepared for the next stage of their Science pathway and are ready to:

Students will have experience of skills and knowledge to prepare for ASDAN accredited Short Course modules in Biology—'Human Machine—Health, Medicine and Disease'

Students will have experience of skills and knowledge to prepare for ASDAN accredited Short Course modules in Biology—'Human Machine' and 'Performance in Sport—Health'

Students will have experience of skills and knowledge to prepare for ASDAN accredited Short Course modules in Biological challenges—'Living World—Evolution and Ecosystems

Nancealverne School Curriculum Offer Science
Curriculum Map Key Stage 3 —Physics Year 7-8—Palm

Intent: At Nancealverne the teaching of Science aims to provide students with the **skills and foundations to help in understanding the world around them**. Students should be supported to develop a sense of **excitement and curiosity** about the world around them and develop the **reasoning, rational thinking and communication skills to explain their ideas** and the observations they make. At key stage 3 the intent is to enable pupils develop a **deeper understanding of scientific ideas** in the subjects of **Chemistry**, **Biology** and **Chemistry**. Learners will be supported to **develop reasoning skills to make observations and recognise patterns** using the scientific knowledge and understanding they have been taught. Learners will be encouraged to **test ideas** and use the observations and understanding gained from these tests to communicate reasoning and generate further scientific questions.

Working Scientifically
During key Stage 3, pupils should be supported to work scientifically across biology, chemistry and physics. This should include the areas of:
Scientific Attitudes
- pay attention to objectivity and concern for accuracy and repeatability
- understand that scientific theories are develop through testing predictions and evaluating results
- evaluate risks

Experimental skills and investigation
- ask questions and develop a line of enquiry based on observations and prior knowledge and experience
- make predictions using scientific knowledge and understanding
- select, plan and carry out the most appropriate types of scientific enquiries to test predictions
- use appropriate techniques, apparatus, and materials during fieldwork and laboratory work.
- make and record observations and measurements; and evaluate the reliability of methods and suggest possible improvements

Measurement, Analyses and Evaluation
- use and derive simple equations and carry out appropriate calculations
- apply mathematical skills to calculate results
- present observations and data using appropriate methods, including tables and graphs
- interpret observations and data, including identifying patterns and using observations, measurements and data to draw conclusions

Physics—Energy —Energy changes and Tranfers
- simple machines give bigger force but at the expense of smaller movement (and vice versa): product of force and displacement unchanged
- heating and thermal equilibrium: temperature difference between 2 objects leading to energy transfer from the hotter to the cooler one, through contact (conduction) or radiation; such transfers tending to reduce the temperature difference; use of insulators
- other processes that involve energy transfer: changing motion, dropping an object, completing an electrical circuit, stretching a spring, metabolism of food, burning fuels

Physics — Electricity and Electromagnetism
separation of positive or negative charges when objects are rubbed together: transfer of electrons, forces between charged objects
the idea of electric field, forces acting across the space between objects not in contact
magnetic fields by plotting with compass, representation by field lines
magnetic poles, attraction and repulsion

Physics — Motion and Forces
-speed and the quantitative relationship between average speed, distance and time (speed = distance ÷ time)
-the representation of a journey on a distance-time graph
-forces as pushes or pulls, arising from interaction between 2 objects
-relative motion: trains and cars passing one another
-forces: associated with deforming objects; stretching and squashing–springs; rubbing and friction between surfaces; resistance to motion of air and water

Physics — Waves—Observed, Energy, Light and Sound
-waves on water as undulations which travel through water with transverse motion; these waves can be reflected, and add or cancel – superposition
-sound needs a medium to travel, the speed of sound in air, in water, in solids
-the auditory range of humans and animals
-sound produced by vibrations of objects, in loudspeakers, detected by their effects on microphone diaphragm and the ear drum; sound waves are longitudinal
-the similarities and differences between light waves and waves in matter
-the transmission of light through materials: absorption, diffuse scattering and specular reflection at a surface
-light transferring energy from source to absorber, leading to chemical and electrical effects; photosensitive material in the retina and in cameras
-colours and the different frequencies of light, white light and prisms (qualitative only); differential colour effects in absorption and diffuse reflection

Skills Progression / Impact

Pathway 1 (Engagement Step 1 – 5)
Opens eyes for brief period of time when encountering stimulating events
Accepts hands being guided over textural experiences
Explores a desired object for up to 10 seconds
Watches their own hands as they move towards an object
Directs their body movements towards a member of staff when engaging in an activity
Explores their environment inquisitively

Pathway 2 (Engagement Step 6 Investigation and discovery-Progression Step 2)
Suggests what to do with an object they have not seen before
Tries to stick magnets to different objects
Identifies that an object will fall to the ground after it has been thrown into the air
Moves objects on a scale in an attempt to make them balance
Moves objects on a scale in an attempt to make them balance
Identifies how to stop an object from moving

Pathway 3/4 (Progression Step 3-8)
Gives a simple reason why something happened
Describes a reaction to the movement they have seen which was created by magnetism
Suggests equipment they can use to measure
Manipulates magnets to make them repel or attract each other
Explains how they think a mechanism works
Notes that a magnet is not touching the object to move it
Names the poles on a magnet as north and south and states whether they attract, or repel
Recognises that the surface area can affect the speed of an object dropping to Earth
Sorts objects to show which mechanism they use, e.g. lever, pulley, wedge
Describes the effect of forces that act at a distance (magnetic forces, including those between like and unlike poles) Identifies simple mechanisms, including levers, gears and pulleys that increase the effect of a force
Describes and evaluates their own and other people's scientific ideas and demonstrations related to transferring energy

Skills Progression / Impact

Reacts to physical contact/textures with minor physiological changes
Reaches for visually appealing objects
Grasps objects intentionally when they have been placed in their hands
Reacts excitedly to an activity when offered a variety of tactile experiences
Transfers from one hand to the other

Identifies a simple change, e.g. colour
Finds objects that roll if they push them
Makes objects move faster or slower
Moves an object in a variety of different ways
Pushes and pulls heavy objects on a range of surfaces as part of an experiment
Observes and identifies objects that have floated or that have sunk
Makes predications about which objects might sink or float
Demonstrates how different parts of their body move
Moves objects on a scale in an attempt to make them balance
Observes which object moves the shortest/furthest distance down a slope

Sorts objects by how they move
Examines objects that move using different means
Describes what it feels like to run against and with the wind, and why it is more difficult
Compares the strength needed to walk in water and the speed they can travel
Recognises that it requires more effort to pull an object over some surfaces more than others
Demonstrates how force can change the speed, direction and shape of an object
Relates how shape helps to lower air resistance
Recognises and uses the term "balanced" force
Gives a simple reason why different surfaces make it harder to slip on
Demonstrates forces acting on a range of objects
Recognises that forces act in a particular direction
Shows the direction of different forces acting on objects in diagrams using arrows

Skills Progression / Impact

Responds to pleasant smells/tastes with sucking motions
Turns head to follow stimulating experiences
Localises music regularly without prompting by a member of staff
Holds their head steady when looking at a different/new event
Attends to changes pointed out by a member of staff in their environment

Identifies a simple change, e.g. colour
Recognises differences between themselves and a peer
Notices that some animals have similar features e.g. beaks
Examines fossils using a magnifying glass
Names parts of an animal using the correct terms, e.g. fin, beak, tail, etc.
Suggests why an animal has a specific feature, e.g. a polar bear has thick fur to keep warm
Classifies pictures of animals by putting them into simple groups, e.g. has a beak, tail, swims

Compares obvious characteristics of dinosaurs
Identifies similar features when comparing photos of their own family
Recognises that all living things produce their own kind
Suggests how different parts of an animal helps them to survive
Creates a simple three tier family tree
Identifies animals from the same habitat and lists similar adaptations they have made to survive there
Suggests how palaeontologists find out about things which have lived long ago
Identifies how different living things have adapted to their environment
Recognises that fossils are a record of evolution
Suggest why an animal has evolved a certain feature, e.g. giraffe's neck
Recognises that offspring are not identical to their parents and can give examples to back up their view

Implementation Outline

Year A	Year B	Year A	Year B

Impact

Students are prepared for the next stage of their Science pathway and are ready to:

Students will have experience of skills and knowledge to prepare for ASDAN accredited Short Course modules in Physics 'Electricity and safety at home' and 'Electricity and renewable energy'

Students will have experience of skills and knowledge to prepare for ASDAN accredited Short Course modules in Physics - 'Forces and motion – including breaking distances'

Students will have experience of skills and knowledge to prepare for ASDAN accredited Short Course modules in Physics—Space Physics - 'Effects of living in the solar system'

Nancealverne School Curriculum Offer Science
Curriculum Map Key Stage 3 —Physics Year 8-9—Elm

Intent: At Nancealverne the teaching of Science aims to provide students with the **skills and foundations to help in understanding the world around them**. Students should be supported to develop a sense of **excitement and curiosity** about the world around them and develop the **reasoning, rational thinking and communication skills to explain their ideas** and the observations they make. At key stage 3 the intent is to enable pupils develop a **deeper understanding of scientific ideas** in the subjects of **Chemistry**, **Biology** and **Chemistry**. Learners will be supported to **develop reasoning skills to make observations and recognise patterns** using the scientific knowledge and understanding they have been taught. Learners will be encouraged to **test ideas** and use the observations and understanding gained from these tests to communicate reasoning and generate further scientific questions.

Working Scientifically

During key Stage 3, pupils should be supported to work scientifically across biology, chemistry and physics. This should include the areas of:

Scientific Attitudes
- pay attention to objectivity and concern for accuracy and repeatability
- understand that scientific theories are develop through testing predictions and evaluating results
- evaluate risks

Experimental skills and investigation
- ask questions and develop a line of enquiry based on observations and prior knowledge and experience
- make predictions using scientific knowledge and understanding
- select, plan and carry out the most appropriate types of scientific enquiries to test predictions
- use appropriate techniques, apparatus, and materials during fieldwork and laboratory work.
- make and record observations and measurements; and evaluate the reliability of methods and suggest possible improvements

Measurement, Analyses and Evaluation
- use and derive simple equations and carry out appropriate calculations
- apply mathematical skills to calculate results
- present observations and data using appropriate methods, including tables and graphs
- interpret observations and data, including identifying patterns and using observations, measurements and data to draw conclusions

Physics—Energy—Calculation of fuel uses and costs in the domestic context
- comparing energy values of different foods (from labels) (kJ)
- comparing power ratings of appliances in watts (W, kW)
- comparing amounts of energy transferred (J, kJ, kW hour
- domestic fuel bills, fuel use and costs
- fuels and energy resources

Physics — Electricity and Electromagnetism
- electric current, measured in amperes, in circuits, series and parallel circuits, currents add where branches meet and current as flow of charge
- potential difference, measured in volts, battery and bulb ratings; resistance, measured in ohms, as the ratio of potential difference (p.d.) to current
- differences in resistance between conducting and insulating components (quantitative)

Physics Matter, Particle Model and Physical Changes
conservation of material and of mass, and reversibility, in melting, freezing, evaporation, sublimation, condensation, dissolving
similarities and differences, including density differences, between solids, liquids and gases
the differences in arrangements, in motion and in closeness of particles explaining changes of state, shape and density; the anomaly of ice-water transition
changes with temperature in motion and spacing of particles
internal energy stored in materials

Physics — Space Physics
gravity force, weight = mass x gravitational field strength (g), on Earth g=10 N/kg, different on other planets and stars; gravity forces between Earth and Moon, and between Earth and sun (qualitative only)
our sun as a star, other stars in our galaxy, other galaxies
the seasons and the Earth's tilt, day length at different times of year, in different hemispheres
the light year as a unit of astronomical distance

Skills Progression / Impact

Pathway 1 (Engagement Step 1 – 5)
Opens eyes for brief period of time when encountering stimulating events
Accepts hands being guided over textural experiences
Explores a desired object for up to 10 seconds
Watches their own hands as they move towards an object
Directs their body movements towards a member of staff when engaging in an activity

Pathway 2 (Engagement Step 6 Investigation and discovery-Progression Step 2)
Selects an electrical object that will give light/make a sound/move
Demonstrates an understanding of how electronic objects work, e.g. pushes buttons
Communicates understanding that they must not touch electrical sockets
Sorts objects into groups that show if they use mains electricity
Identifies that only a plug goes into an electrical socket
Describes a plug in simple terms

Pathway 3/4 (Progression Step 3-8)
Sorts objects into groups showing how electricity is used
Identifies the metal/plastic parts of a plug
Follows electricity from a power source to an object with prompts
Gives examples of objects they use every day which are powered by electricity
Suggests simply how electricity travels from one place to another
Recognises the need for safety when using electricity
Suggests why it is important to have a mobile source of power, e.g. torch
Explains the function of a switch in a circuit and recognises that switching off saves energy
Recognises a circuit must have a power source, which is part of a complete loop, to work
Explains that their series circuit will pass through all components one after the other
Describes the effect of changing components within a circuit
Uses a range of scientific equipment to take accurate and precise measurements or readings, with repeat readings where appropriate
Demonstrates understanding of energy as a quantity that can be quantified and calculated; the total energy has the same value before and after a change

Skills Progression / Impact

Reacts to physical contact/textures with minor physiological changes
Reaches for visually appealing objects
Grasps objects intentionally when they have been placed in their hands
Reacts excitedly to an activity when offered a variety of tactile experiences
Attends to changes pointed out by a member of staff in their environment
Transfers from one hand to the other

Identifies a simple change, e.g. colour
Finds objects that roll if they push them
Makes objects move faster or slower
Moves an object in a variety of different ways
Pushes and pulls heavy objects on a range of surfaces as part of an experiment
Observes and identifies objects that have floated or that have sunk
Makes predications about which objects might sink or float
Demonstrates how different parts of their body move
Moves objects on a scale in an attempt to make them balance
Observes which object moves the shortest/furthest distance down a slope

Sorts objects by how they move
Examines objects that move using different means
Describes what it feels like to run against and with the wind, and why it is more difficult
Compares the strength needed to walk in water and the speed they can travel
Recognises that it requires more effort to pull an object over some surfaces more than others
Demonstrates how force can change the speed, direction and shape of an object
Relates how shape helps to lower air resistance
Recognises and uses the term "balanced" force
Gives a simple reason why different surfaces make it harder to slip on
Demonstrates forces acting on a range of objects
Recognises that forces act in a particular direction
Shows the direction of different forces acting on objects in diagrams using arrows

Skills Progression / Impact

Responds to pleasant smells/tastes with sucking motions
Turns head to follow stimulating experiences
Localises music regularly without prompting by a member of staff
Holds their head steady when looking at a different/new event
Attends to changes pointed out by a member of staff in their environment

Identifies a simple change, e.g. colour
Identifies that the Sun is seen during the day and the moon as being seen at night
Identifies that the Sun and Moon are in the sky
Notices stars and the moon in the sky
Groups photos of the Moon in different phases together knowing they are all the Moon
Looks at globe and describes its shape
Describes simply about how humans can travel into space

Connects the idea that planets are all approximately spherical
Indicates that night and day follow and are regular
Suggests simple reasons why the Sun is important to life on Earth
States that the Sun provides light and warmth
Compares and discusses photos of different planets in the Solar System
Compares and discusses photos of different planets in the Solar System
Describes why planet Earth is conducive to life
Identifies hot and cold places on globe
States that the Sun is the centre of our Solar System
States that the Earth orbits the Sun once a year
States that it takes 24 hours for the Earth to spin on its axis
Explains why day and night occur
States that the Moon orbits the Earth approximately every 28 days
Describes the phases of the Moon using given terms, e.g. full, new, waning

Implementation Outline

Year A	Year B	Year A	Year B

Impact

Students are prepared for the next stage of their Science pathway and are ready to:

Students will have experience of skills and knowledge to prepare for ASDAN accredited Short Course modules in Physics 'Electricity and safety at home' and 'Electricity and renewable energy'

Students will have experience of skills and knowledge to prepare for ASDAN accredited Short Course modules in Physics - 'Forces and motion – including breaking distances'

Students will have experience of skills and knowledge to prepare for ASDAN accredited Short Course modules in Physics—Space Physics - 'Effects of living in the solar system'

Nancealverne School Curriculum Offer Science
Curriculum Map Key Stage 3 —Chemistry Year 7-8—Palm

Intent: At Nancealverne the teaching of Science aims to provide students with the **skills and foundations to help in understanding the world around them**. Students should be supported to develop a sense of **excitement and curiosity** about the world around them and develop the **reasoning, rational thinking and communication skills to explain their ideas** and the observations they make. At key stage 3 the intent is to enable pupils develop a **deeper understanding of scientific ideas** in the subjects of **Chemistry**, **Biology** and **Chemistry**. Learners will be supported to **develop reasoning skills to make observations and recognise patterns** using the scientific knowledge and understanding they have been taught. Learners will be encouraged to **test ideas** and use the observations and understanding gained from these tests to communicate reasoning and generate further scientific questions.

Working Scientifically

During key Stage 3, pupils should be supported to work scientifically across biology, chemistry and physics. This should include the areas of:

Scientific Attitudes
- pay attention to objectivity and concern for accuracy and repeatability
- understand that scientific theories are develop through testing predictions and evaluating results
- evaluate risks

Experimental skills and investigation
- ask questions and develop a line of enquiry based on observations and prior knowledge and experience
- make predictions using scientific knowledge and understanding
- select, plan and carry out the most appropriate types of scientific enquiries to test predictions
- use appropriate techniques, apparatus, and materials during fieldwork and laboratory work.
- make and record observations and measurements; and evaluate the reliability of methods and suggest possible improvements

Measurement, Analyses and Evaluation
- use and derive simple equations and carry out appropriate calculations
- apply mathematical skills to calculate results
- present observations and data using appropriate methods, including tables and graphs
- interpret observations and data, including identifying patterns and using observations, measurements and data to draw conclusions

Chemistry—The Particulate nature of matter
the properties of the different states of matter (solid, liquid and gas) in terms of the particle model, including gas pressure
changes of state in terms of the particle model

Chemistry—Pure and Impure Substances
the concept of a pure substance
mixtures, including dissolving
diffusion in terms of the particle model
simple techniques for separating mixtures: filtration, evaporation, distillation and chromatography
the identification of pure substances

Chemistry—Chemical Reactions and Energetics
chemical reactions as the rearrangement of atoms
combustion, thermal decomposition, oxidation and displacement reactions
what catalysts do
energy changes on changes of state

Chemistry—Earth and Atmosphere
the composition of the Earth
the structure of the Earth
the rock cycle and the formation of igneous, sedimentary and meta-morphic rocks
Earth as a source of limited resources and the efficacy of recycling

Skills Progression / Impact

Pathway 1 (Engagement Step 1 – 5)
Opens eyes for brief period of time when encountering stimulating events
Accepts hands being guided over textural experiences
Explores a desired object for up to 10 seconds
Watches their own hands as they move towards an object
Directs their body movements towards a member of staff when engaging in an activity

Pathway 2 (Engagement Step 6 Investigation and discovery-Progression Step 2)
Suggests what to do with an object they have not seen before
Identifies simple changes e.g. shape of changing matter
Manipulates an object in their hand to find out properties
Explores items to find those which adhere to a specific property, e.g. objects that can bend
Identifies what they did to change a material
Finds objects in their immediate environment that react to a magnet
Identifies which equipment they could use to separate mixtures when offered a selection

Pathway 3/4 (Progression Step 3-8)
Separates mixtures, e.g. using a filter paper
Observes and comments on changes to properties of materials, e.g. wax as liquid and when cooled
Identifies if a substance mixed with water can be separated by filtering or sieving
Identifies if a substance mixed with water can be separated by filtering or sieving
Mixes a variety of substances with water to find out if they are soluble
Identifies simple changes they see with substances they mix together
Describes the changes they observe to materials which have been heated or cooled
Describes what has happened to a range of common materials to produce a change, e.g. heated or mixed
Recognises that some changes may result in a new material, e.g. in cooking
Describes ways to separate different materials
Suggests ways to dissolve a substance
Gives examples of changes which cannot be reversed
Understands and uses the terms correctly "insoluble", "soluble", "solution"

Skills Progression / Impact

Reacts to physical contact/textures with minor physiological changes
Reaches for visually appealing objects
Grasps objects intentionally when they have been placed in their hands
Reacts excitedly to an activity when offered a variety of tactile experiences
Transfers from one hand to the other
Attends to changes pointed out by a member of staff in their environment

Identifies simple changes e.g. shape of changing matter
Observes and responds to kettle boiling/putting ice in the sun
Selects materials to use from a given collection
Experiments with materials to find out if they are suitable for a specific task, e.g. wrapping a present, holding water, etc.
Collects similar objects and identifies differences in materials, e.g. wooden, plastic and metal spoons, etc.
Expects something taken out of the freezer to be cold

Lists ways to heat something up
Gives a simple reason why an object isn't made from a material
Compares the temperature of water using their hand
Groups objects based on their materials
Demonstrates how some materials can be changed, e.g. by bending and stretching
Suggests how they would try and turn a solid into a liquid
Reads a thermometer and records when a material changes state after cooling or heating, e.g. chocolate or butter
Measures or researches to find out the temperature materials change shape
Explores different objects to test if they are solid, liquid or gas
Compares the properties of solids, liquids and gases

Skills Progression / Impact

Responds to pleasant smells/tastes with sucking motions
Turns head to follow stimulating experiences
Localises music regularly without prompting by a member of staff
Holds their head steady when looking at a different/new event
Attends to changes pointed out by a member of staff in their environment

Identifies simple changes e.g. shape of changing matter
Observes and responds to kettle boiling/balloon floating/putting ice in the sun
Matches rocks, by size, colour and trexture
Expects something taken out of the freezer to be cold
Looks at rocks and soil in the environment and uses appropriate terms to describe them
Matches pictures of different types of weather

Points to sea/land on a globe
Observes the effect on glass when breathing
Recognises that water doesn't change permanently
Recognises that humans and plants need gas in the air to live
Recognises that the sun is a star and provides light and warmth
Describes basic stages of the water cycle
Suggests reasons why cliffs might change shape over time
Understands that the atmosphere is made up of gases
Gives examples of how different rocks are used
Describes the characteristics of different states of matter to begin to explain natural phenomena that occur on Earth (including water cycle/ weather)
Begins to use the correct terms when describing the water cycle
Demonstrates an understanding of the Earth as a source of limited resources and the subsequent importance of recycling

Implementation Outline

Year A	Year B	Year A	Year B

Impact

Students are prepared for the next stage of their Science pathway and are ready to:

Students will have experience of skills and knowledge to prepare for ASDAN accredited Short Course modules in Chemistry—**Chemical Change** Kitchen Chemistry – 'changing the state of matter'

Students will have experience of skills and knowledge to prepare for ASDAN accredited Short Course modules in Chemistry—**Chemical Change** Kitchen Chemistry – 'changing the state of matter' and Carbon Footprints, recycling and decomposition

Students will have experience of skills and knowledge to prepare for ASDAN accredited Short Course modules in Chemistry—Weather and climate and Carbon Footprints, recycling and decomposition

Nancealverne School Curriculum Offer Science
Curriculum Map Key Stage 3 —Chemistry Year 8-9—Elm

Intent: At Nancealverne the teaching of Science aims to provide students with the **skills and foundations to help in understanding the world around them**. Students should be supported to develop a sense of **excitement and curiosity** about the world around them and develop the **reasoning, rational thinking and communication skills to explain their ideas** and the observations they make. At key stage 3 the intent is to enable pupils develop a **deeper understanding of scientific ideas** in the subjects of **Chemistry**, **Biology** and **Chemistry**. Learners will be supported to **develop reasoning skills to make observations and recognise patterns** using the scientific knowledge and understanding they have been taught. Learners will be encouraged to **test ideas** and use the observations and understanding gained from these tests to communicate reasoning and generate further scientific questions.

Working Scientifically
During key Stage 3, pupils should be supported to work scientifically across biology, chemistry and physics. This should include the areas of:
Scientific Attitudes
- pay attention to objectivity and concern for accuracy and repeatability
- understand that scientific theories are develop through testing predictions and evaluating results
- evaluate risks

Experimental skills and investigation
- ask questions and develop a line of enquiry based on observations and prior knowledge and experience
- make predictions using scientific knowledge and understanding
- select, plan and carry out the most appropriate types of scientific enquiries to test predictions
- use appropriate techniques, apparatus, and materials during fieldwork and laboratory work.
- make and record observations and measurements; and evaluate the reliability of methods and suggest possible improvements

Measurement, Analyses and Evaluation
- use and derive simple equations and carry out appropriate calculations
- apply mathematical skills to calculate results
- present observations and data using appropriate methods, including tables and graphs
- interpret observations and data, including identifying patterns and using observations, measurements and data to draw conclusions

Chemistry—The Particulate nature of matter
the properties of the different states of matter (solid, liquid and gas) in terms of the particle model, including gas pressure
changes of state in terms of the particle model
a simple (Dalton) atomic model
differences between atoms, elements and compounds

Pure and Impure Substances, Including the periodic table
the concept of a pure substance
mixtures, including dissolving
diffusion in terms of the particle model
simple techniques for separating mixtures: filtration, evaporation, distillation and chromatography
the identification of pure substances
the principles underpinning the Mendeleev periodic table

Chemistry—Chemical Reactions and Energetics
chemical reactions as the rearrangement of atoms
combustion, thermal decomposition, oxidation and displacement reactions
what catalysts do
exothermic and endothermic chemical reactions

Chemistry—Earth and Atmosphere and materials
the composition of the Earth
the structure of the Earth
the composition of the atmosphere
the production of carbon dioxide by human activity and the impact on climate
properties of ceramics, polymers and composites (impact on the planet)

Skills Progression / Impact

Pathway 1 (Engagement Step 1 – 5)
Opens eyes for brief period of time when encountering stimulating events
Accepts hands being guided over textural experiences
Explores a desired object for up to 10 seconds
Watches their own hands as they move towards an object
Directs their body movements towards a member of staff when engaging in an activity

Pathway 2 (Engagement Step 6 Investigation and discovery-Progression Step 2)
Suggests what to do with an object they have not seen before
Identifies simple changes e.g. shape of changing matter
Manipulates an object in their hand to find out properties
Explores items to find those which adhere to a specific property, e.g. objects that can bend
Identifies what they did to change a material
Finds objects in their immediate environment that react to a magnet
Identifies which equipment they could use to separate mixtures when offered a selection

Pathway 3/4 (Progression Step 3-8)
Separates mixtures, e.g. using a filter paper
Observes and comments on changes to properties of materials, e.g. wax as liquid and when cooled
Identifies if a substance mixed with water can be separated by filtering or sieving
Identifies if a substance mixed with water can be separated by filtering or sieving
Mixes a variety of substances with water to find out if they are soluble
Identifies simple changes they see with substances they mix together
Describes the changes they observe to materials which have been heated or cooled
Describes what has happened to a range of common materials to produce a change, e.g. heated or mixed
Recognises that some changes may result in a new material, e.g. in cooking
Describes ways to separate different materials
Suggests ways to dissolve a substance
Gives examples of changes which cannot be reversed
Understands and uses the terms correctly "insoluble", "soluble", "solution"

Skills Progression / Impact

Reacts to physical contact/textures with minor physiological changes
Reaches for visually appealing objects
Grasps objects intentionally when they have been placed in their hands
Reacts excitedly to an activity when offered a variety of tactile experiences
Transfers from one hand to the other
Attends to changes pointed out by a member of staff in their environment

Identifies simple changes e.g. shape of changing matter
Observes and responds to kettle boiling/putting ice in the sun
Selects materials to use from a given collection
Experiments with materials to find out if they are suitable for a specific task, e.g. wrapping a present, holding water, etc.
Collects similar objects and identifies differences in materials, e.g. wooden, plastic and metal spoons, etc.
Expects something taken out of the freezer to be cold

Lists ways to heat something up
Gives a simple reason why an object isn't made from a material
Compares the temperature of water using their hand
Groups objects based on their materials
Demonstrates how some materials can be changed, e.g. by bending and stretching
Suggests how they would try and turn a solid into a liquid
Reads a thermometer and records when a material changes state after cooling or heating, e.g. chocolate or butter
Measures or researches to find out the temperature materials change shape
Explores different objects to test if they are solid, liquid or gas
Compares the properties of solids, liquids and gases

Skills Progression / Impact

Responds to pleasant smells/tastes with sucking motions
Turns head to follow stimulating experiences
Localises music regularly without prompting by a member of staff
Holds their head steady when looking at a different/new event
Attends to changes pointed out by a member of staff in their environment

Identifies simple changes e.g. shape of changing matter
Observes and responds to kettle boiling/balloon floating/putting ice in the sun
Matches rocks, by size, colour and trexture
Expects something taken out of the freezer to be cold
Looks at rocks and soil in the environment and uses appropriate terms to describe them
Matches pictures of different types of weather

Points to sea/land on a globe
Observes the effect on glass when breathing
Recognises that water doesn't change permanently
Recognises that humans and plants need gas in the air to live
Recognises that the sun is a star and provides light and warmth
Describes basic stages of the water cycle
Suggests reasons why cliffs might change shape over time
Understands that the atmosphere is made up of gases
Gives examples of how different rocks are used
Describes the characteristics of different states of matter to begin to explain natural phenomena that occur on Earth (including water cycle/weather)
Begins to use the correct terms when describing the water cycle
Demonstrates an understanding of the Earth as a source of limited resources and the subsequent importance of recycling

Implementation Outline

Year A	Year B	Year A	Year B

Impact

Students are prepared for the next stage of their Science pathway and are ready to:

Students will have experience of skills and knowledge to prepare for ASDAN accredited Short Course modules in Chemistry—**Chemical Change** Kitchen Chemistry – 'changing the state of matter'

Students will have experience of skills and knowledge to prepare for ASDAN accredited Short Course modules in Chemistry—**Chemical Change** Kitchen Chemistry – 'changing the state of matter' and Carbon Footprints, recycling and decomposition

Students will have experience of skills and knowledge to prepare for ASDAN accredited Short Course modules in Chemistry—Weather and climate and Carbon Footprints, recycling and decomposition