



 -Indicates opportunity to revisit subject area.

### Science Long Term Plan

At Reynolds Academy, we use the milestones created by Chris Quigley Education.

Overview	Autumn term	Spring term	Summer term
Milestone 1	<p>To work scientifically</p> <p><b><u>Biology</u></b> To understand plants</p> <p><b><u>Physics</u></b> To understand the Earth's movement in space</p> <p><b><u>Chemistry</u></b> To investigate materials</p>	<p>To work scientifically</p> <p><b><u>Biology</u></b> To understand animals and humans <b>To understand plants (revisited)</b></p> <p><b><u>Chemistry</u></b> <b>To investigate materials (revisited)</b></p>	<p>To work scientifically</p> <p><b><u>Biology</u></b> To investigate living things <b>To understand animals and humans (revisited)</b></p> <p><b><u>Physics</u></b> <b>To understand the Earth's movement in space (revisited)</b></p>
Milestone 2	<p>To work scientifically</p> <p><b><u>Biology</u></b> To understand plants</p> <p><b><u>Chemistry</u></b> To investigate materials -Rocks and soils</p> <p><b><u>Biology</u></b> To understand animals and humans (animals focus)</p>	<p>To work scientifically</p> <p><b><u>Chemistry</u></b> To investigate materials -States of matter</p> <p><b><u>Physics</u></b> To understand electrical circuits To understand light and seeing To investigate sound and hearing</p>	<p>To work scientifically</p> <p><b><u>Biology</u></b> <b>To understand animals and humans (revisited but humans focus)</b> <b>To understand plants (revisited)</b></p> <p><b><u>Physics</u></b> To understand movement, forces and magnets</p>

Milestone 3	<p>To work scientifically</p> <p><b><u>Biology</u></b> To understand animals and humans</p> <p><b><u>Physics</u></b> To understand movement, forces and magnets -Forces</p> <p><b><u>Chemistry</u></b> To investigate materials</p>	<p>To work scientifically</p> <p><b><u>Physics</u></b> To understand movement, forces and magnets -Magnets</p> <p><b><u>Biology</u></b> To understand evolution and inheritance</p> <p><b><u>Chemistry</u></b> To investigate materials</p> <p><b><u>Physics</u></b> To investigate sound and hearing</p>	<p>To work scientifically</p> <p><b><u>Biology</u></b> To investigate living things</p> <p><b><u>Physics</u></b> To understand electrical circuits To understand the Earth's movement in space</p>
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Cycle 1 Key Skills	Autumn term	Spring term	Summer term
Milestone 1	<p><b>Working Scientifically</b></p> <p><b>To work scientifically</b></p> <ul style="list-style-type: none"> <li>• Ask simple questions.</li> <li>• Observe closely, using simple equipment.</li> </ul>		

- Perform simple tests.
- Identify and classify.
- Use observations and ideas to suggest answers to questions.
- Gather and record data to help in answering questions.

**Biology**

**To understand plants**

- Identify and name a variety of common plants, including garden plants, wild plants and trees and those classified as deciduous and evergreen.
- Identify and describe the basic structure of a variety of common flowering plants, including roots, stem/trunk, leaves and flowers.
- Observe and describe how seeds and bulbs grow into mature plants.
- Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.

**Physics**

**To understand the Earth's movement in space**

- Observe changes across the four seasons.
- Observe and describe weather associated with the seasons and how day length varies.

**Chemistry**

**To investigate materials**

**Biology**

**To understand animals and humans**

- Identify and name a variety of common animals that are birds, fish, amphibians, reptiles, mammals and invertebrates.
- 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 (birds, fish, amphibians, reptiles, mammals and invertebrates, 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.
- Notice that animals, including humans, have offspring which grow into adults.
- Investigate 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.
- Describe and compare the structure of a variety of common animals.

**Biology**

**To investigate living things**

- Explore and compare the differences between things that are living, that are dead and 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 micro-habitats.
- 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.

**To understand animals and humans (revisited)**

- Identify and name a variety of common animals that are birds, fish, amphibians, reptiles, mammals and invertebrates.
- Identify and name a variety of common animals that are

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

#### To understand plants (revisited)

- Identify and name a variety of common plants, including garden plants, wild plants and trees and those classified as deciduous and evergreen.
- Identify and describe the basic structure of a variety of common flowering plants, including roots, stem/trunk, leaves and flowers.
- Observe and describe how seeds and bulbs grow into mature plants.
- Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.

#### Chemistry

#### To investigate materials (revisited)

- 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.
- Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.

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- Describe and compare the structure of a variety of common animals (birds, fish, amphibians, reptiles, mammals and invertebrates, 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.
- Notice that animals, including humans, have offspring which grow into adults.
- Investigate 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.
- Describe and compare the structure of a variety of common animals.

#### Physics

#### To understand the Earth's movement in space (revisited)

- Observe changes across the four seasons.
- Observe and describe weather associated with the seasons and how day length varies.

		<ul style="list-style-type: none"> <li>Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick/rock, and paper/cardboard for particular uses.</li> </ul>	
<p>Milestone 2</p>	<p style="text-align: center;"><b>Working Scientifically</b></p> <p><b>To work scientifically</b></p> <ul style="list-style-type: none"> <li>Ask relevant questions.</li> <li>Set up simple practical enquiries and comparative and fair tests.</li> <li>Make accurate measurements using standard units, using a range of equipment, e.g. thermometers and data loggers.</li> <li>Gather, record, classify and present data in a variety of ways to help in answering questions.</li> <li>Record findings using simple scientific language, drawings, labelled diagrams, bar charts and tables.</li> <li>Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.</li> <li>Use results to draw simple conclusions and suggest improvements, new questions and predictions for setting up further tests.</li> <li>Identify differences, similarities or changes related to simple, scientific ideas and processes.</li> <li>Use straightforward, scientific evidence to answer questions or to support their findings.</li> </ul>		
<p style="text-align: center;"><b>Biology</b></p> <p><b>To understand plants</b></p> <ul style="list-style-type: none"> <li>Identify and describe the functions of different parts of flowering plants: roots, stem, leaves and flowers.</li> <li>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.</li> <li>Investigate the way in which water is transported within plants.</li> <li>Explore the role of flowers in the life cycle of flowering plants,</li> </ul>		<p style="text-align: center;"><b>Chemistry</b></p> <p><b>To investigate materials</b></p> <p>States of matter</p> <ul style="list-style-type: none"> <li>Compare and group materials together, according to whether they are solids, liquids or gases.</li> <li>Observe that some materials change state when they are heated or cooled, and measure the temperature at which this happens in degrees Celsius (°C), building on the teaching in mathematics.</li> <li>Identify the part played by evaporation and condensation in the water cycle, and associate the</li> </ul>	<p style="text-align: center;"><b>Biology</b></p> <p><b>To understand animals and humans (revisited but focus on 'HUMANS' aspect)</b></p> <ul style="list-style-type: none"> <li>Identify that animals, including humans, need the right types and amounts of nutrition, that they cannot make their own food and they get nutrition from what they eat.</li> <li>Construct and interpret a variety of food chains, identifying producers, predators and prey.</li> <li>Identify that humans and some animals have skeletons and</li> </ul>

including pollination, seed formation and seed dispersal.

### Chemistry

#### To investigate materials

##### Rocks and soils

- Compare and group together different kinds of rocks on the basis of their simple, physical properties.
- Relate the simple physical properties of some rocks to their formation (igneous or sedimentary).
- Describe in simple terms how fossils are formed when things that have lived are trapped within sedimentary rock.
- Recognise that soils are made from rocks and organic matter.

### Biology

#### To understand animals and humans (animals focus)

- Identify that animals, including humans, need the right types and amounts of nutrition, that they cannot make their own food and they get nutrition from what they eat.
- Construct and interpret a variety of food chains, identifying producers, predators and prey.
- Identify that humans and some animals have skeletons and muscles for support, protection and movement.

rate of evaporation with temperature.

### Physics

#### To understand electrical circuits

- 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.
- Identify common appliances that run on electricity.
- Construct a simple series circuit identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers.

#### To understand light and seeing

- Notice that light is reflected from surfaces.
- Recognise that shadows are formed when the light from a light source is blocked by a solid object.
- Recognise that light is needed in order to see things and that dark is the absence of light.
- Recognise that light from the sun can be dangerous and that there are ways to protect the eyes.
- Find patterns in the way that the size of shadows change.

muscles for support, protection and movement.

- 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.

#### To understand plants (revisited)

- Identify and describe the functions of different parts of flowering plants: roots, stem, 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 role of flowers in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.

### Physics

#### To understand movement, forces and magnets

- Compare how things move on different surfaces.
- Notice that some forces need contact between two objects and some forces act at a distance.

	<ul style="list-style-type: none"> <li>Describe the simple functions of the basic parts of the digestive system in humans.</li> <li>Identify the different types of teeth in humans and their simple functions.</li> </ul>	<p><b>To investigate sound and hearing</b></p> <ul style="list-style-type: none"> <li>Identify how sounds are made, associating some of them with something vibrating.</li> <li>Recognise that vibrations from sounds travel through a medium to the ear.</li> </ul>	<ul style="list-style-type: none"> <li>Observe how magnets attract or repel each other and attract some materials and not others.</li> <li>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.</li> <li>Describe magnets as having two poles.</li> <li>Predict whether two magnets will attract or repel each other, depending on which poles are facing.</li> </ul>
Milestone 3	<p style="text-align: center;"><b>Working Scientifically</b></p> <p><b>To work scientifically</b></p> <ul style="list-style-type: none"> <li>Plan enquiries, including recognising and controlling variables where necessary.</li> <li>Use appropriate techniques, apparatus, and materials during fieldwork and laboratory work.</li> <li>Take measurements, using a range of scientific equipment, with increasing accuracy and precision.</li> <li>Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar and line graphs, and models.</li> <li>Report findings from enquiries, including oral and written explanations of results, explanations involving causal relationships, and conclusions.</li> <li>Present findings in written form, displays and other presentations.</li> <li>Use test results to make predictions to set up further comparative and fair tests.</li> <li>Use simple models to describe scientific ideas, identifying scientific evidence that has been used to support or refute ideas or arguments.</li> </ul>		
<p style="text-align: center;"><b>Biology</b></p> <p><b>To understand animals and humans</b></p> <ul style="list-style-type: none"> <li>Identify and name the main parts of the human circulatory system, and explain the functions of the heart, blood vessels and blood.</li> </ul>		<p style="text-align: center;"><b>Physics</b></p> <p><b>To understand movements, forces and magnets</b></p> <p><u>Magnets</u></p> <ul style="list-style-type: none"> <li>Describe magnets as having two poles.</li> </ul>	<p style="text-align: center;"><b>Biology</b></p> <p><b>To investigate living things</b></p> <ul style="list-style-type: none"> <li>Describe the differences in the life cycles of a mammal, amphibian, an insect and a bird.</li> <li>Describe the life process of reproduction in some plants and animals.</li> </ul>

- Describe the changes as humans develop from birth to old age.
- Recognise the importance of diet, exercise, drugs and lifestyle on the way the human body functions.
- Describe ways in which nutrients and water are transported within animals, including humans.

### Physics

#### To understand movements, forces and magnets (magnets covered in Spring)

##### 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 effect of drag forces, such as air resistance, water resistance and friction that acts between moving surfaces.

### Chemistry

#### To investigate materials

- Compare and group together everyday materials based on evidence from comparative and fair tests, including their hardness solubility, conductivity (electrical and thermal) and response to magnets.
- Understand how some materials will dissolve in liquid to form a solution and describe how to

- Predict whether two magnets will attract or repel each other, depending on which poles are facing.

### Biology

#### To understand evolution and inheritance

- Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents.
- Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago.
- Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.

### Chemistry

#### To investigate materials (revisited)

- Compare and group together everyday materials based on evidence from comparative and fair tests, including their hardness solubility, conductivity (electrical and thermal) and response to magnets.
- Understand how some materials will dissolve in liquid to form a solution and describe how to recover a substance from a solution.

- Describe how living things are classified into broad groups according to common observable characteristics.
- Give reasons for classifying plants and animals based on specific characteristics.

### Physics

#### To understand electrical circuits

- Use recognised symbols when representing a simple circuit in a diagram.
- 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.

#### To understand the Earth's movement in space

- Describe the Sun, Earth and Moon as approximately spherical bodies.

Use the idea of the Earth's rotation to explain day and night.



recover a substance from a solution.

- Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating.
- Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic.
- Demonstrate that dissolving, mixing and changes of state are reversible changes.
- Explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning, oxidation and the action of acid on bicarbonate of soda.

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### Physics

#### To investigate sound and hearing

- 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.