

What are the aims and intentions of this curriculum?

The aim of our Key Stage 3 Science Curriculum is to focus on delivering a curriculum that offers all students the opportunity to discover science through hands on investigation, discussions, enquiring skills, developing debating skills and promoting self-sufficient learners. To develop independent learners and extend the students' repertoire of skills through practical experience that prepares them for life beyond school.

Term	Topics	Knowledge and key terms	Skills developed	Assessment
Autumn 1	<p><b>Biology</b></p> <ul style="list-style-type: none"> <li>Breathing</li> <li>Digestion</li> </ul>	<p>Students will learn about:</p> <ul style="list-style-type: none"> <li>Nutrients</li> <li>Food test</li> <li>Unhealthy diet</li> <li>Digestive system</li> <li>Bacteria and enzymes in digestion</li> <li>Gas exchange</li> <li>Breathing</li> <li>Drugs</li> <li>Alcohol</li> <li>Smoking</li> <li>Physical health and fitness</li> <li>Healthy eating</li> <li>Drugs, alcohol and tobacco</li> </ul>	<p>Students are able to:</p> <ul style="list-style-type: none"> <li>Describe the components of a healthy diet and their functions in the body.</li> <li>Describe how to test for starch, sugars, lipids and proteins.</li> <li>Know the positive associations between physical activity and promotion of mental wellbeing, including as an approach to combat stress.</li> <li>State the characteristics and evidence of what constitutes a healthy lifestyle, maintaining a healthy weight, including the links between inactive lifestyle and ill health, including cancer and cardio-vascular ill-health.</li> <li>Know how to maintain healthy eating and the links between a poor diet and health risks, including tooth decay and cancer.</li> <li>Describe the structure of the main parts of the digestive system.</li> <li>Describe the role of enzymes and bacteria in digestion.</li> <li>Describe the function of the gas exchange system.</li> </ul>	<ul style="list-style-type: none"> <li>Formative assessment:</li> <li>Quizzes, class discussions, projects.</li> <li>Summative assessment: end of topic test.</li> </ul>

## Chemistry

- Elements

Students will learn about:

- Elements
- Atoms
- Compounds
- Chemical formulae
- Polymers

- Describe the processes of inhaling and exhaling.

- Recall the facts about legal and illegal drugs and their associated risks, including the link between drug use, and the associated risks, including the link to serious mental health conditions.
- Know the law relating to the supply and possession of illegal substances.
- Be aware of the physical and psychological risks associated with alcohol consumption and what constitutes low risk alcohol consumption in adulthood.
- Know the physical and psychological consequences of addiction, including alcohol dependency.
- Be aware of the dangers of drugs which are prescribed but still present serious health risks.
- Know the facts about the harms from smoking tobacco (particularly the link to lung cancer), the benefits of quitting and how to access support to do so.

Possible careers are:

Medical careers (doctor, nurse), Physiotherapist, Counsellor, Nutritionist, Dietician.

Students are able to:

- State what an element is.
- Recall the chemistry symbols of 16 elements.
- Use the observation from experiments to explain why a substance must be an element.
- Represent atom using particles diagrams.
- State what a compound is.

- Represent molecules, elements, mixtures, and compounds using particles diagrams.
- Use particle diagrams to classify a substance as an element mixture, or compound.
- Use particle diagrams to classify a substance as an element, mixture or compound. And as molecules or atoms.
- Name compounds using their chemical formulae.
- Use chemical formulae to name the elements present and determine their relative proportions.
- Describe the structure of a polymer.
- Represent polymer using particle diagrams
- Explain how polymer properties depend on their molecules.

Possible careers are:

Computer scientist, Chef, Nutritionist, Dietician, Engineering, Chemical industry, Theatre and stage props master, Car mechanic, Mechanical engineer.

**Chemistry**

- Periodic table

Students will learn about:

- The Periodic table
- Elements in group 1
- Elements in group 7
- Elements in group 0

Students are able to:

- State what the groups and periods of the periodic table tell you about the elements.
- Use data to describe a trend in physical properties.
- Use patterns in data physical properties to estimate a missing value for an element.
- State the properties and reactivity of group 1, 7 and 0 elements.
- Use data and observation to describe trends and predict properties of group 1, 7 and 0 elements.
- Describe the reactions of group 1, 7 and 0 elements.

Possible careers are:

Data scientist, Quality control, Chemical engineer, Computer scientist.

- Formative assessment:
- Quizzes, class discussions, projects.
- Summative assessment: end of topic test.

**Physics**

- Contact forces
- Pressure

Students will learn about:

- Friction and drag
- Squashing and stretching
- Turning forces
- Pressure in gases
- Pressure in Liquids
- Stress on solids

Students are able to:

- Sketch the forces acting on objects when there are contact forces occurs.
- Described what happens to moving objects. when the resultant forces acting on its zero.
- Described the factor that affect the size of the drag forces and friction, and how friction and drag can be reduced.
- Use Hooke's Law.
- Describe what is meant by moment.
- Calculate the moment of a force.
- Describe how fluid exert a pressure in all directions.
- Calculate the fluid pressure.

			<ul style="list-style-type: none"> <li>• Explain the behaviours of objects using ideas of pressure.</li> </ul> <p>Possible careers are: Civil engineering, Construction, car mechanic.</p>	
Spring 1	<b>Biology</b> <ul style="list-style-type: none"> <li>• Respiration</li> <li>• Photosynthesis</li> </ul>	Students will learn about: <ul style="list-style-type: none"> <li>• Aerobic and anaerobic respiration</li> <li>• Biotechnology</li> <li>• Photosynthesis</li> </ul>	Students are able to: <ul style="list-style-type: none"> <li>• State what happen during aerobic respiration.</li> <li>• Use a word equation to describe the aerobic reaction.</li> </ul>	<ul style="list-style-type: none"> <li>• Formative assessment:</li> <li>• Quizzes, class discussions, projects.</li> </ul>

- Leaves
- Investigating photosynthesis
- Plant minerals

- State the difference between the aerobic and anaerobic reaction.
- Use a word equation to describe the anaerobic reaction.
- Explain why specific activities involve aerobic and anaerobic reaction.
- State the word equation for fermentation.
- Describe how bread, beer and wine are made.
- Recall how plants make glucose.
- Explain how plant get the resources they need for the photosynthesis.
- Use word equation to describe photosynthesis.
- Describe the main structure and function of the main component of leaf.
- Explain how a leaf adapted for photosynthesis.
- State the factors that affect the rate of the photosynthesis.
- Describe how to test leaf for the photosynthesis.
- Show graphically how different factors affect the rate of photosynthesis.
- State what fertilisers are used for.
- Describe how a plant uses minerals for healthy growth.
- Explain the role of nitrates in the plant growth.

Possible careers are:

Physiotherapist, Medical careers, Sports trainer, Baker and Food industry, Farming and agriculture.

- Summative assessment: end of topic test.

## Chemistry

- Types of reaction

### Students will learn about:

- Atoms in chemical reactions
- Combustion
- Thermal decomposition
- Conservation of mass

### Students are able to:

- Write word equation from information about chemical reaction.
- Use particle diagrams to show what happens in chemical reaction.
- State the energy transfers involved in combustion.
- Write word equation for combustion reactions.
- Use particle diagrams to describe what happens in combustion reaction.
- Predict the product of combustion of a given reactant
- State what thermal decomposition is.
- Write word equation for decomposition reactions.
- Use particle diagrams to describe what happens in decomposition reactions.
- Predict the product of the decomposition of a given reactant.
- State what is meant by conservation of mass.
- Explain observation about mass in a chemical or physical property change.

Possible careers are:

Car mechanic, Chemical engineer, Medical careers.

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**Chemistry**

- Chemical energy

## Students will learn about:

- Exothermic and endothermic
- Energy level diagrams
- Bond energies

## Students are able to:

- Describe exothermic and endothermic reaction.
- Use experimental observations to distinguish exothermic and endothermic reactions.
- Identify whether an energy level diagram is showing an exothermic or endothermic reaction.
- Use energy level diagram to explain energy changes in change of state and chemical energy.
- State what happens to chemical bond during exothermic and endothermic reaction.
- Use ideas about bond energies to explain energy can changes in chemical reaction.

## Possible careers are:

Chemical engineer, Analytical chemist, Material engineer.

- Formative assessment:
- Quizzes, class discussions, projects.
- Summative assessment: end of topic test.

**Physics**

- Magnetism
- Electromagnets
- Work
- Heating and cooling

## Students will learn about:

- Magnets and magnetic fields
- Electromagnets
- Using electromagnets
- Energy, work and machines
- Energy and temperature
- Energy transfer particles
- Energy transfer: radiation and insulation

## Students are able to:

- Describe how magnets interact.
- Descried how magnetic field diagrams tells you about the direction and strength of a magnetic field.
- Explain observation about navigation using the Earth's magnetic field.
- Describe how to make an electromagnet.
- Use a different diagram to explain how to make an electromagnet and how change its strength.

- Explain how the strength of electromagnet changes with distance.
- Describe what work is and describe what simple machine's do.
- Use a diagram to show how a lever works and compare the work needed to move objects different distances.
- State the difference between the energy and the temperature.
- Explain, in terms of energy, why objects change temperature.
- Describe how energy transferred by particles and sketch diagram to show convection current.
- Describe how a thermal insulator can reduce energy transfer.
- Describe some sources of infrared radiation.
- Describe how energy is transferred from the sun to Earth.
- Compare insulation method in term of conduction, convection, and radiation.

Possible careers are:

Electrician, Electromagnetic engineer, Electrical engineer, Electronics Technician, Test & Installation Engineer, Field Services Technician, Design Engineer, Lead Magnetic Resonance Physicist, Mechanical Manufacturing Technician, Energy sector.

Summer 1

**Biology**

- Evolution
- Inheritance

Students will learn about:

- Natural selection
- Charles Darwin
- Extinction
- Preserving biodiversity
- Inheritance
- DNA
- Genetics
- Genetic modification

Students are able to:

- Describe the theory of natural selection and explain why species evolve over time.
- State some factors that may leads to extinction.
- Describe the importance of biodiversity in maintaining plant and animal populations and explain why a species has become extinct.
- Descried what is meant by endangered species and describe some techniques to prevent extinction.
- Explain how preserving biodiversity benefits human.
- Describe the relationship between DNA, genes and chromosomes and explain how a DNA mutation may affect organism and its future offspring.
- Describe the difference between dominant recessive and alleles.
- Use punnet square to show how genes are inherited.
- Explain why offspring are not identical to their parents.

Possible careers are:  
Paleontologist, Conservationist, Zoo keeper, Zoo veterinarian, Geneticist, Ecologist, Environmental field technician, Wildlife specialist, Sustainability consultant, Wildlife biologist, Environmental planner.

- Formative assessment:
- Quizzes, class discussions, projects.
- Summative assessment: end of topic test.

## Chemistry

- Climate
- Earth resources

### Students will learn about:

- Global warming
- The carbon cycle
- Climate change
- Extraction of metals
- Recycling

### Students are able to:

- State how an increase in greenhouse gases has increased the temperature on Earth.
- State the name and percentage of gases that make up Earth's atmosphere.
- Describe and explain what is meant by global warming.
- List the process that recycles carbon naturally.
- Use the carbon cycle to show how carbon is recycled
- State one cause of global warming that scientists have evidence for.
- Describe how human activities affect the carbon cycle.
- Describe how global warming can impact on climate and local weather patterns.
- State what an ore is and recall the methods of extracting metals.
- Describe how Earth's resources are extracted.
- Justify the choice of extraction method for a metal, given data about reactivity.
- Suggest factors to consider when extracting metals.
- State why certain natural resources will run out
- Explain why recycling some materials is primarily important and describe how earth resource recycled.

### Possible careers are:

Environmental Scientist, Meteorologist for the National Weather Service, Weather analyst for industry, Alternative energy companies, Military

			<p>weather officer, Farming and agriculture, Mining, Construction, Metal worker.</p>	
<p><b>Summer 2</b></p>	<p><b>Biology</b></p> <ul style="list-style-type: none"> <li>• Cell structure</li> <li>• Cell division</li> </ul>	<p>Students will learn about:</p> <ul style="list-style-type: none"> <li>• Observing different types of cells under a microscope</li> <li>• Structure of an animal cell, plant cell and a bacteria cell</li> <li>• Specialised plant and animal cells</li> <li>• Movement of substances in and out of cells</li> <li>• Cell division and growth</li> <li>• Differentiation and stem cells</li> <li>• <b>Stem cells dilemmas</b></li> </ul>	<p>Students are able to:</p> <ul style="list-style-type: none"> <li>• Explain how to use a microscope to observe a cell.</li> <li>• Compare the similarities and differences between plant cell and animal cell.</li> <li>• Describe and explain some of the Specialised plant and animal cells.</li> <li>• Explain how substances move in and out of the cells in plants and animals via diffusion, osmosis and active transport.</li> <li>• Explain the cell cycle and mitosis.</li> <li>• Explain how cell differentiation varies in animals and plants.</li> <li>• Explain the functions of stem cells in embryos, in adult animals and in plants.</li> <li>• <b>Evaluate the pros and cons of the use of stem cells in medical research and treatments.</b></li> </ul> <p>Possible careers are:  Radiologist, Physiotherapist, Nurse, Laboratory assistant, Molecular scientist, Biomedical research assistant, Cancer research scientist, Clinical trials administrator</p>	<ul style="list-style-type: none"> <li>• Formative assessment:</li> <li>• Quizzes, class discussions, projects.</li> <li>• Summative assessment: end of topic test.</li> </ul>