Science

'Inspiring young scientists of the futures, atom by atom'

Science surrounds us. It is everywhere in our daily lives - all day, every day! We want Science to inspire students to explore the world around them and recognise and understand this. We aim to excite and enrich with the practical applications of the subject, teaching students that doing science develops our ability to ask questions, collect information, organise and test our ideas, problem-solve and apply what we learn.

Science is a platform for building confidence, developing communication skills, and making sense of the world around us.

	Autumn	Spring	Summer
1	Digestion, health and disease		Respiration/Plants and photosynthesis
2	Periodic table/chemical reactions	Acids and alkali	Light
3	Energy and Electricity/ Earth and universe	Sound and properties of waves	Earth and universe

Science homework is an integral part of each students learning journey. Therefore the Science department will issue regular homework.

The homework set is designed to:

- Consolidate learning
- Allow further research on subjects
- Develop and practise essential scientific skills
- Provide extra challenge and support for students

At lower school (year 7-9) students will be set one piece of homework per week based on the skills and content that is currently being covered in lessons.

At upper school (year 10-11) students will be set two pieces of homework per week. One piece will be based on the current learning and the second homework will be a piece of recall work to consolidate previous topic and aid revision. Students studying separate sciences will receive three pieces of homework per week but of a shorter duration.

Homework is not expected to be completed in isolation and we actively encourage parents or any other person to help and support students while completing the tasks set. If a student is having difficulty completing homework they must bring this to the attention of their class teacher who will arrange a time suitable to go over any problem areas.

Unit	Learning Objectives/Outcomes
Digestion, health and disease	• Explain the content of a healthy balanced diet • Calculate energy requirements for different people • Describe the digestive system • Explain the function of the parts of the digestive system • Explain how the digestive system allows food to be digested • The importance of bacteria in the human digestive system • Micro-organisms • Fermentation • The process of anaerobic respiration in humans and micro- organisms, including fermentation, and a word summary for anaerobic respiration • Explain the functions of the key nutrients in a balanced diet • Explain the consequences of imbalances in the diet, including obesity, starvation and deficiency diseases • Explain the effect of recreational drugs on the body • Explain the impact of exercise and asthma on the human gas exchange system
Periodic table / chemical reactions	• Explain why symbols are used to represent elements • Link the physical properties to the position in the periodic table • Use observation and patterns to explain the arrangement of the periodic table • Explain why a reaction is an example of combustion or thermal decomposition • Explain observations about mass during combustion and thermal decomposition reactions • Use particle diagrams to show what happens during oxidation, combustion and thermal decomposition reactions • Construct equations • Use experimental data to determine if a reaction is exothermic or endothermic

Energy and Energy transfers/ electricity	• Identify energy transfers as energy in/energy out • Describe the energy transfer between KE and GPE • Describe the energy transfer between KE and EPE • Identify renewable and non-renewable energy resources • Explain how current flows in terms of electrons • Compare how current flows differently in series and parallel circuit • Use a model to explain voltage • Use given data to determine the resistance and explain the differences in resistance between conducting and insulating components
Acids and Alkali	• Use a range of indicators and interpret the results • Explain how neutralisation occurs • Explain how to make specific salts through neutralisation
Sound and properties of waves	• frequencies of sound waves, measured in hertz (Hz); echoes, reflection and absorption of sound • sound needs a medium to travel, the speed of sound in air, in water, in solids • sound produced by vibrations of objects, in loud speakers, detected by their effects on microphone diaphragm and the ear drum; sound waves are longitudinal • Auditory range of humans and animals. • Compare and contrast longitudinal and transverse waves and give examples. • Compare and contrast the properties of sound and light waves. • Calculate wave speed
Respiration / plants and photosynthesis	• Explain how the alveoli are adapted for efficient gas exchange • Apply knowledge gained to locate structures within an actual lung • Apply knowledge of inhalation and exhalation to explain the balloon in a jar lung model • Explain what happens during ventilation to why it hurts so much to breathe after very intense exercise • Explain why our bodies sometimes carry out anaerobic respiration • Explain why a plant needs light, Carbon dioxide, water, chlorophyll • Write the word equation for photosynthesis • Explain how other organisms are dependent on photosynthesis • Explain how specialised plant cells are adapted for their function • Explain how gases move in and out of cells • Sketch and explain how the rate of photosynthesis is affected by changing conditions • Explain why glucose is not suitable for storage

Light	• The similarities and differences between light waves and waves in matter • Light waves travelling through a vacuum; speed of light • The transmission of light through materials: absorption, diffuse scattering and specular reflection at a surface • use of ray model to explain imaging in mirrors, the pinhole camera, the refraction of light and action of convex lens in focusing (qualitative); the human eye • light transferring energy from source to absorber leading to chemical and electrical effects; photo-sensitive 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.
Earth and universe	• Explain the composition of each layer of the Earth • Explain, in detail, the stages involved in the formation of igneous, sedimentary and metamorphic rocks • Link the properties of igneous, sedimentary and metamorphic rocks to their formation and structure • Use a labelled diagram to explain the rock cycle • Explain the different ways that weathering may occur • The gases in the atmosphere • Composition of the atmosphere • The effect of global warming • Changes in levels of carbon dioxide and how carbon in recycled in the environment