

Science

Building Curiosity One Atom at a Time

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.

Group	Autumn	Spring			Summer	
	Introduction to science					
B	Cells	Systems (Diffusion)	Human Reproduction	Interdependence	Plant reproduction	Digestion
C	Particle model	Changes of state	Elements and compounds	Separation	Representing reactions	Chemical reactions (Oxidation)
P		Energy transfers	Forces	Astronomy	Electricity	Fuel bills / appliances

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 Key Stage 3 students will be set one piece of homework per week based on the skills and content that is currently being covered in lessons. They will also be set two pieces of recall homework per half term. These will allow students to reinforce the learning of topics that have been covered previously.

At Key Stage 4 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
Cells	<ul style="list-style-type: none"> • Explain the functions of each part of a cell e.g. nucleus • Explain how a specialised cell is adapted for its function • Use a microscope to observe and record accurate features of a cell
Particle model	<ul style="list-style-type: none"> • Explain the properties of solids / liquids / gases based on the particle arrangement • Explain diffusion in terms of particles in terms of particles and Brownian motion • Explain the effect of increase or decrease in gas pressure
Systems	<ul style="list-style-type: none"> • Apply the different levels of organisation to multicellular organisms • Explain how unicellular organisms are adapted to carry out functions that in multicellular organisms are done by different types of cells • Explain why substances move by diffusion and give examples
Changes of state	<ul style="list-style-type: none"> • Explain how changes of state occur in terms of particle motion • Explain the shape of a change of state graph • Use particle diagrams to explain the mass during a change of state
Energy transfers	<ul style="list-style-type: none"> • 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
Human reproduction	<ul style="list-style-type: none"> • Compare the changes that happen during puberty in males and females • Describe the roles of the male and female parts of the reproductive system • Sequence images of the developing foetus

Elements and compounds	<ul style="list-style-type: none"> • Explain the differences between elements, compounds and mixtures • Use particle diagrams to show substances as elements, compounds and mixtures • Use observations to determine if a substance is an element, compound or mixture • Name compounds formed from a range of elements • Write chemical formulas to show compounds
Forces	<ul style="list-style-type: none"> • Describe how multiple forces react on an object • Calculating resultant forces • Explain the effect of forces (stretching/squashing) • Explain why forces are useful or not (friction)
Interdependence	<ul style="list-style-type: none"> • Describe how organisms within an ecosystem are linked • Construct food webs • Explain the effects of changes on a food web and population
Separation	<ul style="list-style-type: none"> • Explain how substances dissolve using particle models • Use the particle model to explain how filtration and evaporation works • Explain how chromatography works • Explain how distillation works • Produce a solubility curve
Astronomy	<ul style="list-style-type: none"> • Explain the difference in length of day • Explain how the Earth's tilt leads to the different seasons • Explain why planets have different length of day and years • Explain how the position of the moon in relation to us causes the phases • Explain the different theories of the structure of the universe (e.g. geocentric, heliocentric) • Explain how artificial satellites can be used • Explain the difference between stars and planets
Plant reproduction	<ul style="list-style-type: none"> • Explain how plants reproduce using sexual reproduction
Representing reactions	<ul style="list-style-type: none"> • Explain why the properties of composites change • Analyse results on polymer strength • Explain the difference between natural and synthetic polymers • Explain the properties of materials (ceramics, composites, polymers)

Electricity	<ul style="list-style-type: none"> • 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
Digestion	<ul style="list-style-type: none"> • 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
Chemical reactions	<ul style="list-style-type: none"> • 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 to show what is happening during oxidation, combustion and thermal decomposition reactions
Fuel bills / appliances	<ul style="list-style-type: none"> • Compare the power rating of appliances • Compare the amounts of energy transferred by appliances • Calculate the cost of fuels, fuel use and household fuel bills