Curriculum Map

Sandringham School
'Everybody can be Somebody'

Subject: Science

Year group: Yr 9

Timings are broad as classes vary depending on how many teachers the class has.

The colours denote: **Higher tier only content**

Time period	Topic 1 Year 9 (Autumn - Spring Term)	Topic 1 Year 9 (Autumn - Spring Term)	Topic 1 Year 9 (Autumn - Spring Term)	Topic 2 Year 9 (Summer Term)	Topic 2 Year 9 (Summer Term)	Topic 2 Year 9 (Summer Term)
Content ***Declarative Knowledge – 'Know What'***	**Biology 1 - Cell Biology** -Structure of Eukaryotes and prokaryotes -Animal and plant cells -Cell specialisation -Cell differentiation -Microscopy -Cell division and chromosomes -Mitosis and the cell cycle -Causes and types of cancers -Stem cells -Transport in cells via; -Diffusion -Osmosis -Active transport	**Chemistry 9 - Chemistry of the Atmosphere** -The proportions of different gases in the atmosphere -The Earth's early atmosphere -How oxygen increased and carbon dioxide decreased -Greenhouse gases -Human activities which contribute to an increase in greenhouse gases in the atmosphere -Global climate change -The carbon footprint and its reduction -Atmospheric pollutants from fuels -Properties and effects of atmospheric pollutants	**Physics 1 - Energy** -Energy stores and systems -Changes in energy -Energy changes in systems -Power -Conservation and dissipation of energy -Efficiency -National and global energy resources.	**Biology 2 - Organisation part 1** -The principles of organisation -The structure and function of the human digestive system, including the role of enzymes -Food tests	**Chemistry 10a - using resources part 1** -Using the Earth's resources and sustainable development - Potable water -Waste water treatment -Alternative methods of extracting metals - Life cycle assessments -Ways of reducing the use of resources **Chemistry 8a - chemical analysis part 1** -Pure substances -Formulations -Chromatography -Identification of common gases: hydrogen, oxygen, carbon dioxide, chlorine **Chemistry 1 - atomic structure & the periodic table part 1** -Atoms, elements & compounds -Mixtures -Developing the structure of the atom & electronic structure.	**Physics 3 - Thermal physics** -Density of materials -Changes of state -Internal energy -Temperature changes in a system and specific heat capacity -Changes of heat and specific latent heat -Particle motion in gases

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| Skills

Procedural Knowledge – 'Know How' | **Practical Experiments**
1.Use a light microscope to observe, draw and label a selection of plant and animal cells.
3.Investigations to observe and measure the process of osmosis.
3.Plan experiments to test hypotheses. | **Equation application**
1.To use ratios, fractions and percentages.
2.An opportunity to show that aquatic plants produce oxygen in daylight through photosynthesis.

Evaluation
-Evaluate the quality of evidence in a report about global climate change given appropriate information
-Describe uncertainties in the evidence base
-Recognise the importance of peer review of results and of communicating results to a wide range of audiences. | **Equation application**
1.Students should be able to recall and apply Kinetic energy and Gravitational energy, power, efficiency (as a decimal or percentage)
2.Students must be able to apply the equation for elastic potential energy, specific heat capacity
Practical Experiments
1.Investigate the transfer of energy from a gravitational potential energy store to a kinetic energy store
2.Investigate thermal conductivity using rods of different materials.
3.an investigation to determine the specific heat capacity of one or more materials. The investigation will involve linking the decrease of one energy store (or work done) to the increase in temperature and subsequent increase in thermal energy stored. | **Practical & Equation application**
1.Develop an understanding of size and scale
2.Use models to explain scientific ideas.
3.Observing and drawing specimens seen under a microscope.
4.Evaluate risks of treatments of diseases.
5.Translate information between graphical and numerical forms, construct and interpret frequency tables and diagrams, bar charts and histograms, and use a scatter diagram to identify a correlation between two variables.
6.Understand the principles of sampling as applied to scientific data.
7.Process data from investigations to find arithmetic means, understand the principles of sampling and calculate surface areas and volumes. | **Practical Experiments**
1.Safe use of appropriate heating devices and techniques including use of a Bunsen burner and a water bath or electric heater.
2.Use of appropriate apparatus and techniques for the measurement of pH in different situations.
3.Safe use of a range of equipment to purify and/or separate chemical mixtures including evaporation, distillation.
4.Apply a knowledge of a range of techniques, instruments, apparatus, and materials to select those appropriate to the experiment.
5.Carry out experiments appropriately having due regard for the correct manipulation of apparatus, the accuracy of measurements and health and safety considerations.
6.Recognise when to apply a knowledge of sampling techniques to ensure any samples collected are representative.
7.Make and record observations and measurements using a range of apparatus and methods.
8.Evaluate methods and suggest possible improvements and further investigations. | **Equation application**
1. Recall and apply equations for; density, specific heat capacity, specific latent heat,
Practical Experiments
1.Perform an experiment to determine the densities of regular and irregular solid objects and liquids.
2.Perform an experiment to measure the latent heat of fusion of water. |

Curriculum Map

Key Questions	1.How are animal and plant cells different? 2.Why do cells specialise? 3.How do cells replicate? 4.How do substances move across cells?	1.What are the potential effects of global climate change? 2.What is the scale, risk and environmental implications of global climate change. 3.How has the Earth's atmosphere changed over time? 4.How do deposits of limestone, coal, crude oil and natural gas form? 5.How did photosynthesis and green plants contribute to the oxygen content in the atmosphere?	1.How do energy changes in a system, and the ways energy is stored before and after such changes happen? 2.How does the amount of energy stored in or released from a system as its temperature changes be calculated? 3.How is energy transferred usefully, stored or dissipated, or wasted? 4.What is the law of conservation of energy? 5.How can we reduce unwanted energy transfers? 6.What are the main energy resources available, and how can we make energy more renewable and sustainable?	-How are cells organised into whole organisms? -How do we digest our food? -How are plants organised?	-How is waste water made into potable water? -How can we be more sustainable to preserve the world's resources? -Why is it important for industry to evaluate the environmental impact of their processes? -Why is it important that we reduce, reuse, recycle? - What is an element? -What is a compound? -What is a mixture? - How do we know what an atom looks like?	1.What is the density of an object and how is it calculated? 2.What is specific heat capacity and how is it applied? 3.What is internal energy, and how does this relate to specific latent heat? What is kinetic energy and how does this and pressure apply to gases?
Assessment	1.Required practical 1 - Microscopy assessed questions 2.Required practical 2 - Osmosis assessed questions 3.End of topic test	1.Assessment question 2.End of topic test	1.Required practical assessed questions 2.Mid topic test 3.End of topic test	1.Required Practical Assessed Exam Questions - (Enzymes and Food Tests) 2.Assessed Exam Question 3.Mid-topic test 4.End of Topic Test	1.Assessed Exam Questions 2.End of unit test	1.Required practical assessed questions 2.End of topic test
Literacy/Numeracy/ SMSC/Character	**Literacy:** Identification of key terms and differences between similar processes. **Numeracy:** Microscopy calculations. Rearrange a formula when calculating magnification, image size and actual size of objects. **SMSC** Debate - Is cloning ethical? Should we be using stem cells?	**Literacy;** Practice and develop extended answers through 6 mark questions. **Numeracy;** application of equations and calculations **SMSC;** in groups consider the environmental issues that may arise from the use of different energy resources	**Literacy;** plan experiments or devise procedures to make observations **Numeracy;** application of equations and calculations **SMSC;** in groups consider the environmental issues that may arise from the use of different energy resources **Character**; Integrity - show that science has	**Literacy** -Higher tier vocabulary on specific diseases. -Develop extended answers through practice of 6 mark questions. -Development of comprehension skills through research using a variety of sources. **Numeracy** -Understanding of size and scale	**Literacy** -Appropriate use of tier three vocabulary. -Develop extended answers through practice of 6 mark questions. -Development of comprehension skills through research using a variety of sources. **Numeracy:** -Translate information between graphical and numeric form.	**Literacy;** plan experiments or devise procedures to make observations **Numeracy**; application of equations and calculations **SMSC**; collaborative working on practical aspect of the topic **Character**; Resilience & Initiative - students will need to show resilience to recall and apply

	Character; Confidence - Building confidence in practical skills with the completion of two required practicals. Tolerance - Demonstrating tolerance towards others regarding views on stem cells.	**Character**; Aspiration - show that science has the ability to identify environmental issues arising the changing atmosphere of the Earth, but not always the power to deal with the issues because of political, social, ethical or economic considerations.	the ability to identify environmental issues arising from the use of energy resources but not always the power to deal with the issues because of political, social, ethical or economic considerations.	-Analysis of numerical data when considering risk factors -Interpretation of graphs e.g. scatter graphs to identify correlations **SMSC** -Evaluating lifestyle choices -Sensitivity to others when discussing topics such as diseases -Evaluating which treatments should be available on the NHS **Character** Tolerance **-** Showing tolerance to other people and their lifestyle choices	-Use decimals, ratios, fractions and percentages. **SMSC -** -Discussion of use of fluorine in drinking water. -Discussion around should we reduce, reuse, recycle. - Evaluations of use of synthetic fertilisers. - What led to the development of the model of the atom. **Character** Tolerance of others' views during discussions	equations in an exam context.