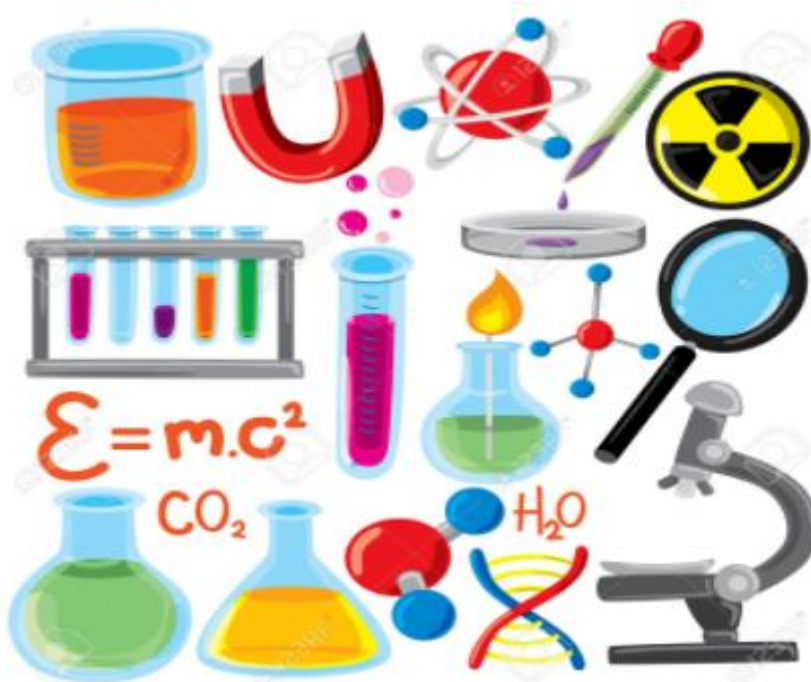




# International School Khuzam (ISK) Grades 6 - 8 Curriculum Book Science



## **Intent**

- Science is a fundamental part of our everyday lives. It has helped us form the world we live in today. Advances in technology and science are transforming our lives at an incredible pace and shaping the future for the next generation
- Students are encouraged to gain a love of the natural world and a curiosity to explain how things work through observation and experimentation
- At International School Khuzam, our vision is to engage young people in science and develop scientists of the future through a stimulating and exciting learning environment that fosters curiosity, motivating and enthusing our students

## **Implementation**

Science at International School Khuzam:

- Our KS3 course follows the Exploring Science scheme of work. It is clearly divided into Biology, Chemistry and Physics units and all students will follow a balanced curriculum
- As well as developing our students' knowledge and understanding of scientific theory, our curriculum has an integrated working scientifically component which covers both the skills needed for thinking about scientific problems and the skills needed to process and analyse data
- Students will develop their numeracy skills by using equations and making calculations, drawing tables and plotting graphs, analysing patterns in tables and graphs
- There is also a clear focus on literacy and communication that seeks to develop students' confidence in articulating their scientific ideas
- During their practical Science lessons students will develop skills in communication and working with others to test concepts for themselves, as well as developing Mathematical and ICT skills during the analysis of their results
- Students are taught in mixed ability whole class lessons
- Homework is set to develop and review student's learning
- Where possible, links are made with other subjects across the curriculum

## **Impact**

As a result of our Science curriculum at International School Khuzam, we have:

- Engaged students who are challenged.
- Confident students who can all talk about Science and their learning and the links between scientific topics across all specialisms.
- Lessons that use a variety of resources to support learning.
- Learning that is tracked and monitored to ensure all students make good progress towards their targets and aim to exceed them.

## Grade 6

### Lessons per Week

- There are 3 lessons

### Skills Developed

- Identify hazards, risks and precautions
- Recognise the importance of scientific quantities and understand how they are measured
- Make a prediction that is explained using scientific knowledge
- Define independent variable, dependent and control variables
- Write a step-by-step method to detail what they did in a practical
- Collect results in a table
- Read simple tables and graphs to identify a relationship
- Describe the trend shown for straight line graphs given prompts
- Simply state what they have discovered as a result of their practical investigation
- Recall the name and use of the equipment they encounter
- Choose appropriate equipment to give accurate results
- Describe what an error is and how they occur

### Literacy and Numeracy

- Use topic keywords in their scientific explanations
- Understand the command terms describe and explain
- Read text and pull out important information
- Read simple tables and graphs and identify a relationship
- Calculate means with support, use equations to make calculations
- Suggest appropriate scales in 1s, 10s and 100s to plot simple graphs and charts
- Plot a simple line graph and label axes with variables

### Assessment

- Students will be formatively assessed in all science topics throughout KS3. This will take the form of retrieval quizzes, mind maps, completing knowledge organisers and comprehensive revision lessons at the end of each topic.
- In every topic, students will complete a midpoint review which will comprise of a multiple choice quiz along with an end of topic assessment which will include longer structured questions, scientific skills and numeracy.
- At the end of every year, students will complete a summative assessment on all the topics they have learnt throughout the year.

### Cross Curricular Links

- In every year group at KS3, we finish the year with a STEAM project. This allows students to work collaboratively on a project that covers Science, Technology, Engineering, Arts and Maths to appreciate how these disciplines come together in real world situations.

### Special Requirements/Equipment

- Scientific calculator

## Home Learning

- Students will be given one piece of homework a week which will vary and could include a consolidation activity, review of keywords and their definitions, research task, mini investigation or small project.

## Reading List and E-books

- Course textbook: Exploring Science eBook – Year 7 (Grade 6).
- The Science department recommends the following top 5 stimulating and challenging reads:
  - Horrible science series. Author: Nick Arnold
  - The Science Book: Big Ideas Simply Explained. Publisher: DK
  - Life on Earth. Author: David Attenborough
  - The Secret Life of the Periodic Table. Author: Dr Ben Still
  - My First Book of Quantum Physics. Author: Sheddad Kaid-Salah Ferrón

## Useful Websites

- <https://www.pearsonactivelearn.com/app/login>
- <https://www.bbc.co.uk/bitesize/subjects/zng4d2p>
- <https://phet.colorado.edu/en/simulations/browse>
- <https://www.sciencekids.co.nz/gamesactivities.html>
- <http://www.darvill.clara.net/myon.htm>
- [https://www.youtube.com/channel/UCsooa4yRKGN\\_zEE8iknghZA](https://www.youtube.com/channel/UCsooa4yRKGN_zEE8iknghZA)
- <https://www.youtube.com/user/virtualschooluk>
- <https://www.youtube.com/user/scishowkids>
- [https://www.youtube.com/channel/UCqOoboPm3uhY\\_YXhvhmL-WA](https://www.youtube.com/channel/UCqOoboPm3uhY_YXhvhmL-WA)

## Setting

- Classes are mixed ability

## Staff

- Adam Khan (Head of Department, Biology Teacher)
- Titus Dadzie (Assistant Head of Department, Chemistry Teacher)
- Paul Leadbeater (Assistant Head of Department , Physics Teacher)
- Farah Khan (Chemistry Teacher)
- Girish Melethil (Physics Teacher)
- Manoj Kumar (Biology Teacher)
- Omneya Ahmed (Biology Teacher)

## Grade 7

### Lesson per Week

- There are 3 lessons

### Skills Developed

- Write a hypothesis that is explained using scientific knowledge
- Identify the independent variable, dependent and control variables
- Write a step-by-step method to detail what they did in a practical
- Draw a simple table and collect results
- Write a conclusion to discuss their observations and prove or disprove their hypothesis
- Read tables and graphs to identify and explain a relationship
- Describe the trend shown for straight and curved line graphs given prompts
- Describe their observations and explain them using scientific knowledge
- Choose appropriate equipment to give accurate results
- Define accuracy, precision, repeatable and reproducible
- Explain how evidence and observations support or do not support a certain theory
- Use simple models to explain scientific concepts
- Evaluate a method and suggest simple improvements

### Literacy and Numeracy

- Use topic keywords in their scientific explanations and start to justify their ideas
- Read longer text and pull out important information
- Read more complex tables and graphs, and describe the trends
- Manipulate data to calculate percentages and means
- Use and rearrange equations to make calculations
- Suggest appropriate scales with a greater variety of scale divisions
- Plot straight line graphs and draw a suitable line of best fit

### Setting

- Classes are mixed ability for 20-2021

### Staff

- Adam Khan (Head of Department, Biology Teacher)
- Titus Dadzie (Assistant Head of Department, Chemistry Teacher)
- Paul Leadbeater (Assistant Head of Department , Physics Teacher)
- Farah Khan (Chemistry Teacher)
- Girish Melethil (Physics Teacher)
- Manoj Kumar (Biology Teacher)
- Omneya Ahmed (Biology Teacher)

### Assessment

- Students will be formatively assessed in all science topics throughout KS3. This will take the form of retrieval quizzes, mind maps, completing knowledge organisers and comprehensive revision lessons at the end of each topic.
- In every topic, students will complete a midpoint review which will comprise of a multiple choice quiz along with an end of topic assessment which will include longer structured questions, scientific skills and numeracy
- At the end of every year, students will complete a summative assessment on all the topics they have learnt throughout the year

### Cross Curricular Links

- In every year group at KS3, we finish the year with a STEAM project. This allows students to work collaboratively on a project that covers Science, Technology, Engineering, Arts and Maths to appreciate how these disciplines come together in real world situations.

### Special Requirements/Equipment

- Scientific calculator

### Home Learning

- Students will be given one piece of homework a week which will vary and could include a consolidation activity, review of keywords and their definitions, research task, mini investigation or small project.

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- <https://phet.colorado.edu/en/simulations/browse>
- <https://www.sciencekids.co.nz/gamesactivities.html>
  - <http://www.darvill.clara.net/myon.htm>
- [https://www.youtube.com/channel/UCsooa4yRKGN\\_zEE8iknghZA](https://www.youtube.com/channel/UCsooa4yRKGN_zEE8iknghZA)
  - <https://www.youtube.com/user/virtualschooluk>
  - <https://www.youtube.com/user/scishowkids>
- [https://www.youtube.com/channel/UCqOoboPm3uhY\\_YXhvhmL-WA](https://www.youtube.com/channel/UCqOoboPm3uhY_YXhvhmL-WA)

## Grade 8

<b>Lessons per Week</b>
<ul style="list-style-type: none"><li>• There are 3 lessons</li></ul>
<b>Skills Developed</b>
<ul style="list-style-type: none"><li>• Write a hypothesis based on their existing scientific knowledge</li><li>• Write a method that includes all variables and a risk assessment</li><li>• Justify their choice of apparatus and intervals for variables to give valid results</li><li>• Present data in a table, collect data and draw a suitable graph based on all skills learnt so far</li><li>• Discuss their method and results relating to accuracy, precision, repeatability and reproducibility</li><li>• Write a conclusion based on their results, use data and scientific knowledge to support their ideas</li><li>• Evaluate a method and suggest improvements</li><li>• Use a variety of concepts and models to develop scientific explanations and understanding</li></ul>
<b>Literacy and Numeracy</b>
<ul style="list-style-type: none"><li>• Use topic keywords in their scientific explanations to justify their ideas</li><li>• Confidently read longer text and pull out important information</li><li>• Use comparative language and linking statements when discussing their results</li><li>• Confidently read tables and graphs and discuss the trends</li><li>• Recognise the equation to use and how to rearrange it to calculate the relevant variable</li><li>• Manipulate data in tables to calculate percentages, means, and round numbers</li><li>• Independently plot a straight line or curved graph using suitable scale and line of best fit</li><li>• Calculate the gradient from a graph</li></ul>
<b>Assessment</b>
<ul style="list-style-type: none"><li>• Students will be formatively assessed in all science topics throughout KS3. This will take the form of retrieval quizzes, mind maps, completing knowledge organisers and comprehensive revision lessons at the end of each topic.</li><li>• In every topic, students will complete a midpoint review which will comprise of a multiple choice quiz along with an end of topic assessment which will include longer structured questions, scientific skills and numeracy</li><li>• At the end of every year, students will complete a summative assessment on all the topics they have learnt throughout the year</li></ul>
<b>Cross Curricular Links</b>
<ul style="list-style-type: none"><li>• In every year group at KS3, we finish the year with a STEAM project. This allows students to work collaboratively on a project that covers Science, Technology, Engineering, Arts and Maths to appreciate how these disciplines come together in real world situations.</li></ul>
<b>Special Requirements/Equipment</b>
<ul style="list-style-type: none"><li>• Scientific calculator</li></ul>

### Home Learning

- Students will be given one piece of homework a week which will vary and could include a consolidation activity, review of keywords and their definitions, research task, mini investigation or small project.

### Reading List and E-books

- Course textbook: Exploring Science eBook – Year 9 (Grade 8)
- The Science department recommends the following top 5 stimulating and challenging reads:
  - Horrible science series. Author: Nick Arnold
  - The Science Book: Big Ideas Simply Explained. Publisher: DK
  - Life on Earth. Author: David Attenborough
  - The Secret Life of the Periodic Table. Author: Dr Ben Still
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- [https://www.youtube.com/channel/UCsooa4yRKGN\\_zEE8iknghZA](https://www.youtube.com/channel/UCsooa4yRKGN_zEE8iknghZA)
- <https://www.youtube.com/user/virtualschooluk>
- <https://www.youtube.com/user/scishowkids>
- [https://www.youtube.com/channel/UCqOoboPm3uhY\\_YXhvhmL-WA](https://www.youtube.com/channel/UCqOoboPm3uhY_YXhvhmL-WA)



## Grade 6 to 8 Curriculum Maps

Term	Grade 6 Topics	Grade 7 Topics	Grade 8 Topics
Term 1	<p><b>Lab Induction</b></p> <ul style="list-style-type: none"> <li>• Health &amp; Safety</li> <li>• Hazard Symbols</li> <li>• Lighting Bunsen Burner</li> <li>• Using Equipment</li> </ul> <p><b>The Particle Model</b></p> <ul style="list-style-type: none"> <li>• States of matter</li> <li>• Changing state</li> <li>• Brownian Motion</li> <li>• Diffusion</li> <li>• Gas pressure</li> <li>• Density</li> <li>• <b>Practical</b> – Observing particles</li> </ul> <p><b>Cells, Tissues &amp; Organs</b></p> <ul style="list-style-type: none"> <li>• Life Processes – MRS GREN</li> <li>• Animal and plant cells</li> <li>• Unicellular organisms</li> <li>• Specialised Cells</li> <li>• Tissues &amp; Organs</li> <li>• <b>Practical 1</b> – Making a Cell</li> <li>• <b>Practical 2</b> – Cheek &amp; Onion cells</li> </ul> <p><b>Acids and Alkalis</b></p> <ul style="list-style-type: none"> <li>• Indicators</li> <li>• pH Scale</li> <li>• Oxidation</li> <li>• Metals and acid reactions</li> <li>• Neutralisation &amp; Titration</li> <li>• <b>Practical 1</b> – Testing Acids &amp; Alkalis</li> <li>• <b>Practical 2</b> – Red Cabbage Indicator</li> <li>• <b>Practical 3</b> – Neutralisation</li> <li>• <b>Practical 4</b> – Antacid Investigation</li> </ul> <p><b>Atoms, Elements &amp; Compounds</b></p> <ul style="list-style-type: none"> <li>• Structure of an atom</li> </ul>	<p><b>Chemical Reactions</b></p> <ul style="list-style-type: none"> <li>• Properties of Group 1 &amp; 7</li> <li>• Properties of metals &amp; Non-metals</li> <li>• Chemical reactions &amp; trends</li> <li>• Oxidation Reactions</li> <li>• Metal &amp; Acid, Carbonate Reactions</li> <li>• Combustion &amp; Oxidation reactions</li> <li>• Conservation of Mass</li> <li>• <b>Practical 1</b> – Demo: Alkali Metals</li> <li>• <b>Practical 2</b> – Metal &amp; Acid Reactions</li> <li>• <b>Practical 3</b> – Metal &amp; Carbonate Reactions</li> <li>• <b>Practical 4</b> – Products of Combustion</li> <li>• <b>Practical 5</b> – Burning Magnesium</li> </ul> <p><b>Food &amp; Digestion</b></p> <ul style="list-style-type: none"> <li>• Healthy and Unhealthy Diets</li> <li>• Deficiency diseases</li> <li>• Food Tests</li> <li>• Energy in Food</li> <li>• Digestion</li> <li>• Enzymes</li> <li>• <b>Practical 1</b> – Food Tests - Carbohydrates</li> <li>• <b>Practical 2</b> – Food Tests – Fats and Proteins</li> <li>• <b>Practical 3</b> – Visking Tubing Model Gut</li> </ul> <p><b>Breathing and Respiration</b></p> <ul style="list-style-type: none"> <li>• Structure of the Lungs</li> <li>• Breathing</li> <li>• Respiration</li> <li>• Exercise &amp; breathing</li> <li>• Effects of smoking</li> <li>• <b>Practical 1</b> – Exercise &amp; Breathing</li> <li>• <b>Practical 2</b> – Demo: Smoking</li> </ul> <p><b>Thermal Energy</b></p> <ul style="list-style-type: none"> <li>• Temperature</li> </ul>	<p><b>Metals &amp; Reactivity</b></p> <ul style="list-style-type: none"> <li>• Review: Metals &amp; their uses</li> <li>• Corrosion of Metals</li> <li>• Preventing Corrosion</li> <li>• Reactivity Series</li> <li>• Displacement Reactions</li> <li>• Extraction of Metals</li> <li>• Exo &amp; Endothermic Reactions</li> <li>• Rates of Reaction &amp; Collision Theory</li> <li>• Effect of Concentration &amp; Surface area</li> <li>• <b>Practical 1</b> – Displacement reactions</li> <li>• <b>Practical 2</b> – Exothermic &amp; Endothermic Reactions</li> <li>• <b>Practical 3</b> – Effect of Surface Area on Rate of Reaction</li> </ul> <p><b>Plant Growth and Reproduction</b></p> <ul style="list-style-type: none"> <li>• Photosynthesis</li> <li>• Structure of a Leaf</li> <li>• Plant Reproduction</li> <li>• Seed Dispersal</li> <li>• Plant adaptations – Xerophytes &amp; Hydrophytes</li> <li>• <b>Practical</b> – Seed Dispersal Investigation</li> </ul> <p><b>Forces &amp; Motion</b></p> <ul style="list-style-type: none"> <li>• Types of forces</li> <li>• Balanced, unbalanced, resultant force</li> <li>• Hooke’s Law</li> <li>• Speed</li> <li>• Distance-Time Graphs</li> <li>• Levers</li> <li>• Work Done</li> <li>• Moments</li> <li>• <b>Practical 1</b> – Hooke’s Law</li> <li>• <b>Practical 2</b> – Measuring Speed</li> <li>• <b>Practical 3</b> – Investigating Speed</li> </ul> <p><b>Energy Transfers</b></p> <ul style="list-style-type: none"> <li>• Energy transfers</li> <li>• Conservation of energy</li> <li>• Power &amp; Efficiency</li> <li>• Sankey Diagrams</li> <li>• Non-renewable &amp; renewable energy sources</li> <li>• <b>Practical</b> – Energy Transfers</li> </ul>

	<ul style="list-style-type: none"> <li>Identifying atoms, elements, compounds, molecules, mixtures</li> <li>Periodic Table</li> <li>Chemical symbols and formula</li> <li>Naming compounds</li> <li><b>Practical</b> – Making Iron Sulphide</li> </ul>	<ul style="list-style-type: none"> <li>Heating curve</li> <li>Conduction</li> <li>Convection</li> <li>Radiation</li> <li><b>Practical 1</b> – Heating &amp; Cooling</li> <li><b>Practical 2</b> – Conduction</li> <li><b>Practical 3</b> – Radiation</li> <li><b>Practical 4</b> – Investigating Insulators</li> </ul>	
<b>Term 2</b>	<p><b>Forces &amp; Magnets</b></p> <ul style="list-style-type: none"> <li>Types of forces</li> <li>Weight, Mass &amp; Gravity</li> <li>Balanced &amp; unbalanced forces</li> <li>Resultant force</li> <li>Magnets &amp; Magnetic Fields</li> <li>Friction</li> <li>Pressure</li> <li>Practical 1 – Bar Magnets &amp; Magnetic Fields</li> <li>Practical 2 – Investigating Friction</li> </ul> <p><b>Energy</b></p> <ul style="list-style-type: none"> <li>Energy stores</li> <li>Energy transfers</li> <li>Fuels</li> <li>Non-renewable &amp; renewable energy sources</li> <li>Practical – Energy Transfers</li> </ul> <p><b>Electricity</b></p> <ul style="list-style-type: none"> <li>Series &amp; Parallel Circuits</li> <li>Current &amp; Voltage</li> <li>Resistance</li> <li>Plugs and Bulbs</li> <li>Practical 1 – Building Circuits</li> <li>Practical 2 – Increasing Current</li> <li>Practical 3 – Investigating Resistance</li> </ul>	<p><b>Sound</b></p> <ul style="list-style-type: none"> <li>Properties of Sound</li> <li>Echos</li> <li>Oscilloscope Traces – Wavelength, Frequency (Pitch), Amplitude (Volume)</li> <li>The Ear</li> <li>Measuring Sound</li> <li>Practical 1 – Making Sound</li> <li>Practical 2 – Oscilloscope Traces</li> </ul> <p><b>Light</b></p> <ul style="list-style-type: none"> <li>Properties of Light &amp; Shadows</li> <li>Reflection</li> <li>Refraction</li> <li>Ray Diagrams</li> <li>Cameras &amp; Eyes</li> <li>Dispersion</li> <li>Practical 1 – Investigating Mirrors</li> <li>Practical 2 – Investigation Refraction</li> <li>Practical 3 – Pinhole Camera</li> <li>Practical 4 – Dispersion</li> </ul> <p><b>Living things &amp; their Environment</b></p> <ul style="list-style-type: none"> <li>Habitats</li> <li>Adaptations</li> <li>Sampling Techniques</li> <li>Food chains</li> <li>Bioaccumulation</li> <li>Pyramids</li> </ul>	<p><b>Genetics &amp; Evolution</b></p> <ul style="list-style-type: none"> <li>Inherited &amp; Environmental Variation</li> <li>Structure of DNA</li> <li>Adaptation</li> <li>Competition</li> <li>Natural Selection</li> <li>Practical – Extracting DNA</li> </ul> <p><b>Electricity &amp; Magnetism</b></p> <ul style="list-style-type: none"> <li>Force Fields</li> <li>Static Electricity</li> <li>Current &amp; Voltage in Series &amp; Parallel Circuits</li> <li>Resistance</li> <li>Electromagnets</li> <li>Practical 1 – Static Electricity</li> <li>Practical 2 – Current &amp; Voltage in Series &amp; Parallel Circuits</li> <li>Practical 3 – Investigating Electromagnets</li> </ul> <p><b>IGCSE Transition – Biology</b></p> <ul style="list-style-type: none"> <li>Life Processes</li> <li>Classification</li> <li>Cells &amp; Specialised Cells</li> <li>Diffusion, Osmosis &amp; Active Transport</li> <li>Practical – Investigating Osmosis in Potatoes</li> </ul>

<b>Term 3</b>	<b>Mixtures &amp; Separation</b> <ul style="list-style-type: none"> <li>• Pure &amp; impure substances</li> <li>• Heating &amp; cooling curve</li> <li>• Filtering &amp; Evaporation</li> <li>• Chromatography</li> <li>• Distillation</li> <li>• Practical 1 – Heating &amp; Cooling Curve of Water</li> <li>• Practical 2 – Filtering &amp; Evaporation of Salt</li> <li>• Practical 3 – Chromatography</li> <li>• Practical 4 – Distillation of Ethanol &amp; Water</li> </ul>	<b>Reproduction</b> <ul style="list-style-type: none"> <li>• Reproductive Systems</li> <li>• Fertilisation</li> <li>• Puberty &amp; Menstrual Cycle</li> <li>• Pregnancy &amp; Birth</li> </ul>	<b>IGCSE Transition – Chemistry</b> <ul style="list-style-type: none"> <li>• Rates of Reaction</li> <li>• Practical 1 – Surface Area and Rate of Reaction</li> <li>• Practical 2 – Investigating Factors that Affect the Rate of Reaction</li> </ul>
	<b>Earth and Space</b> <ul style="list-style-type: none"> <li>• Solar System</li> <li>• Phases of the Moon</li> <li>• Seasons</li> <li>• Gravity</li> <li>• Magnetic Earth</li> <li>• Practical – Build a Solar System</li> </ul>	<b>Earth &amp; the Atmosphere</b> <ul style="list-style-type: none"> <li>• Structure of the Earth</li> <li>• Weathering</li> <li>• Sedimentary, Igneous, Metamorphic Rock</li> <li>• Rock Cycle</li> <li>• Plate Boundaries</li> <li>• Carbon Cycle</li> <li>• Greenhouse Effect</li> <li>• Climate Change</li> <li>• Recycling Resources &amp; Sustainability</li> <li>• Practical 1 – Choc Cycle</li> <li>• Practical 2 – Build a Volcano</li> </ul>	<b>IGCSE Transition – Physics</b> <ul style="list-style-type: none"> <li>• Thermal Properties of Solids, Liquids &amp; Gases</li> <li>• Measuring Temperature</li> <li>• Thermal Capacity</li> <li>• Practical – Investigating Specific Heat Capacity</li> </ul>
	<b>Humans as Organisms</b> <ul style="list-style-type: none"> <li>• The Skeleton</li> <li>• Joints</li> <li>• Muscles</li> <li>• Organ Systems</li> </ul>		