Subject Curriculum Overview for Academic Year 2022/2023

Subject: KS3 Science	Subject Leader: Adem Osbourn	Year Group: 8	AUTUMN TERM
Topic	**Key Learning Points**	**Key Vocabulary**	**Assessments**
Biology: Food and Digestion	*End Point: Understand the difference between a healthy and unhealthy diet. Know how to carry out basic chemical tests for the main groups of nutrients. Know the main digestive organs and describe their role in the digestive process.* • Know the relative proportion of each food group that constitutes a balanced diet • Know how to calculate energy requirements from food • Know the risks of an unhealthy diet • Know how to carry out chemical tests for carbohydrates, protein, fats and sugar • Know that the digestive system breaks down and absorbs food molecules • Describe the role of each digestive organ • Know that digestive enzymes break down large food molecules • Know that bacteria in the intestines produce some vitamins and break down substances that humans cannot digest	• Carbohydrates • Proteins • Fats • Calories • Obesity • Deficiency disease • Oesophagus • Intestines • Stomach • Enzyme • Absorption • Excretion	**Formative Assessment:** • Each lesson starts with a review starter, the teacher provides feedback and students mark in green pen. • Teachers constantly assess students, (for example using questioning, mini-whiteboards, short quizzes and true or false activities) and provide immediate verbal feedback during the lesson. • At the end of each lesson there is a short plenary to review learning. Students review their own work in green pen. **Summative Assessment:** • At the end of the term students will have a summative assessment. This will be a 45-mark exam paper (15 marks from each topic). **Homework:** • Every week students are set review homework tasks in the form of a revision mat.
Chemistry: The Periodic Table	*End Point: Have a secure knowledge of particles, atoms, elements and compounds and understand how elements are displayed on the periodic table. Describe the trends within the groups and periods of the periodic table.* • Know how the periodic table is arranged into periods and groups • Know the history of the periodic table, including Mendeleev's periodic table • Identify metals and non-metals on the periodic table and know their properties • Know that group 1 elements are called the alkali metals and describe the reactivity of alkali metals • Know that group 7 elements are called the halogens and describe their reactivity through displacement reactions • Know that group 0 elements are called the noble gases and are inert (unreactive)	• Atom, Element, Compound • Flammability, Viscosity, Conductivity • Malleable, Brittle • Metal • Period, Group • Alkali Metal • Halogen • Noble Gas • Reactivity	
Physics: Waves	*End Point: Know that waves transfer energy without transferring particles. Know how to draw a waveform and describe how light and sound travels as a wave.* • Know that sound is caused by the vibration of particles • Know the auditory range of humans and that loudness is measured in decibels • Know how to draw and label a waveform • Define the key terms amplitude, wavelength and frequency • Know that sounds with a frequency greater than 20,000 Hz are called ultrasound • Know that water/light waves are transverse and sound waves are longitudinal • Know that the retina of the eye detects light and transmits signals to the brain	• Vibration, Wave • Compression, Rarefaction • Pitch, Frequency, Wavelength • Loudness, Amplitude • Absorb, Transmit, Reflect, Disperse • Longitudinal, Transverse	

Subject Curriculum Overview for Academic Year 2022/2023

Subject: KS3 Science	Subject Leader: Adem Osbourn	Year Group: 8	SPRING TERM

Topic	Key Learning Points	Key Vocabulary	Assessments
Biology: Respiration	*End Point: Understand that respiration is a biochemical process that plays a central role for all living organisms. Link this to the mechanical process of breathing and the cells, tissues, organs and organ systems involved.* • Recap the role of diffusion in the transport of substances in and out of cells • Know that respiration is a biochemical process that releases energy from glucose • Describe the structure of the respiratory system and thorax, including the lungs, diaphragm, ribcage, intercostal muscles, trachea, bronchi and bronchioles • Explain the mechanical process of ventilation in the lungs • Describe factors that affect lung health, such as asthma and smoking • Compare aerobic and anaerobic respiration • Know that fermentation is a type of anaerobic respiration that can be used in baking and brewing	• Diffusion • Aerobic, Anaerobic • Respiration • Fermentation • Thorax, Lungs, Diaphragm, Ribcage, Intercostal muscles, Trachea, Bronchi, Bronchioles • Ventilation • Asthma • Smoking	**Formative Assessment:** • Each lesson starts with a review starter, the teacher provides feedback and students mark in green pen. • Teachers constantly assess students, (for example using questioning, mini-whiteboards, short quizzes and true or false activities) and provide immediate verbal feedback during the lesson. • At the end of each lesson there is a short plenary to review learning. Students review their own work in green pen. **Summative Assessment:** • At the end of the term students will have a summative assessment. This will be a 45-mark exam paper (15 marks from each topic). **Homework:** • Every week students are set review homework tasks in the form of a revision mat.
Chemistry: Acids and Alkalis	*End Point: Know the properties of acids and alkalis and how to test using indicators, be able to predict the indicator results. Describe acid reactions, including neutralisation.* • Know the properties of acids and alkalis • Know that an indicator shows whether a substance is acid, alkali or neutral • Know that that acids and alkalis can have different strengths • Describe acids and alkalis as either strong or weak dependent on their pH • Understand the difference between strength and concentration of an acid • Know that an acid and an alkali react to produce a salt and water • Know how to name salts produced in a neutralisation reaction • Know that an acid and a metal react to produce a salt and hydrogen • Know how to test for hydrogen gas	• Acid, Alkali • Chemical properties • Indicators • Neutral • Solution • Chemical reaction • Salt • Neutralisation • Concentration • Strong/weak acid • Metal	
Physics: Heating and Cooling	*End Point: Understand how energy is transferred between stores of energy both by particles (conduction and convection) and by radiation.* • Describe state changes in terms of energy and recap heating and cooling curves • Know the difference between heat and temperature • Know the thermal energy is transferred through solids by conduction • Know that thermal energy is transferred through liquids and gases by convection • Know that thermal energy is transferred through a vacuum by radiation • Know that materials can be conductors or insulators of thermal energy • Use practical work to determine how to reduce heat loss, relate this to everyday issues, such as insulating materials used in house building	• State change • Vacuum • Heating curve • Energy store, Energy transfer • Thermal energy • Conduction, Convection, Radiation • Conductor, Insulator • Heat, Temperature	

Subject Curriculum Overview for Academic Year 2022/2023

Subject: KS3 Science	Subject Leader: Adem Osbourn	Year Group: 8	SUMMER TERM
Topic	**Key Learning Points**	**Key Vocabulary**	**Assessments**
Biology: Photo-synthesis	*End Point: Understand photosynthesis as a biochemical process to transfers energy from sunlight to glucose. Know how plant organs & specialised cells facilitate photosynthesis.* • Know how specialised plant cells (root hair cell and palisade) are adapted to their role • Describe photosynthesis using a word equation • Describe the function of stomata • Know the test for starch and explain why leaves left in sunlight test positive for starch • Compare gas levels around a plant linking with ideas about rate of photosynthesis and respiration in daytime and night time • Describe limiting factors graphs in terms of limiting the rate of photosynthesis • Describe extremophile plant adaptations	• Characteristics • Food chain/web • Producer/Consumer • Apex predator • Ecosystem/Habitat • Pollination • Food security • Bioaccumulation • Random sampling • Quadrats	**Formative Assessment:** • Each lesson starts with a review starter, the teacher provides feedback and students mark in green pen. • Teachers constantly assess students, (for example using questioning, mini-whiteboards, short quizzes and true or false activities) and provide immediate verbal feedback during the lesson. • At the end of each lesson there is a short plenary to review learning. Students review their own work in green pen. **Summative Assessment:** • At the end of the term students will have a summative assessment. This will be a 45-mark exam paper (15 marks from each topic). **Homework:** • Every week students are set review homework tasks in the form of a revision mat.
Chemistry: Reactions of Metals	*End Point: Know the properties of metals and describe reactivity using the reactivity series. Describe how metals can be protected from corrosion.* • Know that a more reactive metal will displace a less reactive metal from a compound • Write word equations for the reaction of acids and metals/metal carbonates • Describe how to test for carbon dioxide (limewater) and hydrogen (squeaky pop). • Know that all metal oxides are bases and can neutralise acids • Know that corrosion is the reaction of oxygen with the surface of a metal • Know the conditions required for rusting • Know that a physical barrier can be used to prevent oxygen and/or water from reaching a metal to stop corrosion	• Atom/element • Chemical formula • Compound • Physical/Chemical • Reactants/Products • Rate of reaction • Thermal decomposition • Energy • Mass • Word equation	
Physics: Space	*End Point: Know the structure of the solar system and be able to use the solar system model to explain why we experience day, night, months, years and seasons* • Know that our sun is a star and know that there are other stars in other galaxies • Know the name and order of the planets in our solar system • Know that the earth orbits the sun and know how many days are in a year. • Know that the earth rotates on its axis and that the axis is tilted • Describe why we experience day and night and seasons • Know that the moon orbits the earth and know the phases of the moon • Know the history of the model of the solar system, including the work of Aristotle, Copernicus, Galileo and Kepler. • Know that the light year can be used as a unit of astronomical distance	• Sun, Star, Galaxy, Planet • Solar System • Earth • Orbit • Astronomical distance • Rotation • Axis • Seasons • Light year • Hemisphere • Moon Phase	

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How parents can support learning in the subject this academic year

- Have an enthusiasm for Science and try to link the world around us to what students are learning in school, this could involve looking at different types of plants when out for a walk, or investigating how yeast works when cooking. Many Science museums are free to access and it can be worth checking if there are any museums near you, or if you are away for the day. There are many great Science documentaries, such as 'Blue Planet' which can be exciting and informative for a whole family to watch.
- Encourage students to complete their homework every week, having a regular routine for homework can be especially helpful. Students can find all the information that they need for their homework on BBC Bitesize, but may need some guidance from parents to find the relevant information.
- Remind students to regularly review their own learning, especially in the run up to end of topic assessments. Asking students to explain a topic to you or asking questions about what they have learnt can support students' revision.

Recommended Reading

In class all students have their own copy of a textbook to use to support their learning. We use 'Key Stage Three Science, Higher Level, The Study Guide' by CGP. If possible, many parents and students have found it helpful to purchase their own copy to have at home for homework and revision. Please contact your child's Science Teacher if you would like any direction to the appropriate textbook to buy.

Please find below some suggested Science books that students may find interesting, these are linked to the topics that are covered in school and so may extend and strengthen their knowledge:

- Women in Science: 50 Fearless Pioneers Who Changed the World - Rachel Ignotofsky
- Exploring the Elements: A Complete Guide to the Periodic Table – Isabel Thomas
- Unlocking the Universe – Stephen and Lucy Hawking

Points to note

Our Science curriculum is based on the National Curriculum for Science which aims to develop a deep understanding of the big ideas in Science. This is split into the three disciplines of Biology, Chemistry and Physics which are taught on a rotational basis, over three topics per term. The Year 8 Science curriculum has been designed to revisit and recap the big ideas from Year 7, further extending this knowledge to explain new concepts. This allows students to connect new information to pre-existing knowledge. In Biology the key knowledge from Year 7 is levels of organisation, including cells, organs and organ systems. In Chemistry, this is the particle model and the periodic table and in Physics this is forces and energy.

In addition, students learn how to work scientifically, which involves:

- Procedural Knowledge – tasks that students should be able to do as scientists, such as measuring volume.
- Disciplinary Knowledge – knowledge of the scientific method, such as making predictions and recording results.
- Mathematical Knowledge – knowledge of mathematics, such as being able to calculate the average.

Working scientifically is interweaved into the topics of Biology, Chemistry and Physics and students are given regular opportunities to undertake practical work and investigations, with teachers focussing on developing students' procedural, disciplinary knowledge and mathematical relevant to the topic.