

Subject Curriculum Overview for Academic Year 2022/2023

Subject: KS3 Science		Subject Leader: Adem Osbourn	Year Group: 7	AUTUMN TERM
Topic	Key Learning Points		Key Vocabulary	Assessments
Working Scientifically: Introduction to Science	<p><i>End Point: Understand the scientific method and know good practice for carrying out scientific investigations safely and methodically</i></p> <ul style="list-style-type: none"> Recognise potential hazards in a science laboratory Label a Bunsen burner and know how to use it safely Define independent variable, dependent variable and control variable Know how to write a hypothesis Know how to draw and describe basic scientific equipment Know how to write an experimental method and identify risks in a method Know how to calculate the mean, describe data and spot anomalies Define continuous data, discrete data and categoric data Know how to draw a graph Define the terms accurate, precise, repeatable and reproducible Understand that a conclusion describes a trend using scientific knowledge 		<ul style="list-style-type: none"> Hazard Variable Hypothesis Prediction Mean Anomaly Continuous Data Discrete Data Categoric Data Accurate Precise Repeatable Reproducible 	<p>Formative Assessment:</p> <ul style="list-style-type: none"> 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.
Biology: Cells	<p><i>End Point: Describe plant and animal cell structure and know how to use a microscope and prepare cell samples to view. Describe levels of organisation in organisms and compare this with structure of single-celled organisms.</i></p> <ul style="list-style-type: none"> Know how to draw/label an animal/plant cell, describe organelle functions Know how to draw and label a plant cell and describe organelle functions Be able to use a microscope to observe cells Know how to draw and label a sperm cell, egg cell and red blood cell Know how the human body is organised including cells, tissues, organs and organ systems. Give examples of each and describe their functions. Know how to draw and label bacterial cells 		<ul style="list-style-type: none"> Nucleus Mitochondria Cytoplasm Cell Membrane Cell Wall Vacuole Chloroplast Magnification Cell, Tissue, Organ, Organ System 	<ul style="list-style-type: none"> At the end of each lesson there is a short plenary to review learning. Students review their own work in green pen. <p>Summative Assessment:</p> <ul style="list-style-type: none"> 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).
Chemistry: The Particle Model	<p><i>End Point: Understand particle theory, describe how movement/arrangement of particles relates to energy. Describe particles in solids, liquids and gases and explain changes of state.</i></p> <ul style="list-style-type: none"> Know the properties of solids, liquids and gases Define melting, evaporation, sublimation, condensation, freezing & deposition Draw particle diagrams for solids, liquids and gases Define diffusion as the movement of particles from an area of high concentration to an area of low concentration Draw heating and cooling curves and label the states/ state changes Understand that the mass of a substance does not change during a state change 		<ul style="list-style-type: none"> Melting Evaporation Sublimation Condensation Freezing Deposition Brownian Motion Concentration Diffusion Energy 	<p>Homework:</p> <ul style="list-style-type: none"> Every week students are set review homework tasks in the form of a revision mat.

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Topic	Key Learning Points		Key Vocabulary	Assessments
Biology: Reproduction	<p><i>End Point: Describe different methods of reproduction and focus specifically on human development and growth from birth to adolescence.</i></p> <ul style="list-style-type: none"> • Know that sex cells are called gametes (the sperm and the egg cell in humans) • Know that sexual reproduction involves the joining of two gametes • Describe changes to males and females during puberty • Know the function of the male and female reproductive systems • Describe the stages of the menstrual cycle • Know about menstrual well-being and the range of products available • Understand what is meant by a 'healthy intimate relationship' • Describe the process of sexual intercourse and understand the term 'consent' • Describe the process of pregnancy and childbirth 		<ul style="list-style-type: none"> • Reproductive system • Adolescence • Gametes • Fertilisation • Offspring • Puberty • Menstrual cycle • Consent • Pregnancy • Childbirth • Menstrual well-being 	<p>Formative Assessment:</p> <ul style="list-style-type: none"> • 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.
Chemistry: Separating Mixtures	<p><i>End Point: Describe and carry out a range of separation techniques, including filtration, evaporation, distillation and chromatography. Strengthen understanding of particles.</i></p> <ul style="list-style-type: none"> • Know what is meant by the terms; atom, element, compound and mixture • Know that a pure substance contains only one type of particle (either an atom or a compound) and that an impure substance is a mixture • Describe the terms solute, solvent, solution and insoluble • Describe and know how to carry out separation techniques, including filtration, evaporation, distillation, fractional and chromatography • Describe how fractional distillation is used to separate crude oil into pure substances 		<ul style="list-style-type: none"> • Atom, Element, Compound, Mixture • Boiling/Melting point • Solute, Solvent, Solution • Insoluble • Solubility • Chromatography, • Filtration • Evaporation • Distillation 	<p>Summative Assessment:</p> <ul style="list-style-type: none"> • 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).
Physics: Forces and Energy	<p><i>End Point: Understand simple forces, such as friction, air resistance, upthrust and weight. Understand how energy is transferred between stores of energy.</i></p> <ul style="list-style-type: none"> • Identify simple forces and describe forces as contact as non-contact forces • Describe forces as balanced or unbalanced and define the resultant force • Know how to draw accurate force diagrams • Investigate how elastic objects change shape when a force is applied • Describe the following stores of energy; kinetic, chemical, elastic, gravitational and thermal • Know that energy is not produced or destroyed • Know that power is the energy transferred per second and calculate power of domestic appliances 		<ul style="list-style-type: none"> • Contact/Non-contact • Balanced/Unbalanced • Resultant force • Friction • Air/Water resistance • Weight • Upthrust • Elastic Extension • Energy transfer • Energy stores • Power 	<p>Homework:</p> <ul style="list-style-type: none"> • Every week students are set review homework tasks in the form of a revision mat.

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Topic	Key Learning Points		Key Vocabulary	Assessments
Biology: Classification and Feeding Relationships	<p><i>End Point: Understand how living organisms are classified and know how plants reproduce. Describe the interdependence of organisms in an ecosystem.</i></p> <ul style="list-style-type: none"> Know how living things are classified into groups Describe the process of sexual reproduction in plants and know about the importance of plant reproduction through insect pollination on human food security Know how to draw a food chain/ food web Know how to interpret a pyramid of numbers and pyramid of biomass Know that bioaccumulation is the build-up of toxic materials in a food chain Know how to experimentally determine the number of organisms in an area by random sampling using quadrats 		<ul style="list-style-type: none"> Characteristics Food chain/web Producer/Consumer Apex predator Ecosystem/Habitat Pollination Food security Bioaccumulation Random sampling Quadrats 	<p>Formative Assessment:</p> <ul style="list-style-type: none"> 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.
Chemistry: Chemical Reactions	<p><i>End Point: Describe chemical reactions using equations and begin to understand energy changes during reactions.</i></p> <ul style="list-style-type: none"> Know how to deduce type/number of atoms in a compound from chemical formulae Understand how the name of a compound is related to the atoms it contains Describe the difference between physical and chemical changes Know how to write word equations for chemical reactions Know what is meant by the law of conservation of mass Know that the rate of reaction is how quickly the reactants become the products Know that chemical reactions involve a transfer of energy either to or from the surroundings 		<ul style="list-style-type: none"> Atom/element Chemical formula Compound Physical/Chemical Reactants/Products Rate of reaction Thermal decomposition Energy Mass Word equation 	<p>Summative Assessment:</p> <ul style="list-style-type: none"> 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). <p>Homework:</p> <ul style="list-style-type: none"> Every week students are set review homework tasks in the form of a revision mat.
Physics: Introduction to Electricity	<p><i>End Point: Understand the transfer of energy electrically in a circuit, including drawing circuit diagrams to represent simple circuits. Know how fuels and energy resources generate domestic power and compare the power ratings and fuel bills and costs.</i></p> <ul style="list-style-type: none"> Know how to draw the circuit symbol for a cell, battery, bulb, open switch, closed switch, motor and buzzer Know that current is the flow of charged particles, measured in amperes (amps) Know that potential difference is the energy given to the charged particles in a circuit, measured in volts Know that efficiency = Useful energy out / Total Energy in Know that power is the rate at which energy is used, measured in watts Know that energy suppliers measure energy in kilowatt hours (kWh) Compare the advantages and disadvantages of renewable energy and fossil fuels 		<ul style="list-style-type: none"> Electrical circuit Circuit symbols Energy Current Potential difference Efficiency Watts Kilowatt hours Renewable energy Fossil fuels Power 	<p>Summative Assessment:</p> <ul style="list-style-type: none"> 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). <p>Homework:</p> <ul style="list-style-type: none"> Every week students are set review homework tasks in the form of a revision mat.

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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:

- Kay's Anatomy: A Complete (and Completely Disgusting) Guide to the Human Body – Adam Kay
- Science Experiments: Loads of Explosively Fun Activities to do! – Robert Winston
- Shocking Electricity - Horrible Science – Nick Arnold

Points to note

The Key Stage 3 Science Curriculum at JMHS has been carefully designed to engage students and build upon the key knowledge that they have developed during primary school. Students arrive at JMHS from a wide variety of feeder primary schools, with differing curricula for Science and therefore we aim to ensure that all students have the same basic understanding of Science by the end of Year 7 and that any gaps in knowledge have been addressed.

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.

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.