Key Stage 3

The KS3 Science Curriculum at JMHS has been carefully designed to engage students and build upon the key knowledge that they have developed during KS2. 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. The JMHS Science curriculum has been sequenced to allow students to accumulate knowledge in a logical order and have the opportunity to revisit key concepts, providing a foundation of understanding for students to develop mastery before entering the KS4 curriculum. We aim to provide a broad curriculum, therefore, in addition to covering the requirements of the National Curriculum for KS3 Science, it is practical-focused and provides many opportunities for students to design and carry out a range of experiments to supplement and enhance their theoretical knowledge going above the requirements of the National Curriculum where possible.

Summary of Content:

At KS3 students cover each of the three disciplines (Biology, Chemistry and Physics) on a rotational basis, over three topics per term.

Year Group	Term	Topics Covered		
7	**Autumn**	*Working Scientifically*: Introduction to Science	*Biology*: Cells	*Chemistry*: The Particle Model
	Spring	*Biology:* Reproduction	*Chemistry:* Separating Mixtures	*Physics*: Forces and Energy
	Summer	*Biology*: Feeding Relationship and Classification	*Chemistry*: Chemical Reactions`	*Physics*: Electricity
8	**Autumn**	*Biology*: Food and Digestion	*Chemistry*: The Periodic Table	*Physics*: Waves
	Spring	*Biology:* Respiration and Gas Exchange	*Chemistry:* Acids and Alkalis	*Physics*: Heating and Cooling
	Summer	*Biology*: Photosynthesis	*Chemistry*: Reactions of Metals	*Physics*: Space
9	**Autumn**	*Biology:* Health and Disease	*Chemistry:* Earth and Atmosphere	*Physics*: Motion and Pressure
	Spring	*Biology:* Genetics	*Chemistry:* Extracting Metals	*Physics*: Electricity and Magnetism
	Summer	During the Summer term of Y9 students begin GCSE content		

Curriculum Rationale:

Year 7	In the first term, students complete an 'Introduction to Science' topic, this is designed to introduce students to the practical equipment and techniques that they will need across KS3, such as using a Bunsen burner. This topic also recaps the scientific enquiries that students would have carried out at KS2. Students then complete a topic on 'Cells', this introduces the cell as the building block of life and provides a bottom-up approach, with students starting at the cellular level and working up towards understanding the organisation of whole organisms. In the second term, students complete the topic on 'Reproduction', this continues to develop their understanding of cells and the human body that was introduced in the first term. In the third term, students complete the topic on 'Feeding Relationships and Classification', this topic aims to provide a macroscale perspective of the biological systems that have been covered in the first two terms. Students consider how living organisms can be classified by their characteristics and how similar organisms are grouped together. In the first term, students are introduced to chemistry through the 'Particle Model' topic, this begins by building upon their KS2 knowledge of material and properties of everyday objects and understanding of solids, liquids and gases. Students develop their knowledge by learning about the properties of solids, liquids and gases before applying this knowledge to understanding of the arrangement and movement of particles. In the second term, students refer back to their knowledge of the particle model and build upon this by learning about specific types of particles in the 'Separating Mixtures' topic. In term 3, students complete the topic on 'Chemical Reactions'. Students are introduced to the idea of a chemical reaction and learn about how to represent these using word equations. Students begin physics content in term 2, with the 'Forces and Energy' topic. Students begin by recognising and identifying forces, such as friction and air resistance. In term 3, students revisit energy and recap stores and transfers. Student then focus on one of the transfer mechanisms in more detail in the 'Electricity' topic
Year 8	Food and digestion gives students a good grasp of balanced diets, health and how their body works, which sets them up to move on to respiration – with links being drawn between the two in terms of transfer of energy in biological systems. Students can build on their understanding of the movement of gases as they progress to studying photosynthesis in Term 3. The periodic table helps to embed the fundamental idea of the particle model in chemistry that bridges the gap between chemical reactions in Year 7 and reactions of metals in Term 3. Students further apply previous knowledge of the principles of chemical reactivity by studying acids and alkalis. In Physics, students revisit the fundamental principles of energy transfer by investigating waves and their applications on the way to studying transfer of thermal energy in heating and cooling. These concepts are further refined and built upon by considering the influence of gravity in terms of interaction of bodies in the Solar System.
Year 9	The topics in Year 9 allow a firm basis for consolidating the knowledge of Year 7 and 8 as well as laying a foundation for the topics covered in GCSE. Health and disease and genetic variation provide an opportunity to revisit basic ideas about cell structure, but support increasing understanding about the complexity of biological molecules and how cells interact. Students revisit ideas about chemical and physical interactions with reference to 21st Century issues such as how to extract metals, the influence of pollution on the atmosphere around us and also geology and the structure of the Earth. This is further reinforced by studying motion and pressure in detail, while later on in year 9 the concepts of electricity are revisited in more depth.

Assessment Overview

Each topic is assessed via short homework assessments with a multiple-choice format. These are given after every week of work is completed and are designed to offer a 'low floor, high ceiling' approach. We would expect all students to achieve a reasonable number of marks, facilitated by the accessible format, but achieving full marks represents a suitable aspirational challenge. We are aiming to build student confidence whatever the learning needs of the student while offering everyone the opportunity to excel. To further reinforce new knowledge gained and to allow students to identify areas where they need further support topic 'front sheets' with all the National Curriculum learning outcomes for that topic are updated showing progression to confidence with those outcomes.

Students will also complete a comprehension task for every topic. This format involves a short-written piece relevant to that topic, from a variety of forms of media both specialised and popular. Students are encouraged to read the piece and answer a range of questions based on the information therein. This will be formally assessed and feedback given by the classroom teacher. This will promote science literacy particularly, developing confidence with communicating scientific ideas and using specialised language and technical information.

Additionally, at the end of each term there will be a formal, longer format exam to assess assimilation of knowledge over a longer period of time. Along with the shorter format assessments these form the basis of our decisions in terms of further interventions for students if progress is not being made. These could be in terms of the school reporting systems, or parental contact, or moving groups or just in designing specific priorities for homework to help with gaps in knowledge.

Grouping in KS3:

Students are placed in mixed ability sets and are grouped together to offer a diverse mix of students with differing abilities, as well as social, behavioural and SEND needs. This provides an aspirational environment for all students where there are high expectations of all students in every group. This further reinforces the expectation that all students have the same outcomes. Within groups, teachers use 'Kagan Structures' for seating, which allows students to work in groups that encourage peer support. Teachers use a wide variety of differentiation techniques, as outlined in our schemes of work and SEND documentation to support SEND and lower ability students whilst providing suitable change for higher ability students.