RMGS CURRICULUM MAP – SCIENCE Overview and KS3

CURRICULUM INTENT -Science Overview

To instil a passion for Science through excellent teaching and learning.

To develop independent, scientifically literate students who are equipped with the analytical and evaluative skills required for their future careers.'

Our aim is to inspire students with a real sense of awe and wonder at how the world works. Our curriculum is broad and challenging to develop the next generation of future scientists. For those who don't go on to study Science post 16, we aim to contextualise and provide students with the ability to think critically about Science and how it relates to them in their wider lives and to teach the language of Science to unlock words and understanding across all areas of their education and life beyond school.

The vision for Science at RMGS is to foster a culture that enables students to achieve through inspiration, exploration and imagination. This aims to develop above all the scientific thinking skills needed to access the challenging substantive and disciplinary knowledge that students need to be successful in this area.

We understand the importance of an approach that interplays 'substantive' knowledge (key facts, phenomena, and threshold concepts) and 'disciplinary' knowledge (how scientists work, scientific approaches, investigations). Where disciplinary knowledge is embedded within the most appropriate substantive contexts of biology, chemistry and physics; building increasingly more sophisticated as students' progress through the course.

The curriculum anticipates where students are likely to hold misconceptions. These are explicitly addressed, and students learn how the misconception is different to the scientific idea. Students know when and why models and rules can be used in science, which includes knowing what they can and cannot be used for. We believe that this rich knowledge entitlement becomes the foundations to build students' natural curiosity. We achieve this through the development of knowledge and understanding of scientific phenomena and in extending students beyond this to develop a wide 'Science capital'.

Substantive knowledge is delivered in a spiral curriculum and we use the progression model of teaching the 10 'big ideas' in Science that interleaves key concepts to ensure that it is 'knowledge connected'. We also focus on developing students' scientific literacy and embedding the key vocabulary required to learn and communicate effectively.

Our curriculum covers the 10 'Big Ideas' as part of the AQA 5 Year progression model. The big ideas are: Forces, Electromagnets, Energy, Waves, Matter, Reactions, Earth, Organisms, Ecosystem and Genes. These themes continue through to Key Stage 4 material.

KS3 Science Curriculum Design Justification

When designing the current KS3 science curriculum, we very much had the long-term attainment and development of the students in mind. We want to prepare the students for the future by giving them a strong foundation of the skills and knowledge they can build on throughout KS4 for success in their GCSE exams.

That said, we don't see the KS3 course as merely a component of KS4 that has to be "done" before we get on with the "proper" biology, chemistry and physics they will begin in year 9. Actually, we see it is an opportunity to develop (through *doing real science*) a deep understanding of what working scientifically actually is. We aim to do this in a challenging yet engaging way, so that the students can see the common ground that exists, irrespective of what discipline they happen to mostly be working in for that particular topic area.

We also are aware however, that success in science education is very much based on having a good scientific knowledge of the basic principles that underpin our subjects. It is not enough to "do" science experiments, we must "know" why we have done them and appreciate how empirical data has contributed to human knowledge of the material world as a whole.

With those aims in mind we opted to use the AQA KS3 science syllabus, as we felt it gave opportunities to develop knowledge and skill in parallel through its "10 big ideas principle" and four "enquiry processes". We feel that we have designed our schemes of work in such a way that KS3 science will effectively feed into KS4 work without merely being a "dumbed down" version of it.

Central to our work is the "science portfolio" that each student will create throughout the two years of the course. What began as an imitation of the required practical work of KS4 and KS5 has developed (through team work and sharing of good practice) into something much broader than was initially envisaged. Not only are students encouraged to develop the basic skills of working scientifically, they are also challenged to make links to other curriculum areas and to present their work and findings in new and creative ways.

In short, we strive to ensure our KS3 course engages the students with a passion for learning science, whilst equipping them with the basics for future success to whatever level they decide to pursue their studies.

For both year groups we cover the 10 big science ideas topics of Forces, Electromagnets, Energy, Waves, Matter, Reactions, Earth, Organisms, Ecosystems, and Genes.

These are taught in an alternating Physics, Chemistry, Biology systems so that students experience some of each content for each Autumn, Spring and Summer terms. The order in which these are taught varies from teacher to teacher to reduce the clashes of all teachers requiring the same practical equipment at once. However, the same three topics are assessed at the end of each major term.

The portfolio tasks for every topic introduces students to some of the practical skills that they will need to develop for their GCSE required practicals. These include not just physical skills but also understanding of terms about variables, types of data, graphing skills, conclusions looking at relationships with variables and how to evaluate and practical properly. Some of these Portfolio tasks have been customised to work in tandem with required praticals that are also in the GCSE content.

The assessment strategy for KS3 consists of low stakes formative assessment at the end of each topic with more summative formal assessments at the end of each Autumn, Spring and Summer term followed by the End of year assessment cover all content taught. For year 7's this includes all content learnt in year 7 but for year 8's includes all content from both year 7 and year 8 but is slightly weighted towards year 8 content.

	Termly Curriculum Overview					
Year Group	Autumn 1	2	Spring 3	4	Summer 5	6
7	Forces (speed and Gravity), Matter (particle Model and Separating Mixtures), and Organisms (Movement and Cells) Portfolios: Motion of a car on a ramp, separating salt and water, comparing plant and animal cells End of unit assessment for each- End of term exam		Energy (Energy costs and Energy transfers), Reactions (Metals and non-metals, Acids and Alkalis), Ecosystems (Interdependence and plant reproduction) Portfolios: Comparing Lighting, Neutralisation, Ecological Balance End of unit assessment for each- End of term exam		Electromagnets (Voltage, Resistance, Current), Waves (Sound and light) Portfolios: Comparing Series and parallel circuits, Corrective lenses End of unit assessment for each- End of term exam	EOY Assessment at the beginning of this term. Earth (Earth Structure and Universe), Genes (Variation and Human Reproduction) Portfolios: Rock Cycle, Transfer via Placenta End of unit assessment for each- End of term exam
8	Forces (Contact Forces and Pressure), Matter (periodic table and elements), and Organisms (Breathing and Digestion) Portfolios: Drag force, Iron and sulphur elements and compounds, Height and lung volume link. End of unit assessment for each- End of term exam		Energy (Work and Heating and cooling), Reactions (Chemical energy and types of reaction), Ecosystems (Respiration and photosynthesis) Portfolios: Insulation and cooling, Chemical/Physical changes, Respiration of yeast End of unit assessment for each- End of term exam		Electromagnets (Magnetism and electromagnetism), Waves (Wave effects and properties) Portfolios: Strength of an electromagnet, reflection, refraction, diffraction, and Superposition. End of unit assessment for each- End of term exam	EOY Assessment at the beginning of this term. Earth (Climate and Earth Resources), Genes (Evolution and Inheritance) Portfolios: Humans impact on the Earth, How the dinosaurs became extinct. End of unit assessment for each- End of term exam