Science – Year 10

	Year 10 – Block A	Year 10 – Block B
What do we teach?	**Biology** – The Heart, Non-Communicable and Communicable Diseases. **Chemistry** – Energy Changes and Quantitative Chemistry **Physics** – Electricity and for triple students: Space	**Biology** – Mitosis, Meiosis and Inheritance and Bioenergetics **Chemistry** – Chemical Changes and Electrolysis **Physics** – Radioactivity and Waves
How does this meet the National curriculum?	In KS4, the students follow the national curriculum through the AQA GCSE specification. The topics in Block A are listed below: Biology: Topics 2 and 3 - Chemistry: Topics: 1, 3, 7 and 8 -Physics: Topic: 2 (and 8)	In KS4, the students follow the national curriculum through the AQA GCSE specification. The topics in Block B are listed below: Biology: Topic: 1, 2, 4 and 6 - Chemistry: Topic: 4 and 8 -Physics: Topics 4 and 6
Why does this knowledge matter?	In Biology, the students will learn about the vital organ of the heart and the circulatory system. Students will learn about the differences between communicable and non-communicable diseases which will support their understanding of how to keep themselves healthy by exploring how we can prevent the spread. Students will also develop their knowledge about the vaccination. This topic is especially important given the current climate with coronavirus. In Chemistry, students will learn about energy changes that are a very important component of all chemical reactions. Understanding about energy changes can allow students to recognize different observations in chemical reactions and the heating and cooling effects that are used in a range of everyday applications. In Physics, electricity is a fundamental part of our daily lives. Understanding electricity is important to keep us safe and understand the world around us. Many circuits are powered by mains electricity, some by batteries and portable devices. This topic also raises questions of sustainable methods for the future. Within triple science, students will complete an additional topic of Space and helps students address fundamental questions about our space in the universe.	In Biology, students will learn about the key reactions of photosynthesis and respiration. Photosynthesis is one of the most important biological processes on Earth as it helps to control the makeup of our atmosphere and our climate. Respiration is also a key process to learn about as all organisms respire to release energy to fuel their life processes. On top of this, the topic of genetics is key to understand our own health, what makes us unique and similar to our families as well as understand why some illnesses can run in the family. In Chemistry, the understanding of chemical changes is important to be able to explain what happens during chemical reactions in a systematic way. This topic will support students to organize their results logically, make predictions and understand complex reactions. In Physics, the topic of radioactivity is important as ionizing radiation is hazardous but can be useful. Today radioactive materials are widely uses in medicine, industry, agriculture and electrical power stations. However, when mishandled it can lead to fatal consequences. The topic of wave is also important. Wave behaviour is common in both natural and man-made systems. Waves carry energy from place to another and can carry information Designing comfortable and safe structures such as bridges, houses and music performance halls requires an understanding of mechanical waves. Modern technologies such as imaging and communication systems show how we can make the most of electromagnetic waves.
Why do we teach in this sequence?	In Biology, students already have an understanding of cells and specialized cells from KS3. Students will build on the topic of living things in Year 7 as well as Cell Biology in Year 9. This topic also supports future learning of homeostasis in Year 11 In chemistry, chemical reactions were taught in Year 8 and Year 9, temperature changes are associated with chemical reactions e.g. combustion in Year 8 and Group 1 metals reactions in Year 9. This leads to the new concept of exothermic and endothermic reactions and develop the skills on how to represent the temperature changes in table of results and graphs. In Physics, this topic will build on the KS3 topic of electricity and will support future topics in electromagnetism and electrolysis.	In Biology, students already have some understanding of bioenergetics by studying Respiration and Photosynthesis in Year 8. They also looked at genetics at the start of Year 9 Cycle A. Students can build on this knowledge in this cycle. These topics will support the learning of variation and evolution in Y 11 Block A In Chemistry, this topic leads on from Year 10 Block A, where we looked at chemical reactions and from Physics block A where we looked electricity and current concepts. In Physics. the students have a firm understanding of the atom from KS3 and sound waves and light waves from KS3 also. This topic will help with future topics on particle model of matter in Year 11.
What career links are made?	Biology – these topics are fundamental for any career involving the study of life. These topics are also critical for students interested in careers in the field of medicine. Chemistry - This topic is vital for all careers linked to chemistry especially work around chemical reactions and fuels. Physics – Electricity fills the modern world and therefore is essential knowledge for many careers in engineering, design, the entertainment industry as well as being an electrician.	Biology – these topics are fundamental for any career involving the study of life. These topics are also critical for students interested in careers in the field of medicine, genetics and sport. These topics are also essential for plant scientists and botanists. Chemistry – this topic is vital for all careers linked to chemistry. The extraction of important resources from the earth relies upon knowledge of chemical changes and extraction. Physics – Radioactivity is important in careers linked to medicine, industry, agriculture and electrical power stations. Knowledge about waves is important in modern technologies, communication and the design of key infrastructure.

Science – Year 11

	Year 11 – Block A	Year 11 – Block B
What do we teach?	Biology – Electrical and Hormonal Communication and Variation and Evolution Chemistry – Rates and Equilibrium, Formulation and Analysis, organic chemistry Physics – Electromagnetism and Forces	Biology – Ecology Chemistry – Chemistry and the Atmosphere and Using Resources Physics – Particle Model of Matter
How does this meet the National curriculum?	In KS4, the students follow the national curriculum through the AQA GCSE specification. The topics in Block A are listed below: Biology: Topics 5 and 6 Chemistry: Topics: 5 and 6 (and 7) Physics: Topic: 7 and 5	In KS4, the students follow the national curriculum through the AQA GCSE specification. The topics in Block B are listed below: Biology: Topic: 7 Chemistry: Topics: 9 and 10 Physics: Topics: 1 and 3
Why does this knowledge matter?	In Biology, homeostasis is a key topic as it allows us to understand processes within the body. This topic is important for students to understand their own bodies, how their bodies change in puberty and what happens in the body if the hormonal balance is not correct. The second half of the block, looks at variation and evolution giving the students an understanding of variations and what happens when scientists intervene with the genome. The chemistry of carbon compounds is vital and forms its own branch of chemistry. Organic chemistry is key in understanding compounds of living things or once living material. These compounds are important in the petrochemical industry. Also, students need a firm understanding of purities and formulations. In order to be a chemist, you have to be able to develop a range of quantitative and qualitative methods to separate substances and test whether they are pure. Quantitative chemistry is critically important for all chemists. In Physics, the students will be learning about electromagnetism. Electromagnetic effects are used in a wide variety of devices and very important in the fields of engineering. Forces is another core physics unit that is essential for engineering, construction and understanding the world around us and how objects move and interact with another.	In Biology, the students will develop an understanding of the ecosystems and work around them. These ecosystems provide essential services to support human life and continued development. In order to continue to benefit from these services humans need to engage with the environment in a sustainable way. This topic explores how humans are threatening biodiversity and actions humans should consider to ensure future health, prosperity and wellbeing for people and the world around us. In Chemistry, students will also be learning about the Earth around them and the Earth's atmosphere. It is important for students to recognize that the Earth's atmosphere is dynamic and forever changing. Some of these changes are caused by humans and some are natural. A greater understanding of the Earth's atmosphere will support the students to live their lives more sustainably. In Physics, the particle model is the essential building block of all matter. It is used to predict the behaviors of different substances and has many applications to everyday life. It can help scientists to understand how to design vessels to withstand high pressures and high temperatures such as submarines and spacecrafts. It also allows students to understand what happens to their bodies when they climb a mountain.
Why do we teach in this sequence?	In Biology, students have already looked at some non-communicable diseases such as obesity and coronary heart disease. In KS3 students looked at reproduction. In Chemistry, the topic of energy changes links closely to the students work on particles in KS3. It also links to electricity as the chemical reactions that happen inside batteries. Organic chemsitry leads from covalent bonding in Y9 and separating mixtures in Year 7. This topic will support the future chemistry topics of chemical reactions in using resources. In Physics, the topic of electromagnetism is important to teach after electricity. The students have studied forces in KS3 – Year 8 Cycle A and Year 9 Cycle B. They can draw upon this knowledge to support their learning in KS4. There are many equations in this unit so students need a strong understanding of using and rearranging equations.	In Biology, students already have some understanding of bioenergetics by studying Respiration and Photosynthesis in Year 8. They also looked at the start of genetics including, DNA, chromosomes and alleles in Year 9 Cycle A. Students can build on this knowledge in this cycle. These topics will support the learning of variation and evolution in Year 11 Block A. In Chemistry, this topic leads on from Year 10 Block A, Chemistry and Physics where we looked at organic compounds, chemical reactions and electricity. The topic intricately links with the biology topic that is why these topics are taught within the same block. The students have covered similar content in the KS3 Combustion unit and has links to Block A rate of reactions. In Physics, the students have engaged with particles throughout KS3 and in early Year 9 as the building block for many physics units. This topic, expands on some of these ideas in greater depth.
What career links are made?	Biology – These topics are key for any career involving the human body and medicine. Chemistry – organic chemistry is important in the petrochemical industry: looking at how to make new and useful materials such as polymers, pharmaceuticals, perfumes, flavorings, dyes and detergents. Chemical analysis is key for careers in forensics and drug control. Physics – Many engineering careers use electromagnets in infrastructure and appliances such as loud speakers. Forces are essential in engineering and construction.	Biology – These topics are fundamental for any career involving the study of nature and the world around us. Chemistry – This topic is key for careers in engineering and climate science, where people will develop solutions that help reduce human impact on the planet and slow down the rate of global warming. Physics – This topic is essential for many scientific careers including engineering and design as well as particle physicists.