Curriculum Principles

Our curriculum has been carefully thought through, and to ensure that all students develop holistically, we have designed and planned our curriculum according to the following principles:

Our curriculum is **ambitious**, offering all students access to the most powerful knowledge of each subject

For example:

During Key Stage 3, in Year 8, in the Chemistry topic 'Thermal Reactions', students are taught about exothermic and endothermic reactions. They describe what happens to energy in these reactions. Students are taught about energy level diagrams and they identify whether an energy level diagram is showing an endothermic or exothermic reaction. Students use these diagrams to explain energy changes. They state what happens to the bonds during these reactions and consequently use their ideas of bond energies to explain energy changes in chemical reactions.

All students at KS4 study AQA Combined science so they are taught all three sciences. Biology, Chemistry and Physics. Within the Physics curriculum one example that demonstrates our curriculum is ambitious is that all Year 10 students are taught Specific Heat Capacity. Students plan an investigation, which is a Required Practical, to determine the specific heat capacity of more than one material . This provides students with the opportunity to develop their skills in making and recording a range of measurements accurately. Students then calculate the specific heat capacity using the equation

$$\Delta E = mc\Delta\Theta$$

Change in thermal energy = mass x specific heat capacity x temperature change

Students apply this knowledge in order to calculate the energy change involved when the temperature of a material changes. Using both their scientific and mathematical skills this challenges students' higher order thinking skills.

Our curriculum is **taught to be remembered**, not merely encountered, through curriculum content that is **well sequenced** and vertically integrated

For example:

In Year 7, during the topic Particles, students get an introduction into atoms, looking at the particle model of matter. In year 8 we develop this knowledge during the topic Atoms and the Periodic table, students build upon their knowledge and learn about compounds and the periodic table, identifying and naming compounds. During the topic Atomic Structure in Year 9, students build on their prior knowledge and look at

the structure of the atom and their electronic configuration. Towards the end of Year 9, students study Rates of Reaction using the scientific concept of the Particle theory in more depth. In year 10, within the topic Chemical calculations, using knowledge form KS3, student then calculate Relative atomic masses (RAM)

In Year 7 students are taught about cells, the building blocks of life. They learn about the functions of the cell membrane, cytoplasm and nucleus. They build upon this knowledge further in the beginning of year 9, where they learn about cell structure in more detail, learning about two more cell organelles, mitochondria and ribosomes. After learning about the structure of a cell, they learn about the cell cycle and how the cell divides to make more cells. In Year 11, students learn how cells divide by meiosis to form gametes, halving the chromosome number and the difference between mitosis and meiosis.

Our curriculum embodies our **vision and ethos** through educating for knowledge, wisdom and skills, educating for hope and aspiration, educating for community and living well together, and educating for dignity and respect

For example:

Throughout our science curriculum we educate for dignity and respect: the basic principle of respect for the value and preciousness of each person, treating each person as a unique individual of inherent worth. An example of this is during KS4 we teach about sexually transmitted diseases (STD) such as Gonorrhoea, which is caused by a bacterium and spread by sexual contact. We teach about respecting our bodies and each other and that the spread can be controlled by the use of a barrier method of contraception such as a condom.

Throughout the science curriculum we educate for community and living well together: a core focus on relationships, participation in communities and the qualities of character that enable people to flourish together. One example of this is during Key stage 3 and Key stage 4 we teach about the importance of Reduce, Reuse and Recycle. The reduction in use, reuse and recycling of materials by end users reduces the use of limited resources, use of energy sources, waste and environmental impacts, We teach students about the importance of respecting the planet, working together in the community and the importance of sustainable development, which is development that meets the needs of current generations and communities without compromising the ability of future generations to meet their own needs.

promotes the **spiritual development** of all students

One area of spiritual development is the ability to ask and discuss the 'Big Questions' such as how life began and making sense of the world. In both Key Stage 3 and Key Stage 4 we teach about the theory of evolution by natural selection, which states that all species of living things have evolved from simple life forms that first developed more than three billion years ago. At Key Stage 4, students learn that

many early forms of life were soft-bodied, which means that they have left few traces behind. What traces there were have been mainly destroyed by geological activity. This is why scientists cannot be certain about how life began on Earth. But evidence suggests it is 4.6 billion years old.

Another area of spiritual development is developing a sense of awe and wonder and enjoying the miracles of everyday life. A great example of this at both Key Stage 3 and Key Stage 4 is when we teach that acids react with some metals to produce salts and hydrogen. Students test the hydrogen and learn that when they put a lit splint to a boiling tube of hydrogen it makes a 'squeaky pop' sound. When this is done on a bigger scale, i.e. a balloon of hydrogen, a huge explosive bang is created which is a wonderful example of those awe and wonder moments when students are surprised, shocked and excited!

develops students' **21st century learning skills**, and is underpinned by a **literacy strategy** that supports increased vocabulary acquisition and reading fluency

For example:

One example of 21st century learning skills is collaboration, working independently, learning from and contributing to the learning of others for a shared purpose in a wide range of environments. A perfect example of this in Science is students working together to carry out required practicals. Students at Key Stage 4 investigate the effect of varying the force on the acceleration of an object of constant mass, and the effect of varying the mass of an object on the acceleration produced by a constant force. Students must work effectively together in a team, carry out experiments appropriately having due regard for the correct manipulation of apparatus, the accuracy of measurements and health and safety considerations and make and record observations and measurements. They need to communicate appropriately and interact with others to carry out the experiment successfully.

In Science, we demonstrate an understanding of and take responsibility for promoting high standards of literacy, articulacy and the correct use of standard English, whatever the specialist subject. Implicit phonics begins with a whole word and then deconstructs it into beginning sounds, ending sounds and context clues. This is an effective strategy in Science to expose students to a wide variety of sounds, the patterns of sounds and how sounds can give an insight into the meaning of a word. An example of this is when introducing the separation technique chromatography. Students learn that "chroma" is from the Greek word for "colour", combined with "graphy", meaning writing or recording.