SCIENCE
CURRICULUM MAP

Our subject vision:

Aspiration	**Mission Statement:** *'We aim to teach students to become scientifically literate and responsible citizens as well as our next generation of inspirational professional scientists. A solid understanding of science is imperative for everyone and we have an aspirational curriculum full of great opportunities for every student.* *As a faculty "we enable all students to **acquire knowledge** that takes them beyond their experience. Access to knowledge is the **right** of all pupils as future citizens'* (Young, 2014). **Knowledge:** In Science we aim to understand the world around us. We look at everything from tiny atoms to enormous stars as well as how our bodies work. We have a spiral curriculum so key ideas are revisited and built-upon such as cells, energy and atomic structure. **Skills:** Students learn how to plan experiments, use laboratory equipment, analyse data and draw valid conclusions. We encourage a deep level of analytical thinking around topical scientific issues and believe that all students should learn to think like scientists. **Understanding:** At the end of students' study of Science they will be able to understand the world around them to be able to make decisions for themselves and their families. They will be prepared to undertake further study and have developed a curiosity for how and why things work.
Opportunity	**Within the classroom:** In Science lessons, students study a range of topics along with developing their practical skills. We ensure that every topic begins with links to relevant careers for students to explore using a research-based homework. Each topic also contains a link to a relevant real-life scientist. We offer "extra-curricular" within our curriculum such as a project tracking local wildlife, sponsored by the Royal Society. **Beyond the classroom:** Beyond the curriculum, students may participate in: • Science club • Eco club • IRIS Research project • Lots of partnership activities as part of the Abingdon Science partnership • External talks and visits
Integrity	**Knowledge:** Scientific knowledge allows students to engage with the world around them, to be active and knowledgeable citizens. Students are taught key information to help them make life choices such as around reproduction, genetic engineering and climate change. **Skills:** Students often work in pairs or small groups to complete practical work. This allows them to develop team working skills such as negotiation and clear communication. They are encouraged to have a solution-focused approach to problems that arise during the practical. **Understanding:** They demonstrate their character development through their increasing ability to apply real-world knowledge to their work, and through their application of empathy and interpretation skills in discussion and in writing.

SUBJECT CURRICULUM MAP: Year 9

KS4

Assessment: each unit is assessed with exam-style questions.

Careers: all units start with an introduction of a relevant career to help students apply their understanding. The introductory lesson also includes links to an aspirational scientist in the field.

End of year assessment

Particle Model of Matter

- Kinetic theory of matter
- Internal energy
- Density
- Changes of state
- Specific latent heat
- Specific heat capacity
- Gas pressure and volume

Organisation – Transport Systems

- Components of the blood and blood vessels
- The heart
- Heart Disease and Treatments
- Gas Exchanges
- Plant Tissue
- Transpiration and Evaporation
- Heart dissection

The Periodic Table

- History of the periodic table
- The alkali metals
- The halogens
- The noble gases
- Transition metals

Organisation and Digestion

- Tissues and organs
- Digestive system
- Enzymes as catalysts
- Chemistry of food
- Enzymes required practical
- Food tests required practical

Structure and Bonding

- States of matter
- Ionic bonding
- Giant ionic structures
- Covalent bonding
- Bonding in metals
- Nanoparticles

Throughout year 9 students have end of unit assessments using exam questions.

Extra opportunities
RAF workshop
Science club
Eco club

Atomic Structure

- Structure of the atom
- Electronic configuration
- Chemical equations
- Separation techniques
- Ions and isotopes

Energy

- Energy stores and transfers
- Conservation of energy
- Efficiency of energy transfer
- Energy and work
- Power
- Thermal conductivity
- Infrared radiation
- Generating the electricity that we need
- Energy and the environment

Cell Structure and Division

- Eukaryotes and prokaryotes
- Animal and plant cells
- Specialised cells
- Cell transport
- Exchange surfaces
- Cell division
- Growth and differentiation
- Stem cells
- Microscopes required practical

Year 9

Year 9

1 Cell Structure and Division

Why this?	Students learn the role of components of the cell and how substances move into and out of cells. Student will also undertake two required practical's – Using microscopes and osmosis. They will finally consider cell division and the importance of stem cells.
Why now?	This unit provides the core knowledge for all future biology topics. It allows students to develop their key practical skills.

2 Energy

Why this?	Students learn about the different energy stores and how this energy can be transferred and apply this to examples in everyday life. They also learn about the transfer of thermal energy through conduction. The students will look at renewable and non-renewable energy resources and the advantages and disadvantages associated with each.
Why now?	This unit provides students with core knowledge for future physics topics. It provides plenty of opportunity for investigative work and also allows students to become critical thinkers as they analyse data and facts.

3 Atomic Structure

Why this?	Students learn about the structure of an atom, ions and isotopes. They will learn how to write chemical equations and how to separate mixtures.
Why now?	This unit provides the core knowledge for all future chemistry topics.

4 The Periodic Table

Why this?	Students will learn about patterns in the periodic table, it's history and the properties of key elements.
Why now?	Students have studied the core knowledge of atomic structure they are now able to apply this to begin to explain patterns and reactivity in this unit.

5 Organisation and Digestion

Why this?	Enzymes are involved in many different reactions in living organisms – understanding of this is key for students.
Why now?	Students have studied exchange surfaces cell structure, this topic builds on this focusing on the exchange surfaces in the digestive system. It also focuses on some core knowledge on enzymes which will appear repeatedly during the course. Students will complete two required practical's – food tests and enzyme reactions.

6 Structure and Bonding

Why this?	Students will learn about interactions between atoms and ions in the forming of larger chemical structures. These structures and their properties are fundamental to their understanding of chemistry.
Why now?	Students have studied the structure of both atoms and ions and the properties of key elements earlier in the year. In this unit students will begin to take this knowledge and explain how these properties lead to reactions and bonding. The skills from this unit will be used regularly throughout the GCSE course.

7 Organisation – Transport Systems

Why this?	This topic introduces pupils to key organ systems in both animals and plants. This topic allows for some exciting practicals like dissections to further understand the topic.
Why now?	This topic builds on students understanding of cell structure in as well as the organ systems like the digestive system that were considered earlier in the year.

8 Particle Model of Matter

Why this?	This topic looks at the different states of matter, using kinetic theory to explain their properties. Changes of state and changes in temperature are investigated by considering the changes of internal energy involved.
Why now?	This topic builds upon key ideas of matter studied in Key Stage 3 and introduces calculations to be able to quantitatively determine the energy changes involved. It also provides opportunity to revisit ideas from the energy topic earlier in the year.