WHAT ARE THE BIG AIMS OF YEAR 9?

We use appropriate scientific techniques to investigate how different variables can affect chemical reactions, living organisms, photosynthesis, fluids, light, forces and motion. Pupils will be able to independently plan investigations to solve problems and communicate their findings in a scientific way. They confidently analyse their results using research and data to support their ideas.

WHAT WILL EXCELLENCE LOOK LIKE IN YEAR 9?

- We conduct thorough and appropriate investigations
- Extend understanding into new situations
- Predict likely outcomes and consequences of actions (Using prior learning).

WHAT KNOWLEDGE DO THE PUPILS NEED TO ACQUIRE?

Throughout this year we use investigative approaches to explain different phenomena. We manipulate different factors to see how they affect photosynthesis and how human and natural chemical processes can affect our climate. We learn to classify microorganisms and evaluate their uses and dangers. We look further into chemical reactions and explore how exothermic and endothermic reactions have helped us in today's modern world. We also manipulate variables to find out factors that affect speed and how data relating to speed and journeys can be displayed scientifically. We learn how magnets, levers and electricity can be used to make modern life easier. We look at properties of light and how this changes through different mediums. We use the particle model to explain the behaviours and properties of fluids.

WHAT SKILLS DO THE PUPILS NEED TO DEVELOP?

We will be able to choose appropriate ways to display data to suit the purpose of communication and intended audience.
We will be fully aware of any risks they need to undertake to collect evidence and take steps independently to minimise these.
We can analyse data objectively and can identify bias, interrogating, sources and judging possible misrepresentations.
We can plan and complete appropriate scientific investigations to gather evidence.

WHAT MISCONCEPTIONS MAY THEY HAVE FROM PREVIOUS LEARNING?

classification errors, confusing models with "reality", language ambiguity (multiple meanings of words), difficulty of understanding things that cannot be seen (e.g. atoms, waves, magnetism), where plants obtain their mass from, all microorganisms are "bad", not realising that burning involves oxygen, misunderstanding of when forces are acting on objects, heavier objects fall faster, not understanding the existence of air/air pressure around us.

WHAT ASSESSMENTS WILL BE USED ACROSS THE YEAR TO DEMONSTRATE HOW THE PUPILS HAVE ACQUIRED THE KNOWLEDGE AND DEVELOPED THE SKILLS?

<u>Using investigative approaches: planning an approach:</u> Demonstrate how the planned approach to answer a scientific question was informed by scientific knowledge, understanding or other sources of evidence by researching existing evidence in order to inform an aspect of the investigation, e.g. independently researching information about the reactivity of metals when planning an experiment involving reactions and give reasons for selecting a particular approach.
<u>Using investigative approaches: assessing risk and working safely:</u> by explaining how approaches to practical work were adapted to control risk by recognising a need for an adaptation of approach, e.g. when planning a series of experiments on reactivity series that the procedure for the use of certain metals has to be different.
<u>Working critically with primary evidence</u> explain how patterns and trends in results can be manipulated to be consistent with the evidence gathered and the predictions made and how improvements to the planning and implementation would have led to the collection of more valid and reliable evidence and a more secure conclusion. By giving reasons for a pattern identified e.g. suggest why it should be that pressure exerted increases with force but decreases as the area is increased or why it is thought that using data loggers to measure light and temperature over a 24-hour cycle will give a better coverage.
<u>Communication for audience and with purpose:</u> communicate effectively and use appropriate scientific terminology and conventions in discussion and written work. Through presenting a scientific case persuasively, making selective use of evidence, and anticipating responses, objections, bias and misinterpretations.