

Chemistry

Intent

The intent of teaching chemistry is to prepare learners to be informed, objective citizens in their adult life. The knowledge of chemistry helps all learners to be critical thinkers and problem solvers. For example; chemistry enables the learners to make informed decisions about issues such as climate change, use of chemicals in toiletries and cleaning products and proportions of ingredients in cooking. A knowledge in chemistry will give people the tools to be safe in understanding hazard labels and to be able to understand global issues in the environment and technological advancements e.g. nanotechnology.

For learners who choose to study chemistry further the subject develops their experimental technique which allows them to understand the fundamentals necessary for further study.

The chemistry GCSE builds on a spiral curriculum from years 7-9 which is modelled and planned around the AQA national curriculum. This gives students a basic grounding of the subject in preparation for their GCSEs in years 10 and 11. At Key stage 3 the students will study:

Enquiry skills: where pupils will test hypotheses, analyse chemical results, patterns and review their theories.

- Reaction: metals, non-metals, acids and alkalis, energy changes and the types of reactions
- Matter: particle model, periodic table and mixtures
- Earth: earth structure, climate and the earth's resources.

At Key Stage Four:

Atomic structure, periodic table, structure and bonding, chemical calculations, chemical changes, electrolysis, energy changes, rates and equilibrium, fuels, organic reactions, polymers, chemical analysis, the earth's atmosphere and resources.

At Key Stage Five:

Learners follow OCR Chemistry A where they learn about developments in practical skills, foundations in chemistry, periodic table and energy, core organic chemistry, physical and transitional chemistry, organic chemistry and analysis. These years also have a focus on the Practical Endorsement where students are assessed on their ability to carry out experiments independently, precisely and safely.

Pupils are intended to master these necessary skills by modelling, enquiry based challenges, hands on practical work, which are regularly assessed formatively and summatively.

Implementation

We deliver the curriculum using a hierarchical approach, whereby scaffolding approaches are given to pupils so that they may fully access the curriculum. Stretch and challenge is integrated in teaching and planning. As a chemistry faculty we have tailored the GCSE specification to suit our large range of high ability learners. The arrangement of the curriculum has been founded to support students' cognitive development and the implementation of practical skills. Resources are selected to suit the ability of the classes in line with their aspirational targets.

This year our planning has been informed by the Education Endowment Funds: Improving Secondary Science Report, where we have been specifically focusing on feedback, retrieval, language and modelling. Teaching has implemented 'retrieval roulette' which involves low stakes questioning and high engagement. This helps students to be resilient in their learning. We have improved pupils' language and responses to long answer questions, (AO3) by focusing on command words and insisting on the use of chemistry terminology in verbal and written answers. We also regularly provide opportunities to use mark schemes in self and peer assessment. This is useful to develop and refine exam technique.

In Key Stage Three, progress is assessed with biweekly feedback tasks on lemon paper. The task should provide opportunities to capture 6 lessons worth of learning. The tasks should lead to effective feedback so that pupils can address misconceptions, correct mistakes and/or improve work below standard. The feedback should be noted onto their work and DIRT time planned so that pupils can make progress or complete extension work as appropriate. Every unit will conclude with a summative assessment opportunity with progress tracked on central mark books. At Key Stage Four progress is monitored however, discretion is given to the classroom teachers to tailor the assessment to the needs and ability of the class. Practical skills are delivered in a hierarchical approach where skills are developed throughout the key stages.

Impact

Upon leaving St Bede's pupils will have sat either a double science GCSE or a triple science Chemistry qualification. Most of our students take the triple science Chemistry due to our large quantity of high attaining students.

We measure our progress by using 'developing, secure and extend' criteria in KS3 and in KS4 we assess based on past GCSE grades boundaries, however we increase these slightly to cater for the fact that each topic test is only a small quantity of learning, compared to the

actual GCSE papers where they are expected to know significantly more content. At KS5 pupils are assessed at the end of each module of teaching using past papers and they are also given summative mock assessments.

By studying chemistry we hope that students will be fully equipped with the knowledge necessary to make informed decisions about our world. St Bede's chemists should be able to critically analyse data and question information presented to them. We also believe our rigorous and engaging curriculum inspires students to take chemistry for further study.