



Sandbach School Science Curriculum: Chemistry Impact

Implementation

Intent

A - Level

We aim to create the very best scientists and have students appreciate that chemistry is fundamental to our world and touches almost every aspect of our existence. We challenge students to think, act and speak like those working in a scientific field would. We do this by using effective questioning techniques in each lesson to push our students to think beyond their first response. Students are expected to carry out practical work in each topic, where it is appropriate, in a responsible manner and record data effectively in order to be able to analyse it and draw conclusions from it. During practical work, students are expected to select the most appropriate apparatus and justify the choices that they make, thus demonstrating that they are thinking through a problem rather than simply following instructions. Students are expected to consider their own and others' safety and independently carry out risk assessments.

Y9-11

To make sure students learn subject content relevant to the qualifications phase exams and community life. To strengthen student confidence in applying their knowledge to exam questions and new situations and being sufficiently adept in transferring of those skills that adequately reflects their understanding of subject and topic content. The qualification phase science curriculum has been structured for the purpose of reinforcing and building upon vocabulary, concepts and visual models studied in the Transition phase Science Curriculum.

Y7-8 Transition phase

Pupils will be taught to:

- Develop an awe and wonder of science
- Develop a confident recall of scientific knowledge and an ability to apply scientific concepts
- Develop the ability to question the credibility of reported science
- Develop confident and independent scientists through individual and collaborative work
- Allow students to have informed and ethical opinions about the big scientific questions facing society
- Develop a sense of responsibility for our planet and the knowledge to be able to best care for it
- The development of a curiosity for what else we can learn about the world through science
- Develop transferable and employability skills

By the end of Y13, students will know how to:

- Use experimental data to make calculations to monitor progress of reactions.
- Calculate pH of acids, bases and buffers
- Make predictions about the feasibility of reactions from experimental and data book values.
- Describe and explain the properties and reactions of transition metals
- Explain periodic trends across the periodic table.
- Plan an multi-step organic synthesis of a target product through a series of reactions.
- Use a range of analytical techniques to elucidate structure of organic compounds.

By the end of Y11, students will know:

The complex and diverse phenomena of the natural world can be described in terms of a small number of key ideas in chemistry. These key ideas are of universal application. They underpin many aspects of the science assessments

Key ideas in chemistry:

- matter is composed of tiny particles called atoms and there are about 100 different naturally occurring types of atoms called elements
- elements show periodic relationships in their chemical and physical properties
- these periodic properties can be explained in terms of the atomic structure of the elements
- atoms bond by either transferring electrons from one atom to another or by sharing electrons
- the shapes of molecules and the way giant structures are arranged is of great importance in terms of the way they behave
- there are barriers to reaction so reactions occur at different rates
- chemical reactions take place in only three different ways:
 - proton transfer
 - electron transfer
 - electron sharing
- energy is conserved in chemical reactions

By the end of transition phase, students will know how to :

Understand that scientific methods and theories develop as earlier explanations are modified to take account of new ideas. Evaluate risks

Make predictions using scientific knowledge and understanding select, plan and carry out the most appropriate types of scientific enquiries to test predictions, including identifying independent, dependent and control variable

Use appropriate techniques, apparatus, and materials during fieldwork and laboratory work, paying attention to health and safety

Make and record observations and measurements using a range of methods

Evaluate methods and suggest possible improvements

Apply mathematical concepts and calculate results

Present observations and data using appropriate methods, Interpret observations and data, including identifying patterns and using observations, measurements and data to draw conclusions

Present reasoned explanations, including explaining data in relation to predictions and hypotheses

Evaluate data, showing awareness of potential sources of random and systematic error

Identify further questions arising from their results

Understand and use SI units and IUPAC (International Union of Pure and Applied Chemistry) chemical nomenclature

