

## KS3 Science

### Course Summaries

Year 7 and 8.

Each half term pupils study one module from each of the three sciences. By the end of year 8 pupils will have covered all of the biology, chemistry and physics content from the National Curriculum. The topics are arranged into what our science department agree are the 'big ideas' within the National Curriculum – i.e. the themes that are key to the further study of science. In addition to scientific theory, we also equip pupils with the necessary 'Working Scientifically' skills needed to think like scientists. The theory pupils are learning (see table below) is used as a context to deliver skills to pupils in lessons. This is not only done on a lesson by lesson basis, but one lesson a week in year 7 and 8 is set aside for skills delivery.

In most cases, the content that pupils encounter in year 8, builds directly on the content that they encountered in year 7 (see tables below). In fact it could well be the case that a higher ability year 7 pupil is encountering the same material in lesson as a middle ability year 8 pupil for example.

How will the students be assessed?

Students are assessed formally at the end of each half term with a written test.

Pupils will also receive formative assessments during each module. Here the emphasis isn't on the overall mark, but how to improve.

What topics will the students study?

Half Term	Biology Topic	Chemistry Topic	Physics Topic
1	Cells	Particles 1	Force & Motion 1
2	Nutrition	Chemical Reactions 1	Energy 1
3	Reproduction	Acids and Alkalis 1	Waves 1
4	Interdependence 1	Environmental Chemistry 1	Electricity and Magnetism 1
5	Photosynthesis	Acids and Alkalis 1	Matter 1
6	Variation	Purity 1	Space 1

Year 7

Half Term	Biology Topic	Chemistry Topic	Physics Topic
1	Skeleton and Muscles	Particles 2	Force & Motion 2
2	Digestion	Chemical Reactions 2	Energy 2
3	Health	Acids and Alkalis 2	Waves 2
4	Interdependence 2	Environmental Chemistry 2	Electricity and Magnetism 2
5	Respiration	Acids and Alkalis 2	Matter 2
6	Heredity	Purity 2	Space 2

By the end of year 8, pupils are expected to be able to:

Scientific attitudes

- pay attention to objectivity and concern for accuracy, precision, repeatability and reproducibility
- understand that scientific methods and theories develop as earlier explanations are modified to take account of new evidence and ideas, together with the importance of publishing results and peer review
- evaluate risks.

Experimental skills and investigations

- ask questions and develop a line of enquiry based on observations of the real world, alongside prior knowledge and experience

- 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 variables, where appropriate
- 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 for different investigations; and evaluate the reliability of methods and suggest possible improvements
- apply sampling techniques.

#### Analysis and evaluation

- apply mathematical concepts and calculate results
- present observations and data using appropriate methods, including tables and graphs
- 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.

#### Measurement

- understand and use SI units and IUPAC (International Union of Pure and Applied Chemistry) chemical nomenclature
- use and derive simple equations and carry out appropriate calculations
- undertake basic data analysis including simple statistical techniques.

#### Year 9

We use year 9 as a transition year between the KS3 and KS4 Science National curriculums. Pupils carry on consolidating the 'Working Scientifically' aspect of the KS3 curriculum (see above), but against a backdrop of the KS4 theory. This gives the pupil the benefit of an extra year to study the GCSE theory (meaning less stress near the end of year 11 and hopefully helping their mental wellbeing), whilst at the same time recognising that skills take longer to develop than simple knowledge recall ability. The topics that pupils study are:

#### Biology

- Cell biology
- Organisation
- Infection and response

#### Chemistry

- Atomic structure and the periodic table
- Bonding, structure, and the properties of matter
- Quantitative chemistry
- Chemical changes

#### Physics

- Energy
- Electricity
- Particle model of matter
- Atomic structure

#### How will the students be assessed?

Each half term pupils are given GCSE past paper questions to assess their knowledge of theory and also selected skills elements (where they overlap with the KS3 working scientifically strands). We would only expose pupils to higher tier GCSE content in very exceptional circumstances, realising that exposure to content this challenging in year nine could have detrimental consequences to pupils confidence. For this reason we carefully select either 'foundation only' questions or 'common tier' questions.