

BIOLOGY

Student year: **Lower 4 (Yr 8)**

Head of Department: **Mrs S. Thorne**

SUBJECT OVERVIEW

This is the second year of a 2 year Key Stage 3 course. Students learn the knowledge and skills that give a sound foundation for studying Biology to GCSE. The course is divided into four topic-based units.

Subject / Topic

Food and Digestion

- content of a healthy human diet and why each food is needed
- simple tests for starch, simple (reducing) sugars, protein, fat
- calculations of energy requirements in a healthy daily diet and the consequences of imbalances in the diet
- the mechanism of enzyme action
- the tissues and organs of the digestive system, including adaptations to function

Breathing and Respiration

- the significance of respiration
- a comparison of aerobic and anaerobic respiration in humans
- the structure and functions of the respiratory system in humans
- gas exchange in humans
- the mechanism of breathing to move air in and out of the lungs
- the impact of exercise, asthma and smoking on the breathing system

The Skeletal System

- the structure and functions of the human skeleton, including synovial joints
- the function and antagonistic actions of major muscle groups
- The harmful effects of exercise on joints and muscles

Plants and Photosynthesis

- explaining the word equation for photosynthesis
- the relationship between the structure and functions of leaves
- adaptations of the root for the uptake of water
- the balance between respiration and photosynthesis in plants

Working Scientifically

Students will learn the following skills in the contexts of the topics studied in Lower 4

- Understanding how the scientific community uses evidence
- Planning and carrying out experiments to test predictions
- Applying mathematical concepts in data analysis
- Using tables and graphs & interpreting observations to draw conclusions
- Presenting explanations and suggesting further questions arising from their data
- Evaluating the validity of experiments and suggesting improvements

CHEMISTRY

Student year: **Lower 4 (Yr 8)**

Head of Department: **Mr I Macdonald**

SUBJECT OVERVIEW

This is the second year of a 2 year Key Stage 3 course. Students learn the knowledge and skills that give a sound foundation for studying Chemistry to GCSE. The course is divided into four topic-based units.

Subject / Topic

Working scientifically for Lower 4

Atoms, elements and compounds

- A simple (Dalton) atomic model
- Differences between atoms, elements and compounds

Chemical reactions

- Representing reactions using formulae & equations
- Different types of reaction

The Periodic Table

- The principles underpinning the Mendeleev Periodic Table
- Predicting patterns in reactions using the Periodic Table

Materials

- The use of carbon in obtaining metals from metal oxides
- The properties of ceramics, polymers and composites

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- Applying mathematical concepts in data analysis.
- Using tables and graphs & interpreting observations to draw conclusions.
- Presenting explanations and suggesting further questions arising from their data.
- Evaluating the validity of experiments and suggesting improvements.

PHYSICS

Student year: **Lower 4 (Yr 8)**

Head of Department: **Mr C Ridler**

SUBJECT OVERVIEW

This is the second year of a 2 year key stage 3 course. Students learn the knowledge and skills that give a sound foundation for studying Physics to GCSE. The course is divided into three topic-based units and students develop and apply 'working scientifically' skills throughout the year.

Subject / Topic

Working Scientifically

Light and Sound

- Energy transfer by waves
- Light ray diagrams
- Reflection, absorption and transmission of light
- Refraction and dispersion of light
- Frequency of light and colour
- Production and transmission of sound waves
- Frequency of sound and pitch, amplitude of sound and loudness
- Speed of sound
- Echoes and ultrasound

Particles, Pressure and Density

- Pressure in gases
- Pressure in liquids
- Upthrust
- Methods for determining density of regular and irregular solids
- Determining the density of a liquid

Magnetism and Electromagnetism

- Magnets, magnetic materials and domain theory
- Magnetic forces
- Compasses and magnetic fields
- Electromagnets

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- Presenting explanations and suggesting further questions arising from their data
- Evaluating the validity of experiments and suggesting improvements