BIOLOGY

Pupil year: **Lower 4 (Yr 8)** Head of Department: **Mrs S Thorne**

SUBJECT OVERVIEW

This is the second year of a two 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.

Topic

Food and Digestion

- Content of a healthy human diet and why each 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

Pupil year: **Lower 4 (Yr 8)** Head of Department: **Mr I Macdonald**

SUBJECT OVERVIEW

This is the second year of a two 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.

Topic

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.

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.

PHYSICS

Pupil year: **Lower 4 (Yr 8)** Head of Department: **Mr C Ridler**

SUBJECT OVERVIEW

This is the second year of a two 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

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.

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.