Craig Ormerod Associates Ltd.

Subject Overview: Science (KS3)

YEAR 7

Gravity and Speed

Pupils begin the term by examining how speed is measured and what causes it to change. Distance-time graphs and their interpretation are then introduced. The term concludes with an investigation into the relationship between weight, mass and gravity, including an exploration into how these concepts affect space travel at various points within our Solar System.

Voltage, Resistance and Current

This topic teaches pupils about the key concepts surrounding the function of electric circuits. Through various experiments pupils acquire an understanding of current flow, potential difference and resistance in both series and parallel circuits.

Energy Costs and Energy Transfer

This module focuses on how energy is transferred from one mode of storage to another. The relationship between this process and the costs involved in running various household appliances is also explored. Pupils develop a working knowledge of different energy resources so that they can evaluate the social, economic and environmental consequences of utilising different resources to generate electricity.

Sound and Light

In this unit, pupils study a wide-ranging combination of phenomena associated with sound, light, transverse and longitudinal waves.

Particle Model and Separating Mixtures

Pupils study the compositional nature of a range of naturally occurring materials. Pupils learn about the laws surrounding the behaviour of particles and how these concepts can be used to explain the unique properties of solids, liquids and gases. Students also learn how to chemically separate different types of mixtures, as well as developing their own strategies to replicate the process in alternative environments.

Metals and Non-metals; Acids and Alkalis

Pupils are introduced to the key concepts covered in Chemistry. Practical experiments allow pupils to examine the basic chemical reactions of various metals and non-metals, and to create their own subsequent reactivity series. Acids and alkalis are studied in similar fashion, with pupils applying their knowledge of chemical properties in order to better understand the composition and function of everyday medications such as indigestion remedies.

Earth, Structure and the Universe

What is the Earth made from? Why is the rock cycle so important? Why are days and years measured like they are? Is life on Mars possible? All these questions and more are answered in this unit of work, which includes a practical component as well as in-depth study into the structure of our planet and an increased understanding of its relative position in space.

Cells and Movement

Pupils are introduced to the unseen world of cells via the practical use of microscopes. Pupils further develop their understanding by drawing comparisons between the physical make-up of plant and animal cells, including those that have adapted according to their function and/or environment. The roles of the muscular and skeletal systems are also studied through the dissection of a chicken wing, helping pupils to understand how these two integrated systems combine to create movement.

Interdependence and Plant Reproduction

Have you ever wondered what might happen if bees became extinct? Pupils develop the ability to make informed predictions about the impact of human behaviour on various ecosystems. The complexities of plant reproduction are also examined, an understanding of which is used to draw links between plant structure and pollination.

Human Reproduction and Variation

What makes every one of us different? How do the sperm and the egg interact? Where does fertilisation occur? These key biological questions are all addressed in this unit of work. Pupils also learn about inherited characteristics, as well as developing an understanding of the importance of variation within a species.

YEAR 8

Contact Forces and Pressure

What is drag and how is it affected? What effects do balanced and unbalanced forces have on speed? Why might changes in pressure be necessary? Pupils build on the knowledge and skills developed in the *Gravity and Speed* module to gain a deeper understanding of contact forces. This

increased knowledge assists pupils in making design changes to vehicles that will allow them to achieve higher top speeds.

Electromagnets and Magnetism

Pupils investigate the properties of magnets and magnetic fields through experimental techniques and case studies of devices including loudspeakers and microphones. Pupils are also introduced to the concept of electromagnetism and the critical role it plays in the 21st century.

Heating and Cooling

In this unit, the concept of *work done* as a function of energy transfer is introduced. Pupils learn to calculate the amount of *work done* in various contexts and acquire an understanding of how levers and pulleys increase efficiency. The transfer of thermal energy is also studied, with pupils learning how to evaluate the effectiveness of different kinds of insulation.

Wave Effects and Wave Properties

This module sees pupils learning the skills needed to assess the effect, on a cellular level, of different types of waves. The various uses of ultrasound are covered, as well as the contrast between light and sound in terms of how they vibrate relative to the direction of the wave they produce.

Periodic Table of Elements

What is the difference between elements and compounds? How can there be only a hundred or so naturally occurring substances in the universe when we are surrounded by thousands of different types of material? In this unit, pupils deconstruct the Periodic Table by analysing the first twenty elements. Trends and properties of specific Group 1 and Group 7 elements are then examined in detail, with pupils forming hypotheses regarding the properties of other elements based on their observations.

Chemical Energy and Types of Reaction

Why is heat released during burning? What makes some reactions feel hot and others cold? Pupils tackle these questions and many more through the study of energy changes that occur during chemical reactions, which in turn increases pupils' ability to balance chemical equations and make predictions regarding the mass of products formed by a given quantity of reactant.

Climate and Resources

How is iron ore extracted? Why wasn't aluminium used in Victorian engineering? Are humans alone responsible for climate change? Pupils apply their knowledge of the reactivity series to the methods used to extract metals from their ores. The carbon cycle is also studied, as well as the impact on the environment of fossil fuel consumption.

Respiratory and Digestive Systems

Pupils examine the structure and function of these two key systems, focusing on the impact of lifestyle on each as well as the effectiveness of varying diets and treatments on lung cancer.

Photosynthesis

Pupils investigate the processes essential for life to exist on Earth. Pupils use their newly acquired knowledge of respiration to investigate the action of yeast during fermentation, as well as examining the key differences between aerobic and anaerobic respiration. The structure of a leaf is analysed and linked back to the dependence of cells on light, CO_2 and water in order to survive.

Evolution and Inheritance

What is natural selection? Why is biodiversity essential? Who were Watson, Crick and Franklin? Is it safe to genetically modify food crops? Pupils gain an insight into the complex world of genetics through the study of DNA and chromosomes, as well as a detailed understanding of how this information is transferred during reproduction.

YEAR 9

Cells and Genes

Pupils build on their existing knowledge to focus on content more closely linked to GCSE-level work. Pupils examine the structure of DNA and the function of different organelles within a cell, as well as further developing their understanding of genetics and inheritance.

Forces and Energy

This topic bridges the gap between concepts taught in Years 7 and 8 and introduces various skillsets required at GCSE level. Pupils explore the nuances of moments and pressure, concluding with an in-depth, mathematical examination of speed.

Chemical Reactions

The aim of this topic is to link complex chemical theories to pupils' prior experience and builds on what they have already learned, ideally placing them to begin their GCSE studies. Pupils become more proficient at balancing equations as well as deepening their understanding of chemical reactions. They become familiar with more advanced terminology such as *endothermic* and *exothermic*, as well as looking in closer detail at what happens on an atomic level during a chemical reaction.