



# VOCATIONAL SCIENCE

## Curriculum Overview

At KS3, Science is based on the AQA ELC (5960) syllabus. At Woolton High, science is about students developing a sense of enquiry and extending their knowledge and understanding of the world round them. The curriculum includes knowledge about Organisms, behaviour and health, Chemical and material behaviour, Energy, electricity and forces, the environment, Earth and the universe.

The Science curriculum has recently been adapted to facilitate a more practical hand on approach where ever possible. The principles of Science will be the foundation of learning with linked practical tasks to consolidate and demonstrate new knowledge of the world around us. All practical tasks are designed to give students the opportunity to develop their skills, understanding and confidence. They are also aimed at giving students a greater understanding of real life situations which link directly to Science.

At KS4, students will cover a Scheme of Learning based on the AQA ELC Science (5960) syllabus. This allows pupils to gain an understanding of all subject disciplines: Biology, Chemistry and Physics. Pupils are able to succeed in the ELC and allow them to progress in Science. Additional enrichment activities and challenges are included throughout the Year.

### **Departmental Staff**

Mr Monti

Vocational Science Teacher

## Departmental Overview

The Science Department comprises of 1 science teacher, a classroom and several other spaces stocked with a wide range of equipment designed to support students in their learning. The department also has access 1 bank of laptops for data analysis and report writing. The department's key aims are to develop a passion for Science within our students, allowing them to access a wide range of specialist careers whilst developing theoretical and practical knowledge encapsulated with skills for life.

## The Science Curriculum

	Year 7	Year 8	Year 9	Year 10	Year 11
<b>Half term 1</b>	<p><b>Biology 1: 3.1 The human Body</b></p> <p>Diet and exercise Weight problems Inheritance, exercise and health Pathogens and disease Defence mechanisms Using drugs to treat disease Growing and investigating bacteria Immunity How do we deal with disease Practicals include preparing and making a selection of healthy dishes</p>	<p><b>Chemistry 3.5.1: Energy, energy transfer and energy resources</b></p> <p>Investigate rocks and building materials Limestone and its uses Reactions of carbonates The limestone reaction cycle Cement and concrete Limestone issues Understanding of ergonomics Produce a thermolite sculpture</p>	<p><b>Biology 3.2.1: What are the feeding relationships between living organisms</b></p> <p>Adapt and survive Adaptation in animals Adaption in plants Competition in plants Competition in animals How to survive Measuring environmental change The impact of change Practical: Design and build a bird house</p>	<p>Describe the constituents of a healthy diet and define metabolic rate. Explain how exercise can reduce health problems. Explain what cholesterol is and describe the effects of high levels of 'bad' cholesterol in the blood. Describe the three main methods of heat transfer; conduction, convection and radiation. Explain evaporation and condensation in terms of particle theory. Explain specific heat capacity. Heat loss consideration in buildings and U-values.</p>	<p>To explore electromagnetic waves have many practical applications. For example: Radio waves - television and radio microwaves - satellite communications, cooking food infrared - electrical heaters, cooking food, infrared cameras visible light - fibre optic communications ultraviolet - energy efficient lamps, sun tanning X-rays and gamma rays - medical imaging and treatments.</p>

<p><b>Half term 2</b></p>	<p><b>Biology 3.1.4: How the body is coordinated</b></p> <p>Coordinating and control          Responding to change          Reflex actions          Hormones and the menstrual cycle          The artificial control of fertility          Control conditions          Practical activities linked to reflexes will be completed.          Hormones and the control of plant growth          Using hormones</p> <p>Practical tasks linked to testing reflexes will also be completed</p>	<p><b>Biology 3.2.2: What determines where particular species live</b></p> <p>Energy in biomass          Pyramids of biomass          Energy transfer          Decay processes          The carbon cycle          Practical:          Recycling organic waste into useful products</p>	<p><b>Chemistry 3.3.4: Metals and Alloys</b></p> <p>Metals and their uses          Extracting metals          Iron and steels          Aluminium and Titanium          Extracting coppers          Useful metals          Metallic issues          Design and make a metal sculpture using different metals          Analyse oxidization due to the outdoor elements.</p>	<p>Define elements and atomic structure in terms of protons, neutrons and electrons.          Electron arrangement, bonding; ionic and covalent. Conservation of mass in chemical reactions          Interpret formula in terms of number and type of atoms, higher - balanced equations.          Explain reflex actions and the role of receptors.          Describe the function of hormones and how they relate to the menstrual cycle.          Explain what inhibiting is.          Describe how plant hormones are involved in agriculture and horticulture.</p>	<p>To understand the process of inheritance          Explore different types of reproduction          To understand genetic and environmental differences          Describe how oils can be extracted from plants          Recognise an unsaturated oil          Describe how plant oils are important in foods</p>
<p><b>Half term 3</b></p>	<p><b>Biology 3.1.3: How the body fights disease</b></p> <p>Developing new medicines          How effective are medicines          Drugs          Legal and illegal drugs          Drugs in sport          Students will work at case studies linked to sports cheats</p>	<p><b>Chemistry 3.4: Chemistry in our world</b></p> <p>Our changing planet          Structure of the Earth          The restless Earth          The Earths atmosphere in the past          Life on Earth          Gases in the atmosphere          Carbon dioxide in the atmosphere          Students will also work on a case study to establish how they can</p>	<p><b>Physics 3.5.1: Energy transfer and energy resources</b></p> <p>Energy transfer by heating          Infared radiation          Surfaces and radiation          States of matter          Conduction          Convection          Evaporation and condensation</p>	<p>Energy changes in a system, and the ways energy is stored before and after such changes          Describe the environmental impact arising from the use of different energy resources          Explain patterns and trends in the use of energy</p>	<p>Explore how oils can be used in science          To understand issues related to oils          To explore different alternatives          Describe the materials that living organisms need in order to survive          Explore adaptions</p>

		<p>minimize their carbon footprint</p>	<p>Energy transfer by design Specific heat capacity Heating and insulating buildings Linked practical experiments will be conducted when necessary</p>	<p>resources. Descriptions of how energy resources are used to generate electricity Exploring the structure of the earth The Earths Atmosphere Gases in the atmosphere Carbon dioxide in the atmosphere</p>	
<p><b>Half term 4</b></p>	<p><b>Biology 3.2.1: Environment, evolution and inheritance</b></p> <p>Evolution Accepting Darwins theory Natural selection Classification and evolution.</p> <p>Students will also take part in practical tasks linked to this topic.</p>	<p><b>Physics 3.6.1: Electrical current</b></p> <p>Using energy Forms of energy Conservation of energy Useful energy Energy and efficiency</p> <p>Practical tasks include: Making a steady hand game</p>	<p><b>Chemistry 3.4.4: Fuels and human impact on the atmosphere</b></p> <p>Plant oils Extracting vegetable oil Cooking with vegetable oils Everyday emulsions Food issues</p> <p>Practical`s include: Healthy cooking.</p>	<p>The effects of diet, smoking and exercise on cardiovascular Obesity as a risk factor for Type 2 diabetes. The effect of alcohol on the liver and brain function. The effects of smoking and alcohol on unborn babies. Distinguish between energy resources that are renewable and energy resources that are non-renewable Compare ways that different energy resources are used, the uses to include transport, electricity generation and heating Understand why some energy resources are more reliable than others</p>	<p>Explore native metals Recognise metals found in ores Relate the use of carbon in metal extraction Explore what biomass is Explore where biomass comes from</p>

<p><b>Half term 5</b></p>	<p><b>Chemistry 3.4.4: Fuels and human impact on the atmosphere</b></p> <p>oil and fuels          Fractional distillation          Burning fuels          Cleaner fuels          Alternative fuels          Bio fuel          Students will have the opportunity to manufacture their own Bio fuel.</p>	<p><b>Physics 3.6.2: Domestic electricity</b></p> <p>Electrical appliances          Electrical power          Using electrical energy          Cost effectiveness matters.          Practicals include:</p> <p>Replacing a fuse          Wiring a plug</p>	<p><b>Chemistry 3.4.4: Fuels and human impact on the atmosphere</b></p> <p>Analyse domestic, commercial and industrial waste</p> <p>Explore global effects of waste          Modern recycling methods and ideas          Upcycling          Design and make an upcycled product from used products</p>	<p>The composition and evolution of the Earth's atmosphere          The proportions of different gases in the atmosphere          Content Key          Carbon dioxide and methane as greenhouse gases          Greenhouse gases          Describe briefly four potential effects of global climate change          Discuss the scale, risk and environmental implications of global climate change.</p>	<p>Explore how oils can be extracted from plants          Recognise unsaturated oils          Explore why plant oils are important</p>
<p><b>Half term 6</b></p>	<p><b>Physics 3.6.2: Domestic electricity</b></p> <p>Generating electricity          Fuel for electricity          Energy from wind - wind turbines          Energy from water - Hydro electric power          Power from the sun and the earth          Energy and the environment          The national grid          Environmental issues          Practical tasks include:          Making an elastic powered vehicle, a vehicle powered by electricity and a hovercraft.</p>	<p><b>Chemistry 3.4.4: Fuels and human impact on the atmosphere</b></p> <p>Products from oil          Cracking hydrocarbons          Making polymers from alkenes          New and useful polymers          Plastic waste          Ethanol          Recycling project</p>	<p><b>Chemistry 3.3.5: Polymers</b></p> <p>How Polymers are used in our homes          Uses of polymers in industry          The reality and effects of polymers          Using polymers to make a useful product          Explore different uses of polymers          Manufacture a product made from polymers</p>	<p>The composition and evolution of the Earth's atmosphere          The proportions of different gases in the atmosphere          Content Key          Carbon dioxide and methane as greenhouse gases          Greenhouse gases          Potential effects of global climate change          Explore the scale, risk and environmental implications of global climate change.</p>	

## **Examinations/Key Assessments**

All KS3 work is marked and assessed every two weeks to school policy. The school follows the stages of learning for assessment purposes which are Remember, Understand, Apply and Analyse.

All KS4 work students will be following the AQA Science 5960 entry level course. Each student will complete six practical's will sit six tests. Students will achieve a level 1, 2 or 3 depending on their attainment.

### **How Parents can Help:**

- Request Homework to be set from school.
- Request a fortnightly update on progress



