

## Faculty Website Curriculum information

Science

### Subject vision

It is our aim that over the seven years at WRHS students will enjoy science and will develop the knowledge and enthusiasm needed to reach the next steps in their academic journey. Students will be challenged to see how science affects their life, and the wider world and to understand how they can use science in their future careers.

### Topics/ units being studied

#### Key Stage 3

Year 7	Year 8	Year 9
<ul style="list-style-type: none"> <li>• Acids and Alkalis</li> <li>• Elements and Compounds</li> <li>• The Particle Model</li> <li>• Sound</li> <li>• Cells</li> <li>• Reproduction</li> <li>• Circuits and magnets</li> <li>• Energy Changes and Transfers</li> <li>• Pure and impure substances</li> <li>• Organisms and the Environment 1</li> </ul>	<ul style="list-style-type: none"> <li>• Organisms and the Environment 2</li> <li>• Systems</li> <li>• Forces</li> <li>• Stretching and Turning</li> <li>• Rocks, Earth and the Atmosphere</li> <li>• Materials</li> <li>• Space</li> <li>• Light</li> <li>• Variation, DNA and Evolution</li> <li>• Pressure</li> </ul>	<ul style="list-style-type: none"> <li>• Cell Structure and organisation</li> <li>• Atomic structure and the periodic table</li> <li>• Particle model of matter</li> <li>• Bonding and Structure</li> <li>• Respiration</li> <li>• Organisation</li> <li>• Energy Changes</li> </ul>

#### Key Stage 4

Year 10	Year 11
<ul style="list-style-type: none"> <li>• Energy</li> <li>• Cell Division and Transport</li> <li>• Electricity</li> <li>• Chemical Changes</li> <li>• Quantitative Chemistry</li> <li>• Atomic Structure (Radioactivity)</li> <li>• Plant Structure and Photosynthesis</li> <li>• Chemical Analysis</li> <li>• Rates of Reaction and Equilibria</li> <li>• Organic Chemistry</li> <li>• Ecology</li> </ul>	<ul style="list-style-type: none"> <li>• Rates of reaction and equilibria</li> <li>• Homeostasis</li> <li>• Waves</li> <li>• Magnetism and Electromagnetism</li> <li>• Inheritance, Variation and Evolution</li> <li>• Chemistry of the Atmosphere</li> <li>• Chemical Analysis</li> <li>• Using Resources</li> <li>• Space Physics</li> <li>• Forces</li> </ul>

## Key Stage 5 Biology A - Level

Year 12	Year 13
<ul style="list-style-type: none"><li>• Biological molecules</li><li>• Cell structure</li><li>• Biological membranes</li><li>• Nucleotides and Nucleic Acids</li><li>• Biological membranes</li><li>• Cell division, cell diversity and cell organisation</li><li>• Enzymes</li><li>• Exchange surfaces</li><li>• Communicable disease, Disease, and the immune system</li><li>• Transport in animals</li><li>• Biodiversity</li><li>• Plant transport</li><li>• Classification and evolution</li><li>• Photosynthesis</li><li>• Ecosystems</li><li>• Respiration</li><li>• Populations and Sustainability</li></ul>	<ul style="list-style-type: none"><li>• Communications and homeostasis</li><li>• Populations and sustainability</li><li>• Plant hormones</li><li>• Cellular Control</li><li>• Excretion</li><li>• Hormonal communication</li><li>• Patterns of inheritance</li><li>• Neuronal communication</li><li>• Animal response</li><li>• Manipulating Genomes</li><li>• Coordination of nervous and endocrine systems</li><li>• Cloning and biotechnology</li></ul>

## Key Stage 5 Chemistry A - Level

Year 12	Year 13
<ul style="list-style-type: none"><li>• Atomic Structure and Isotopes</li><li>• Electron structure</li><li>• Compounds and formulae</li><li>• Amount of substance</li><li>• Bonding and structure</li><li>• Redox</li><li>• Periodicity</li><li>• Basic concepts of organic chemistry</li><li>• Group 2</li><li>• The Halogens</li><li>• Alkanes</li><li>• Alkenes</li><li>• Qualitative analysis</li><li>• Alcohols</li><li>• Haloalkanes</li><li>• Reaction rates</li><li>• Organic Synthesis</li><li>• How fast?</li><li>• Spectroscopy</li><li>• Carbonyl compounds</li></ul>	<ul style="list-style-type: none"><li>• Acids</li><li>• Acids, bases, and buffers</li><li>• Aromatic Compounds Carboxylic acids and esters</li><li>• Enthalpy changes</li><li>• Lattice enthalpy</li><li>• Enthalpy and entropy</li><li>• Amines</li><li>• Amino acids, amides and chirality</li><li>• Polyesters and polyamides</li><li>• Carbon – carbon bond formation</li><li>• Redox and electrode potentials</li><li>• Organic synthesis</li><li>• Synthetic routes in organic synthesis</li><li>• Proton NMR spectroscopy</li><li>• Analytical techniques</li><li>• Redox reactions</li><li>• Testing for ions</li><li>• Combined techniques</li></ul>

<ul style="list-style-type: none"> <li>• Transition elements</li> <li>• Analytical techniques</li> <li>• Qualitative analysis</li> <li>• Chromatography and qualitative analysis</li> <li>• Chemical equilibrium</li> <li>• How far?</li> <li>• Aromatic Compounds</li> </ul>	
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### Key Stage 5 Physics A - Level

Year 12	Year 13
<ul style="list-style-type: none"> <li>• Electric Current</li> <li>• Electrical properties</li> <li>• Foundations of physics</li> <li>• Motion</li> <li>• Electrical circuits</li> <li>• Forces in action</li> <li>• Waves</li> <li>• Work, energy, power</li> <li>• Materials</li> <li>• Quantum physics</li> <li>• Newton's Laws</li> <li>• Nuclear and particle physics</li> <li>• Particle physics, nuclear fission, and fusion</li> <li>• Astrophysics</li> </ul>	<ul style="list-style-type: none"> <li>• Capacitors</li> <li>• Astrophysics</li> <li>• Thermal physics</li> <li>• Electric fields</li> <li>• Circular motion</li> <li>• Magnetism</li> <li>• Nuclear, Particle physics</li> <li>• Gravitational fields</li> <li>• Medical imaging</li> <li>• Oscillations</li> </ul>

### Key Stage 5 BTEC Diploma in Applied Science

Year 12	Year 13
<ul style="list-style-type: none"> <li>• Unit 3 – Science investigation skills</li> <li>• Unit 8 – Physiology of human body systems</li> <li>• Unit 1 – Principles and application of science I</li> <li>• Unit 5 - Principles and application of science II</li> <li>• Unit 2 – Practical scientific procedures and techniques</li> </ul>	<ul style="list-style-type: none"> <li>• Unit 5 - Principles and application of science II</li> <li>• Unit 6 – Investigative project</li> <li>• Unit 4 – Laboratory techniques and their application</li> <li>• Unit 12 – Diseases and Infection</li> </ul>

### **Additional information about your subject**

- All of Year 7 beach ecology trip
- All of Year 8 visit to Jodrell Bank
- Regular practical work in our 14 laboratories for all key stages
  
- Careers talks/ activities/ events for all year groups
- Extracurricular and leadership activities
- Science sixth form buddy system and key stage 5 science leaders

### **Contact information**

If you have questions on the curriculum that your daughter will be studying, please contact one of the following.

- Head of Faculty: Miss E. Bird ([ebird@wrhs1118.co.uk](mailto:ebird@wrhs1118.co.uk))
- Assistant Head of Faculty/ Key stage 4 Coordinator: Mr G. Al-Sammari
  
- Assistant Head of Faculty (Physics and Combined Science Coordinator): Mr G. Al-Sammari
- Biology Coordinator: Miss S. Clayton
- Chemistry Coordinator: Miss A. Mehmood
- Vocational Coordinator: Dr J. Sadler
- KS3 Coordinator: Miss B. Alderson