KS5 Long Term Curriculum Plan

Biology - Edexcel							
Year	Curriculum Title	HT1 topics	HT2 topics	HT3 topics	HT4 topics	HT5 topics	HT6 topics
12	Edexcel AS Level 'Biology A'	**Topic 1 Lifestyle, Health and Risk** 1. What is cardiovascular disease? 2. How does circulation work? 3. Atherosclerosis and blood clotting. 4. Who is at risk of cardiovascular disease? **Topic 2 Genes and Health** 1. The role of mucus in the lungs. 2. Gas exchange surfaces. 3. Protein structure. 4. The fluid mosaic models	**Topic 1 Lifestyle, Health and Risk** 1. Identifying risk factors for cardiovascular disease: • Studying cardiovascular disease. • Age and gender. • Blood pressure. • Dietary factors. • Obesity. • Cholesterol. • Genes and coronary heart disease. • Other risk factors. • Reducing the risks of cardiovascular disease. • Drug treatment. **Topic 2 Genes and Health**	**Topic 1 Lifestyle, Health and Risk** Core practical's 1 & 2 **Topic 3 Voice of the Genome** 1. Prokaryotic and eukaryotic cells. 2. Gametes. **Topic 4 Biodiversity and Natural Resources** 1. Why are there so many different species? 2. Niches. 3. Adaptations. 4. Natural selection. 5. Biodiversity. 6. Classification. 7. Genetic variation. 8. Measuring biodiversity.	**Topic 3 Voice of the Genome** 3. How do gametes form? 4. Sex linkage. 5. Fertilisation. 6. The cell cycle. 7. Early embryonic development – stem cells. **Topic 4 Biodiversity and Natural Resources** 1. Making use of biodiversity. 2. Cell walls. 3. Specialised cells in plant stems. 4. Useful plant fibres. 5. Digitalis and drug development. *Retrieval:*	**Topic 3 Voice of the Genome** 1. How development is controlled. 2. Gene expression. 3. Nature and nurture. 4. Gene and environment interactions. 5. The epigenome. 6. Cancer. **Topic 4 Biodiversity and Natural Resources** 1. Seeds. 2. Zoos and conservation. 3. Reintroducing animals to the wild. *Retrieval:* *Topic 3*	**Topic 7 Run for Your Life** 1. Respiration – Glycolysis. 2. Respiration – Krebs cycle. 3. Respiration – Chemiosmosis. **Topic 5 On the wild Side** 1. What is an ecosystem? 2. Biotic and abiotic factors. 3. Succession. *Retrieval:* *Topic 3 part 2*

		of cell membranes. 5. Transport across membranes. 6. Regulating mucus water content in the lungs. 7. Why cystic fibrosis lungs cannot regulate the water in mucus. *Retrieval:* *GCSE Disease and Medicine*	1. The effect of cystic fibrosis on the digestive system. 2. Enzyme structure and rates of reaction. 3. The effect of cystic fibrosis on the reproductive system. 4. The structure of DNA. 5. Protein synthesis. 6. DNA replication. 7. How is cystic fibrosis inherited? 8. Testing for cystic fibrosis. 9. Making ethical decisions. *Retrieval:* *Part 1 of Each topic*	*Retrieval:* *Topic 2*	*Topic 1*		
13	Edexcel AS Level 'Biology A'	**Topic 5 On the wild Side** 1. Chloroplasts. 2. Photosynthesis. 3. Energy transfer. 4. Evidence for climate change. 5. The greenhouse effect. 6. Global warming.	**Topic 5 On the wild Side** 4. Changing distribution of species. 5. Altered development. 6. The effect of climate change on evolution. 7. Molecular evidence for evolution. 8. Speciation. 9. The carbon cycle. 10. Sustainability.	**Topic 6 Infection, Immunity and Forensics** 1. Forensic Biology – identifying the body. 2. Making a DNA profile. 3. Polymerase chain reaction. 4. Determining time of death. 5. Succession.	**Topic 6 Infection, Immunity and Forensics** 1. What is tuberculosis? 2. HIV and AIDS. 3. Protein synthesis. 4. Physical barriers and chemical defences. 5. Immunity and vaccination.	Revision and study of the extended article for A Level paper 3. Exam season.	Exam season.

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		7. Predicting future climates. **Topic 7 Run for Your Life** 1. Recap respiration 2. Anaerobic respiration. 3. Rate of respiration. 4.Joints and movement. 5. Muscles. 6. Types of muscle fibres. *Retrieval:* *Topic 3* .	**Topic 7 Run for Your Life** 1. Cardiac output. 2. Control of heart rate. 3. Breathing. 4. Homeostasis and negative feedback. 5. Excessive exercise and immune suppression. 6. Benefits of exercise. 7. Performance enhancing substances. *Retrieval:* *Topic 4*	6. Bacterial and viral structure. 7. Transmission of disease. 8. The non-specific immune system. 9. Specific immunity. 10. The secondary immune response **Topic 8 Grey Matter** 1. Cells of the nervous system. 2. Reflex arcs. 3. Transmission of impulses. 4. Synapses. 5. Comparing nervous and hormonal control. 6. Receptors. 7. Structure of the brain. 8. Brain imaging. *Retrieval:* *Topic 5 and 7*	6. Treating AIDS. 7. Antibiotic resistance and hospital-acquired infection. **Topic 8 Grey Matter** 1. Visual development. 2. Depth perception. 3. Learning and memory. 4. Ethics of using animals in research. 5. Problems with the synapses. 6. The human genome project. 7. Using genetically modified organisms to produce drugs. 8. Concerns about genetic modification. *Retrieval:* *Topic 5 and 7*		

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Chemistry - AQA							
Year	Curriculum Title	HT1 topics	HT2 topics	HT3 topics	HT4 topics	HT5 topics	HT6 topics
12	AQA Chemistry Year 1	<u>Atomic Structure</u> The atom Atomic Models Relative Mass Mass Spectrometry Using Mass Spectra Electronic Structure Ionisation Energies <u>Amount of substance</u> The Mole Gases and the Mole Chemical Equations Equations and Calculations Titrations Formulas Chemical Yield Atom Economy *Retrieval:*	<u>Bonding</u> Ionic Bonding Covalent Bonding Charge Clouds Shapes of Molecules Polarisation Intermolecular Forces Metallic Bonding Properties of metals <u>Energetics</u> Enthalpy Bond enthalpies Measuring Enthalpy Changes Hess's Law <u>Kinetics</u> Reaction Rates Catalysts Measuring reaction rates *Retrieval:* *Atomic Structure* *Amount of Substance*	<u>Equilibria and redox</u> Reversible Reactions Industrial Processes The Equilibrium Constant Factors affecting the Equilibrium Constant Redox Reactions Redox Equations <u>Periodicity</u> The Periodic Table Periodicity *Retrieval:* *Bonding* *Energetics*	<u>Group 2 elements and Group 7 elements</u> The Alkaline Earth Metals Group 2 compounds The Halogens Halide Ions Tests for ions <u>Introduction to Organic Chemistry</u> Formulas Functional Groups Nomenclature Mechanisms Isomers E/Z Isomers <u>Alkanes and halogenoalkanes</u> Alkanes and Petroleum Alkanes as fuels Synthesis of Chloroalkanes Halogenalkanes		

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		GCSE Topics, Calculations involving masses and Types of Substances			Nucleophillic Substitution Elimination Reactions <u>Organic Analysis</u> Tests for functional groups Mass Spectrometry Infrared Spectrometry *Retrieval: Equilibria Kinetics*		
13	AQA Chemistry Year 2	<u>Thermodynamics</u> Enthalpy Changes Born-Haber Cycle Enthalpies of Solution Entropy Free Energy Change <u>Rate equations and K_p</u> Monitoring Reactions Reaction Rates and Graphs Rate Equations	<u>Electrode Potentials and Cells (Part 2)</u> Electrochemical Series Electrochemical Cells <u>Acids, bases and Ph</u> Acids, Bases and Kw pH Calculations The Acid Dissociation Constant Titrations and pH Curves Titration Calculations Buffer Action Calculating pH of Buffers <u>Period 3 elements</u> Period 3 Elements Period 3 Oxides	<u>Transition metals</u> Transition Metals – The Basics Complex Ions Isomerism in Complex Ions Formation of Coloured Ions Ligand Substitution Reactions Variable Oxidation States Transition Metal Titrations Transition Metal Catalysts Metal-Aqua Ions	<u>Aromatic Compounds and Amines</u> Aromatic Compounds Reactions of Aromatics Amines and Amides Reactions of Amines Further Synthesis and Analysis Organic Synthesis NMR Spectroscopy		Exam season.

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		The Initial Rates Method Clock Reactions Rate-Concentration Graphs The Rate-determining Step The Arhenius Equation Gas Equilibria Changing Gas Equilibria <u>Electrode Potentials and Cells (Part 1)</u> Electrode Potentials Standard Electrode Potentials *Retrieval: Organic Alkenes*	<u>Polymers</u> Condensation Polyerisation Monomers and Repeating Units Disposing of Polymers *Retrieval: Thermodynamics* *Rate Equations*	<u>Isomerism and Carbonyl Compounds</u> Optical Isomerism Aldehydes and Ketones Hydroxynitriles Carboxylic Acids and Esters Reactions and Uses of Esters Acyl Chlordies Acid Anhydrides Purifying Organic Compounds <u>Amino Acids, Proteins and DNA</u> Amino Acids Proteins Enzymes DNA Cisplatin *Retrieval: Electrode potentials* *Acids and Bases*	^{13}C NMR Spectroscopy ^{1}H NMR Spectroscopy Chromatography Gas Chromatography Revision for examinations *Retrieval: Transition Metals* *Amino Acids*		

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Physics - AQA							
Year	Curriculum Title	HT1 topics	HT2 topics	HT3 topics	HT4 topics	HT5 topics	HT6 topics
12	AQA Physics	**Topic 1 Measurements and their errors** • Use of SI units and their prefixes • Limitation of physical measurements • Estimation of physical quantities **Topic 2 Particles and radiation** • Constituents of the atom • Stable and unstable nuclei	**Topic 3 Waves** • Progressive waves • Longitudinal and transverse waves • Principle of superposition of waves and formation of stationary waves • Interference • Diffraction • Refraction at a plane surface *Retrieval:* *Particles GCSE Motion*	**Topic 4 Force, energy and momentum** • Scalars and vectors • Moments • Motion along a straight line • Motion along a straight line • Newton's laws of motion • Momentum • Work, energy and power • Conservation of energy *Retrieval:* *Waves* *Radiation*	**Topic 4 (Part 2) Materials** • Bulk properties of solids • The Young modulus *Retrieval:* *Energy* *Motion*	**Topic 5 Electricity** • Basics of electricity • Current–voltage characteristics • Resistivity • Circuits • Potential divider • Electromotive force and internal resistance *Retrieval:* *Material properties* *Scalars and Vectors*	**Electricity Continued** **Revision and End of Year Exams**

		• Particles, antiparticles and photons • Particle interactions • Classification of particles • Quarks and antiquarks • Applications of conservation laws **Topic 2 (Part 2) Electromagnetic radiation and quantum phenomena** • The photoelectric effect • Collisions of electrons with atoms • Energy levels and photon emission • Wave-particle duality *Retrieval:*					

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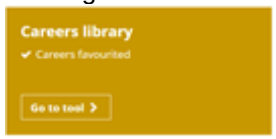
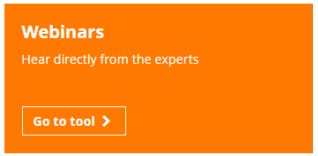
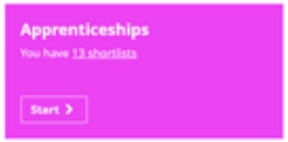
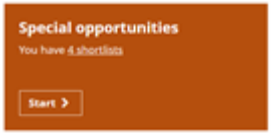
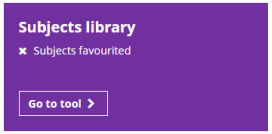
		GCSE topics Waves and Radiation					
13							

Science: Key Stage 4 & 5: Linking Curriculum Learning to Careers – GB4

You will find a dedicated section in the Resources Library - GB4 Linking Curriculum Learning to Careers. Here there are dozens of resources which can be found pertinent to most subjects.

Careers/Gatsby benchmark links				
Links to careers/jobs	Career Talks (Possible contacts)	Career and labour market information	Work place visits	Encounters wither higher/further education
Unifrog – student side  https://www.unifrog.org/student/careers **Student side** **→ careers library** **SEARCH→ Biology, Chemistry, Physics** https://www.prospects.ac.uk/job-profiles/browse-sector Use this website to browse jobs in science sectors- to find salaries, skills, qualifications, responsibilities	Unifrog – student side -  https://www.unifrog.org/student/webinars **Range of webinars on Unifrog linked to Science including:** **→Subject discovery: Medicine** If you are fascinated by how the human body works and have a genuine concern for the welfare of others, Medicine could be the perfect course for you. **→Subject discovery: Liberal Arts and Sciences Ever wondered what it would be like to study one of the oldest subjects in the**	LMI for all widget to compare jobs – pay and growth in those sectors – bottom of page on this link https://www.altrinchamcollege.com/careers/websites Unifrog – Student side  Research over 1000 career profiles by subject area which includes a full range of up-to-date national and regional LMI. 	Unifrog – student side  Search over 2000 Virtual WEX opportunities as well as numerous residential and summer schools. Students can search Virtual WEX opportunities by subject area.  See AC careers bulletin – you could select any	Unifrog - student side  search your subject area to find University course videos/info https://www.unifrog.org/student/subjects/school-subjects https://www.unifrog.org/student/subjects/area-sciences **Student side** **→ subject's library** **SEARCH→ Sciences / Biology, Chemistry, Physics**

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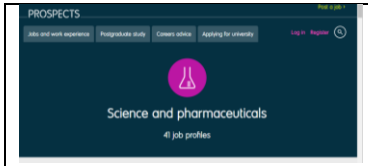

https://www.prospects.ac.uk/job-profiles/browse-sector/energy-and-utilities

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https://www.prospects.ac.uk/job-profiles/browse-sector/transport-and-logistics

world? Liberal Arts is one such subject – it goes back to the Ancient Greeks, who considered a liberal arts education to be the ultimate mark of an educated person.
→Subject discovery: Engineering If you're seeking a future that revolves around innovation and assisting mankind in reaching new heights (literally, in the case of Aeronautical Engineering!), a degree in Engineering is the one for you.
→Subject discovery: Psychology How do children acquire language? Why do we forget things? What makes a good leader? If these sorts of questions interest you, tune in to learn more about Psychology.

National careers week talks 2021 - career clips
T:\Careers & Enterprise\$Career talks\$National Careers Week Talks 2021\$$Recordings

https://icould.com/explore/categories/subject/science/
Over 170 science job profiles – including lots of videos

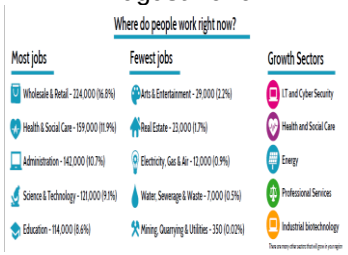
https://www.unifrog.org/student/apprenticeships/standards

Research all live apprenticeship and traineeship opportunities including a range of LMI covering jobs available, average salary and employment rate.

https://www.prospects.ac.uk/employer-profiles

Job profiles include recent LMI
https://www.prospects.ac.uk/job-profiles/browse-sector

Greater Manchester LMI – August 2020

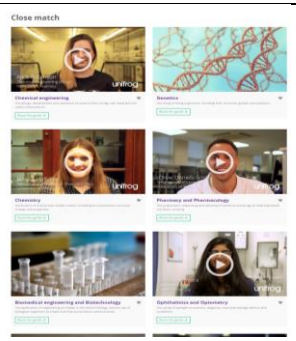


suitable virtual work experiences

https://www.prospects.ac.uk/jobs-and-work-experience/work-experience-and-internships

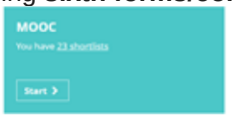
Create an account to see live virtual work experience opportunities
https://www.springpod.co.uk/virtual-work-experience-programmes

Medicine virtual work experience opportunities
→https://medicmentor.co.uk/university-hospitals-birmingham-trust-virtual-work-experience/
→https://bsmsoutreach.thinkific.com/courses/VWE
→https://join.springpod.co.uk/medicine-virtual-work-experience/?gclid=EAIaIQobChMIztDIvYKh8AIVjtd3Ch3DNQ6dEAAYASAAEgJOZfD_BwE



Unifrog – student side

Search **Universities** - Undergraduate courses in the UK as well as every FE course including **sixth forms/college**.



KS4/5 - Find a suitable **MOOC** linked to your Science get a taste for what it's like to study a module at university.

For example
Meiosis and mitosis- On demand so get started any time - The Open University -
8 hours to complete

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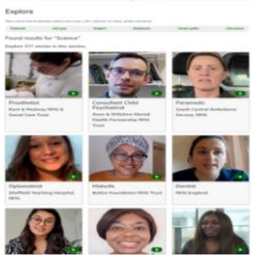
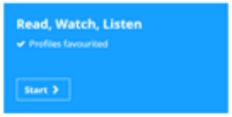
https://www.prospects.ac.uk/job-profiles/browse-sector/social-care				**Digital forensics** On demand so get started any time- The Open University - 7 weeks to complete - 8 hours to complete **Making Sense of Climate Science Denial -** On demand so get started any time - The University of Queensland - 7 weeks to complete **Nanotechnology and Nanosensors, Part1** On demand so get started any time - Technion - Israel Institute of Technology - 60-100 hours of videos and quizzes **Basic Analytical Chemistry** On demand so get started any time - The University of Tokyo - 6 weeks to complete  **Student side - Read watch listen – SEARCH → Biology, chemistry, physics** For 1000s of wider reading materials, from journals and articles to podcasts and ted talks **GM higher – search for a 'What can I study' at University for Sciences – 5 minute video** https://gmhigher.ac.uk/resources/what-can-i-study-part-2-sciences/

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