

Year 12 Exam Week Preparation

Year Group:	12
Subject:	Applied Science

Details of exam

Paper to be sat:	3 x 40-minute papers- separate papers for Biology, Chemistry and Physics (as per the Unit 1 exam).
Topics to be covered in the exam:	<p><u>CHEMISTRY</u></p> <p>A1 Structure and bonding in applications in science</p> <ul style="list-style-type: none"> • Understand the electronic structure of atoms: electronic orbitals, Aufbau principle, Bohr theory. • Understand ionic bonding: strong electrostatic attraction between oppositely charged ions, the effects ionic radius and ionic charge have on the strength of ionic bonding, formation of ions in terms of electron loss or gain, electronic configuration diagrams of cations and anions. • Understand covalent bonding: strong electrostatic attraction between two nuclei and the shared pair(s) of electrons between them, dot and cross diagrams to show electrons in simple covalent molecules including those with multiple bonds and dative covalent (coordinate) bonds, the relationship between bond lengths and bond strengths in covalent bonds, tetrahedral basis of organic chemistry. • Understand metallic bonding: de-localised electrons, positive metal ions o regular layer structure. • Understand the following intermolecular forces: van der Waals, dipole-dipole, hydrogen bonding. • Understand the following: balanced equations, relative atomic mass, atomic number and relative molecular mass, moles, molar masses and molarities. • Understand the quantities used in chemical reactions: mass, volume of solution, concentration, reacting quantities, percentage yields. <p><i>A2 (Production and uses of substances in relation to properties) will not be covered in this mock.</i></p> <p><u>BIOLOGY</u></p> <p>B1 Cell structure and function</p> <ul style="list-style-type: none"> • Know that cell theory is a unifying concept stating that cells are a fundamental unit of structure, function and organisation in all living organisms. • Understand the ultrastructure and function of organelles in the following cells: <ul style="list-style-type: none"> prokaryote cells (bacterial cell) – nucleoid, plasmids, 70S ribosomes, capsule, cell wall eukaryotic cells (plant and animal cells) – plasma membrane, cytoplasm, nucleus, nucleolus, endoplasmic reticulum (smooth and rough), Golgi apparatus, vesicles, lysosomes, 80S ribosomes, mitochondria, centriole eukaryotic cells (plant-cell specific) – cell wall, chloroplasts, vacuole, tonoplast, amyloplasts, plasmodesmata, pits.

- Recognise cell organelles from electron micrographs and the use of light microscopes.
- Understand the similarities and differences between plant and animal cell structure and function.
- Understand how to distinguish between gram-positive and gram-negative bacterial cell walls and why each type reacts differently to some antibiotics.
- Calculate magnification and size of cells and organelles from drawings or images.

B2 Cell specialisation

Understand cell specialisation in terms of structure and function, to include:

- palisade mesophyll cells in a leaf
- sperm and egg cells in reproduction
- root hair cells in plants
- white blood cells
- red blood cells.

B3 Tissue structure and function

- Understand the structure and function of epithelial tissue, to include: squamous cells as illustrated by the role of alveolar epithelium in gas exchange to include the effect of chronic obstructive pulmonary disease (COPD) in smokers AND columnar cells as illustrated by goblet cells and ciliated cells in the lungs to include their role in protecting lungs from pathogens.,
- Understand the structure and function of endothelial tissue, as illustrated by blood vessels in the cardiovascular system, including the risk factors that damage endothelial cells and affect the development of atherosclerosis.
- Understand the structure and function of muscular tissue, to include: the microscopic structure of a skeletal muscle fibre, structural and physiological differences between fast- and slow-twitch muscle fibres and their relevance in sport.
- Understand the structure and function of nervous tissue, to include: non-myelinated and myelinated neurones, the conduction of a nerve impulse (action potential) along an axon, including changes in membrane permeability to sodium and potassium ions and the role of the myelination in saltatory conduction, interpretation of graphical displays of a nerve impulse and electrocardiogram (ECG) recordings, synaptic structure and the role of neurotransmitters, including acetylcholine, how imbalances in certain, naturally occurring brain chemicals can contribute to ill health, including dopamine in Parkinson's disease and serotonin in depression, the effects of drugs on synaptic transmission, including the use of L-Dopa in the treatment of Parkinson's disease.

PHYSICS

C1 Working with waves

- Understand the features common to all waves and use the following terms as applied to waves: periodic time, speed, wavelength, frequency, amplitude, oscillation.
- Graphical representation of wave features.
- Understand the difference between the two main types of wave: transverse, longitudinal.
- Understand concepts of displacement, coherence, path difference, phase difference, superposition as applied to diffraction gratings.
- Understand the industrial application of diffraction gratings, to include:

	<p>emission spectra, identifying gases.</p> <ul style="list-style-type: none"> • Be able to use the wave equation: $v = f \lambda$ • Understand the concept and applications of stationary waves resonance. • Musical instruments. • Be able to use the equation: calculation of speed $v = \sqrt{T/\mu}$ <p><i>C2 (Waves in communication) and C3 (Use of electromagnetic waves in communication) will not be assessed in this mock.</i></p>
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Materials to support your revision

Link to Online Resources:	<p>There are no specific online resources for BTEC Applied Science level 3. Each student will be provided with a revision booklet (produced in house) which contains exam questions.</p> <p>There is also a published revision workbook available from the LRC (£6) along with a limited number of published revision guides (£6).</p>
Link to exemplar questions or past papers to use:	<p>https://qualifications.pearson.com/en/qualifications/btec-nationals/applied-science-2016.coursematerials.html#filterQuery=Pearson-UK:Category%2FSpecification-and-sample-assessments</p> <p>https://qualifications.pearson.com/en/qualifications/btec-nationals/applied-science-2016.coursematerials.html#filterQuery=category:Pearson-UK:Unit%2FUnit-1&filterQuery=category:Pearson-UK:Category%2FExternal-assessments</p>
Link to model answers or mark schemes:	See above