

SCHEME OF WORK

DEPARTMENT: Physics

COURSE: PHB

Tutor B

LEVEL: A level Year 1

BOARD: AQA

CODE: 7408

Notes

Textbook references are from AQA Physics – Breithaupt. The assignments column serves as a guide only; students may find this useful as a source of additional practice questions, or to assist with catching up on work missed. Supporting experimental work will be supervised by tutor A and consist of introductory experiments, individual experiments completed on a 'circus' basis and more investigatory exercises. Practical work embodies the content of section 3.1 'Measurements and their errors'

WEEK & TUTOR	ROUTE THROUGH THE SPECIFICATION BY TOPIC or UNIT	LEARNING AND TEACHING ACTIVITIES (Highlighting differentiation)	ASSIGNMENTS	EDUCATIONAL RESOURCES USED (Type and Location)
1	<u>3.1.1 Use of SI units and their prefixes</u> Introduction to A/AS level physics; Quantities and Units; number work; Standard form; Prefixes; significant figures	Exercises and problems.	Exercises on Godalming Online	Godalming Online

2– 4	<u>3.4.1 Mechanics</u> Motion along a straight line. Displacement, speed, velocity and acceleration. Representation by graphical methods of uniform and non-uniform acceleration, interpretation of velocity-time and displacement-time graphs for uniform and non uniform acceleration, significance of areas and gradients. Equations for uniform acceleration; Acceleration due to gravity, g. Terminal speed.	Experiment: Measurement of g by free fall	Text P. 112 – 125 Summary Qu. P. 113, 115, 118, 121, 123, 125 Practical reports Introduction to using spreadsheets in Physics	Demonstration apparatus; textbooks; problem books Lab apparatus; reference worksheets / GO
5-6	Scalars and vectors The addition of vectors by calculation or scale drawing. The resolution of vectors into two components at right angles to each other. Projectile motion - Independence of vertical and horizontal motion.	Demonstration: Pulsed water jet	Text P. 126 – 129 Summary Qu. P. 127, 129 Exam Qu. P. 130 - 131	Demonstration apparatus; textbooks; problem books
7	Newton's laws of motion Knowledge and application of the three laws of motion in appropriate situations. $F = ma$ for constant mass, Momentum, Force as the rate of change of momentum, Impulse = change in momentum,	Experiments: Relationship between force, mass and acceleration,	Text P. 132 – 145 Summary Qu. P. 134, 137, 139, 142, 145 Exam Qu. 146 - 147 Practical reports	Demonstration apparatus; textbooks; problem books Lab apparatus; reference worksheets / GO

8 - 13	Moment of a force about a point, couples and torque. The principle of moments and its applications in simple balanced situations. Centre of mass. The resolution of vectors into two components at right angles to each other. Conditions for equilibrium for two or three coplanar forces acting at a point.	Experiments: Conservation of linear momentum – motion sensor, Conservation of momentum in explosions	Breithaupt text. Text P. 4 – 17 Summary Qu. P. 7, 10, 13, 15, 17 Exam Qu. P. 18 - 21 Practical reports	
14-15	Conservation of linear momentum, Elastic and inelastic collisions; explosions.	Question and answer	N.b. This topic is covered in the A2	Demonstration apparatus; textbooks; problem books; Video
16 - 17	Work, energy and power. Efficiency. Conservation of energy – applied to examples involving gravitational potential energy, kinetic energy and work done against resistive forces.		Text P. 148 – 159 Summary Qu. P. 150, 152, 154, 156, 159 Exam Qu. 160 - 161	Demonstration apparatus; textbooks; problem books;
18 – 22	<u>3.2.2 Electromagnetic Radiation and Quantum Phenomena</u> The photoelectric effect. Work function, threshold frequency, photoelectric equation. Collisions of electrons with atoms. The electron volt, ionisation and excitation, the fluorescent tube. Energy levels and photon emission. Line spectra. Wave-particle duality. Electron diffraction, the de Broglie wavelength.	Experiment: Estimate of Planck's constant from LED.	Text P. 30 – 43 Summary Qu. P. 31, 33, 35, 38, 40, 43 Exam Qu. P. 44 - 45 Practical reports	Demonstration apparatus; textbooks; problem books; video Lab apparatus; reference worksheets / GO

23 – 24	<u>3.2.1 Particles</u> Constituents of the atom. Proton, neutron, electron. Proton number Z, nucleon number A, nuclide notation, isotopes. Stable and unstable nuclei. The strong nuclear force; its role in keeping the nucleus stable; Equations for alpha decay and β - decay including the neutrino.	Experiment: Using radioactivity	Text P. 4 – 7 Summary Qu. P. 5, 7 Practical reports	Lab apparatus; reference worksheets / Godalming Online
25	Particles, antiparticles and photons. Comparison of particle and antiparticle masses, charge and rest energy in MeV. Annihilation and pair production. Photon model of electromagnetic radiation, the Planck constant.	.Teacher explanation Question and answer Problem solving	Text P. 8 – 12 Summary Qu. P. 9, 12	Textbooks; problem books; question sheets; PowerPoint; GO
26	Particle interactions. Exchange particles; virtual photons, W^+ and W^- particles. Feynman diagrams		Text P. 13 – 19 Summary Qu. P. 15 Exam Qu. P. 16 - 17	Textbooks; problem books; question sheets; PowerPoint; GO; video

27	Classification of particles Hadrons: baryons and mesons. Leptons: electron, muon, neutrino. Quarks and antiquarks.	Teacher explanation Question and answer Problem solving	Text P. 18 – 27 Summary Qu. P. 19, 21, 23, 25, 27 Exam Qu. P. 28 - 29	Textbooks; problem books; question sheets; PowerPoint; GO
28	Up (u), down (d) and strange (s) quarks. Combinations of quarks and antiquarks. Application of conservation laws to particle interactions. Strangeness. Change of quark character in β^- and β^+ decay..			
29	Revision		Exam Qu. P. 82 - 87 Exam Qu. P. 208 - 215	Revision handbooks / past questions.