Subject: Physics
Year: 10

Richmond School & Sixth Form College
Striving for Excellence

Overview:

Students have 5 physics lessons a fortnight during which we develop increasingly complex and demanding physics concepts, processes and skills. A range of topics are taught, which build on the learning from Year 9. Independent learning is set every week which follows learning in lessons so students have the chance to revisit and embed knowledge. We have three big assessments in the year, and leading up to these assessments we have revision lessons where we teach and develop good revision techniques.

Careers in the Curriculum:

The topics covered will highlight links to careers in electrical engineering, mechanical engineering, nuclear engineering, me dical physics, electrician.

Term	Topic	Assessment
Aut1	P4 - Atomic Structure • History and model of the atom • Half-life • Uses and risks of nuclear radiation P1 - Energy • Recap of P1 lessons from Year 9 • Infrared radiation	Aiming High 1 test in mid-October assessing all of the topics taught up to that point.
Aut2	P1 - Energy • Potential and kinetic energy stores • Specific Heat Capacity P3 - Particle Model of Matter • Recap of P3 lessons from Year 9 • Internal energy and changes of state • Specific latent heat • Particle Motion in gases	Formative assessment in class through the use of show me boards and questioning.
Spr1	P2 - Electricity • Static electricity and electric fields • Resistance and I-V characteristics • Series and parallel circuits • Investigating resistance	Aiming High 2 test in late January assessing all of the topics taught up to that point.
Spr2	P2 - Electricity • Electricity in the home • Power of electrical appliances • National grid P5 - Forces • Recap of P5 lessons from Year 9 • Forces and elasticity	Formative assessment in class through the use of show me boards and questioning.
Sum1	P5 - Forces • Moments • Fluid pressure, upthrust and atmospheric pressure P6 - Waves • Recap of P6 lessons from Year 9 • Transverse and longitudinal waves	Formative assessment in class through the use of show me boards and questioning.
Sum2	Revision • Past paper revision questions to practice techniques including evaluate, compare and data interpretation questions. P6 - Waves • Reflection and reflection	Formative assessment in class through the use of show me boards and questioning. PPE in mid-June assessing all of the topics taught up to that point.

Subject: Physics
Year: 11

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Overview:

Students are taught the final topics from GCSE physics. Lessons focus on developing application, analytical and data processing skills by using past paper questions as part of lessons. Required practicals are carried out alongside regular practicals so we continue to develop practical skills. Independent learning continues to be set each week which supports retention of knowledge and skills developed in lessons. We have two major assessments in the year, and of course the big focu s is the final exam in the summer. Revision lessons precede these assessments where we refine revision skills and hone knowledge and techniques.

Careers in the Curriculum:

The topics covered will highlight links to careers in astronomy, mechanical engineering, mechanical engineering, acoustic engineers, sport science, opticians, audiologist.

Term	Topic	Assessment
Aut1	P6 - Waves • Recap of electromagnetic waves from Year 9 • Lenses and ray diagrams • Visible light and Blackbody radiation • Sound waves, ultrasound, seismic waves	Formative assessment in class through the use of show me boards and questioning.
Aut2	P6 - Space Physics • Life cycle of stars • Redshift and the Big Bang P5 - Forces • Resultant forces and Newton's Laws	Aiming High 1 test in early November assessing all of the topics taught up to that point.
Spr1	P5 - Forces • Investigating motion • Stopping distances and braking distances • Momentum	Formative assessment in class through the use of show me boards and questioning.
Spr2	Revision • Past paper revision questions to practice techniques including evaluate, compare and data interpretation questions. P7 - Magnets and Electromagnetism • Magnets and electromagnets • Motor effect, electric motors and loudspeakers • Generator effect, generators and microphones • Transformers	PPE in mid-February assessing all of the topics taught up to that point.
Sum1	Revision • Past paper revision questions to practice techniques including evaluate, compare and data interpretation questions. • Review of all topics	Formative assessment in class through the use of show me boards and questioning.
Sum2	Revision and exam preparation	Final exams.

Subject: Physics
Year: 12

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Striving for Excellence

Overview:

Year 12 Physics builds on the knowledge and skills developed at GCSE. Topics will feel familiar but the depth of knowledge will be greater so more intensive lesson preparation and review is initiated. All lessons are shared online and students are encouraged to complete notes prior to the lesson. Independent learning tasks are set weekly to embed learning. Practical work is carried out throughout the whole year with skills developed and stretched. Practical competency is monitored by the completion of series of set tasks which are written up in a lab book.

Careers in the Curriculum:

The topics covered will highlight links to careers in particle physics, electrical engineering, mechanic engineering, material scientist, medical physics,

Term	Topic	Assessment
Aut1	**Unit 1 - Measurements and their errors** • This unit is covered continually across the two years of a level physics in all units and is revisited in every required practical lab report. **Unit 2 - Particles and Radiation** • Atomic structure, stable and unstable nuclei • Particles and Antiparticles • Classification of particles and quarks **Unit 4 - Mechanics** • Forces and moments • Displacement-Time, Velocity-Time and Acceleration-Time graphs	Progress tests at the end of each term to assess progress. Practical skills assessed in lessons.
Aut2	**Unit 2 - Particles and Radiation** • The Photoelectric Effect • Energy levels and photon emission • Waves particle duality **Unit 4 - Mechanics** • Acceleration due to gravity • Projectile Motion • Newton's laws of motion • Unit 5 - Electricity • Current, potential difference and resistance	Progress tests at the end of each term to assess progress. Practical skills assessed in lessons.
Spr1	**Unit 3 - Waves** • Progressive waves, stationary Waves **Unit 5 - Electricity** • I/V characteristics • Resistivity and superconductivity • EMF and internal resistance	Progress tests at the end of each term to assess progress. Practical skills assessed in lessons.
Spr2	**Unit 3 - Waves** • Diffraction and diffraction gratings • Interference, refraction **Unit 5 - Electricity** • Conservation of energy, potential Dividers **Unit 4 - Mechanics** • Momentum and Impulse • Work and power	Progress tests at the end of each term to assess progress. Practical skills assessed in lessons.
Sum1	**Unit 4 - Mechanics** • Conservation of energy and efficiency **Unit 3 - Waves** • Waves required practicals **Unit 5 - Materials** • Stress and Strain • The Young Modulus **Unit 6 - Further Mechanics** • Circular Motion	Progress tests at the end of each term to assess progress. Practical skills assessed in lessons.
Sum2	Revision **Unit 6 - Further Mechanics** Simple harmonic motion **Unit 7 - Fields and their Consequences** Gravitational Fields	Pre-Public Exams (PPEs) in mid June covering all of the learning from year 1 of A level Physics (units 1 to 5)

Subject: Physics
Year: 13

Richmond School & Sixth Form College
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Overview:

Year 13 physics continues in the same fashion as Year 12 but with more complex topics that require students to use a wider range of multidisciplinary knowledge. We focus on developing application and investigative skills in Year 13 developing ever more critical thinking. Independent learning tasks are set weekly to embed learning. Practical work is carried out throughout the whole year with skills developed and stretched. Practical competency is monitored by the completion of series of set tasks which are written up in a lab book.

Careers in the Curriculum:

The topics covered will highlight links to careers in nuclear physics, nuclear engineering, electrical engineering, theoretical physics, astrophysicist.

Term	Topic	Assessment
Aut1	**Unit 7 - Fields and their consequences** • Gravitational potential • Electric Fields • Electric Potential **Unit 6 - Thermal Physics** • Gas Laws • Ideal gas equation • Kinetic theory	Progress tests at the end of each term to assess progress. A progress test in mid September (A Level paper 2 - topics 1-6). Practical skills assessed in lessons.
Aut2	**Unit 7 - Fields and their consequences** • Magnetic Fields • Electromagnetic induction • Induction laws and alternators • Capacitors • Charging and discharging capacitors • Alternating current • Transformers	Progress tests at the end of each term to assess progress. Practical skills assessed in lessons.
Spr1	Revision for PPEs **Unit 8 - Nuclear Physics** • Rutherford scattering • Radioactive emissions	Pre-Public Exams (PPEs) in late January covering all of the learning from year 1 and 2 of A-level Physics (Units 1-6: Paper 1, Unit 7 and practical skills - Paper 2.)
Spr2	**Unit 8 - Nuclear Physics** • Exponential law of decay • Nuclear decay • Nuclear Fission and Fusion • Binding Energy **Unit 9 - Astrophysics** • Optical and non-optical Telescopes	In class PPE for nuclear physics (from A Level Paper 2). Practical skills assessed in lessons.
Sum1	**Unit 9 - Astrophysics** • Distances and Magnitudes • Spectral classes and HR diagrams • Stellar evolution • Doppler effect and Redshift • Quasars and exoplanets	In class PPE for Astrophysics (Paper 3B).
Sum2	Exam preparation and revision.	Final exams.