Physics **SOW** & **Required Practical** (2023-2024)**: Y12** (A1)

**AQA A-level Physics: 7408**

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 **Year 12:** *(green=covered)*

1. **Particles and radiation**
2. **EM radiation and Q phenomena**
3. **Waves**
4. **Mechanics….**
5. **Materials**
6. **Electricity**

 ***(Y13):***

 ***7. Further mechanics***

 ***8. Gravitational and electric field***

 ***9. Electromagnetism***

 ***10. Capacitors***

 ***11. Nuclear physics***

 ***12. Thermal physics***

 ***13. Astrophysics (option)***

**Curriculum intent:**

A level Physics aims to consolidate and extend learning of themes from the GCSE course and develop these further, piquing interest in new and exciting areas of research (such as theoretical and quantum physics and cosmology), deepening understanding of established topics (such as electricity and forces) and strengthening the links between key concepts, leading on to larger overarching topics that may span across a number of other subject areas such as Chemistry, Maths, Technology and Engineering. The course has a mandatory component of assessed practicals (and an assessed lab book) which must satisfy exam board criteria to allow awarding of the A level with ‘practical endorsement’ desired by universities nationally. This programme allows students to develop practical, analysis and evaluative skills as well as introduce statistical analysis necessary for university undergraduate study.

**We have chosen AQA A-level Physics as we are STEM academy, thus there are lots of cross-over and we also tech cross-curricular methods. Furthermore, AQA Physics has many practical and industrial components making AQA Physics very relevant for apprenticeship and university degrees.**

**Curriculum Implementation:**

The course is delivered as 5 lessons weekly. The curriculum is designed to build on and extend concepts from GCSE such as forces (Kinetic energy and gravitational potential energy) motion of equations (distance time graphs, acceleration, projectile motion) but with an introduction to complex and newer areas of Science such as Cosmology and wave particle duality. **We have built in assessment points to allow feedback for students and parents on progress and address weaknesses early on in the course and put in place support if needed.**

**Curriculum impact:**

Students will deepen their understanding of an extensive range of applications of Physics in the real world and gain insight into the fundamental laws of nature governing the functioning of the universe. They will enhance their scientific research techniques, both physical and analytical, by applying higher GCSE level mathematical skills (with a minimum 40% application of math skills) and acquiring new proficiency in statistical mathematics.

Moreover, students will expand their knowledge and understanding of the impact of forces, including areas like automotive design, material science, and the fundamental laws that govern the formation of atoms to galaxies. They will come to appreciate the significance and importance of physicists and their roles in medicine and the NHS.

Furthermore, students will develop independent learning techniques, including research and essay writing, to prepare themselves for university-based assessments.

**Most students should attain grade C or above to progress to A-level Physics. Those who score below grade C will have a formal meeting with the HOD and principals to ascertain their next step in the A-level programme (at the end of Year 12).**

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| **Week** | **Date** | **Topic** | **Cross-curricular** | **Additional notes/spec code** |
| W1 | 04-09-23 | * N/A
* N/A
 |  | **Monday (4th ) INSET day** |
|  W2 | 11-09-23 | * N/A
* Introduction of A Level Physics
* Introduction to Experimentation and recap of “Atomic Physics from KS4”
 | Experimental techniques in A-level Biology, Chemistry & Physics*All 3 science practical skills such measurement of length, volume, mass, conversion of units and error analysis,*PS 1.1 to PS 4.1*and mathematical skills*MS 0.0 to MS 4.3 | Spec\_ref: 3.11 to 3.1.3 |
|  W3 | 18-09-23 | * 1.1 Atomic Structure
* 1.2 Stable and Unstable Nuclei
* 1.3 Antiparticles and Photons
 | Chemistry: Atomic structure 3.1.1.1 to 3.1.2.2  | 1. **Particles and radiation**

Spec\_ref: 3.2.1.1 to 3.2.1.7 |
|  W4 | 25-09-23 | * 1.4 Classifications
* 1.5 Quarks
* 1.6 Particle Interaction
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|  W5 | 02-10-23 | * Summary and review
* Revision & summary: Pre-test
* EOU test
 |  |  |
|  W6 | 09-10-23 | * Evaluation of EOU test
* 2.1 The Photoelectric effect
* 2.2 Energy Levels in Atom
 | ChemistryElectron configuration: 3.1.1.3Energy levels in atom and shells  | 1. **EM radiation and Q phenomena**

**Spec\_ref: 3.2.1.1 to 3.2.2.4**Blended learning: Friday 13th |
|  W7 | 16-11-23 | * 2.3 Wave -Particle Duality
* Summary and Review
* **EOU Test**
 |  |  |
|  W8 | HT(23-10-23) |  |  |  |
|  W9 | HT(30-10-23) |  |  |  |
|  W10 | 06-11-23 | * FD and review
* 3.1 Recap of KS4 Waves
* 3.2 Nature of Waves
 |  | 1. **Waves**

Spec\_ref: 3.3.1.1 to 3.3.2.3 |
|  W11 | 13-11-23 | * 3.3 Transverse and Longitudinal Waves
* Superposition and Interference
* 3.5 Stationary Waves
 |  |  |
|  W12 | 20-11-23 | * 3.6 Diffraction and standing Waves
* RP1: Investigating Resonance frequency
* 3.7 Interference
 |  | *Will take place on W15***✓**To assess: CPAC 1a CPAC 2a, CPAC 2b, & CPAC 3a & CPAC 3b |
|  W13 | 27-11-23 | * 3.8 Diffraction grating
* RP2: Determination of wavelength of a RED Laser Light using Double Slit interference
* RP2: Determination of wavelength of a RED Laser Light using Diffraction Grating
 |  | *Will take place on W15* **✓ ✓**To assess: A range of CPACs assessed, see Tracker  |
|  W14 | 04-12-23 | * 3.9 Refractive Index
* 3.10 Critical Angle and TIR
* Review and recap
 |  | Blended learning: Friday 8th |
|  W15 | 11-12-23 | * EOU test
* FD and Evaluation of EOU test

Buffer |  |  |
|  W16 | 18-12-23 | * 4.1 Scalars and Vectors
* 4.2 Forces in Equilibrium
* 4.3 Moments
 | A-level maths: Applied maths have already covered some basics mechanics, before we start mechanics in PhysicsEdexcel 9MA0Section 2.7: KinematicsSection 2.8: Forces and Newton’s lawsSection 2.9: Moments | 1. **Mechanics**

**Spec\_ref: 3.4.1.1 to 3.4.1.8*****School breaks on Thursday 21st*** |
|  W17 | HT(25-12-23) |   |  | **Winter break:**BANK holiday Monday 25th and Tuesday 26th |
|  W18 | HT(01-01-24) |  |  | BANK holiday Monday 1st |
|   |  |  |  | **Schools opens Tuesday 4th of Jan** |
|  W19 | 08-01-24 | * 4.4 Acceleration / Acceleration Time graph
* 4.5 Displacement Time graph & Velocity Time graph
* 4.6 Newton’s Law of Motion
 |  | *We are about 2 weeks behind due to changes in the time table of INSET days and extra-curricular activities* |
|  W20 | 15-01-24 | * 4.6 Newton’s Law of Motion
* Buffer
* Buffer
 |  |  |
|  W21 | 22-01-24 | * 4.1 Half-way Summary and Review
* Exam Type Qs
* Evaluation and FD
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|  W22 | 29-01-24 | * 4.7 Acceleration due Gravity & Projectile Motion
* 4.8 Drag, Lift and Terminal Velocity
* 4.9 Conservation of Momentum
 |  |  |
|  W23 | 05-02-24 | * 4.10 Force, Momentum and Impulse
* 4.11 Work and power
* 4.12 Conservation of energy
* RP3: Determining acceleration due to gravity.
 |  | **INSET day Thursday 8th and Friday 9th**To assess: A range of CPACs assessed, see Tracker  |
|  W24 | 12-02-24 | * Recap of Section 4 & appraisal of work in coming weeks
* EOU test
* Evaluation of Test
 |  |  |
|  W25 | HT(19-02-24) |  |  |  |
|  W26 | 26-02-24 | * 5.1 Density
* 5.2 Hooks Law
* 5.3 Stress and Strain
 |  | 1. **Materials**

Spec\_ref: 3.4.2.1 to 3.4.2.2 |
|  W27 | 04-02-24 | * 5.4 The Young Modulus
* RP4: Determining the Young Modulus of a material
* Evaluation of RP
 |  | **INSET day Friday 8th** |
|  W28 | 11-03-24 | * 5.5 Stress-Strain and Force-Extension Graph
* 5.6 Brittle material
* Review and Summary
 |  | To assess: CPAC 2b, CPAC 2a, & CPAC 2c |
|  W29 | 18-03-24 | * EOU test
* Evaluation of EOU test
* “Buffer”
 |  |  |
|  W30 | 25-03-24 | * Recap of KS4 Electricity
* 6.1 Circuits and recaps
* 6.2 *I-V* Characteristics
 |  | 1. **Electricity**

Spec\_ref: 3.5.1.1 to 3.5.1.6BANK holiday Friday 29th |
|  W31 | HT(01-04-24) |  |  | **Easter break:**BANK holiday Monday 1st |
|  W32 | HT(08-04-24) |  |  |  |
|  W33 | 15-04-24 | * 6.3 Resistivity
* RP5: Determining the Resistivity of a Wire
* Evaluation of the practical
 |  | To assess: Cpac1a CPAC 2b, CPAC 2a, & CPAC 2c, CPAC 3a, CPAC3b |
|  W34 | 22-04-24 | * 6.4 Power, electrical energy and emf
* RP6: Measuring the Internal Resistance and e.m.f of a Cell
* Write-up of RP6
 |  | To assess: Cpac1a CPAC 2b, CPAC 2a, & CPAC 2c, CPAC 3a, CPAC3b |
|  W35 | 29-04-24 | * 6.5 Conservation of Energy and Charge in a Circuit
* 6.6 The Potential Divider
* Review and Summary
 |  |  |
|  W36 | 06-05-24 | * EOU test
* Evaluation of EOU test
* Buffer
 |  | BANK holiday Monday 6th |
|  W37 | 13-05-24 | * Buffer
* Buffer
* Buffer
 |  |  |
|  W38 | 20-05-24 | * Revision
* Revision
* Revision
 |  |  |
|  W39 | HT(27-05-23) |  |  | BANK holiday Monday 27th |
|  W40 | 03-06-23 | * Review and catch-up
* Review and catch-up
* Review and catch-up
 |  |  |
|  W41 | 10-06-23 | * Revision & catch-up
* Revision & catch-up
* Revision & catch-up
 |  |  |
|  W42 | 17-06-23 | * Exam
* Exam
* Exam
* Exam
 |
|  W43 | 24-06-23 |
|  W44 | 01-07-23 | * FD
* FD
* FD
 |  |  |
|  W45 | 08-07-23 | * **Y13 material**
* **Y13 material**
* **Y13 material**
 |  |  |
|  W46 | 15-07-23 | * Extra-curricular practical activities
* Extra-curricular practical activities
 |  |  |
|  W47-52 | 22-07-23END of the academic Year | **Summer break: *School breaks Friday 19th*** |