**AQA GCSE Physics, and Combined Science – Physics topics, Grade 8 to 9 Booster workbook**

***Grey shading indicates Physics only***

|  |  |  |  |
| --- | --- | --- | --- |
| **Section** | **Topic** | **Page No.** | **Single science specification reference** |
| **1 Energy changes in a system** | Energy stores and systems | 4 | 4.1.1.1 |
| Calculating energy changes | 4-6 | 4.1.1.2 (NB energy stored in a spring is also included in section 5 Forces) |
| Calculating energy changes when a system is heated | 6-8 | 4.1.1.3, 4.3.2.2; Required practical activity 1 |
| Work and power | 8-9 | 4.1.1.4 (NB work done is covered again in section 5 Forces) |
| Conservation of energy | 9-10 | 4.1.2.1 (part) |
| Ways of reducing unwanted energy transfers | 10-11 | 4.1.2.1 (remainder); Required practical activity 2 (the required practical is physics only) |
| Efficiency | 11-12 | 4.1.2.2 |
| National and global energy resources | 12 | 4.1.3 |
| **2 Electricity** | Circuit diagrams | 13 | 4.2.1.1 |
| Electrical charge and current | 13-14 | 4.2.1.2 |
| Electrical resistance | 14-16 | 4.2.1.3; Required practical activity 3 |
| Resistors and *I*-*V* characteristics | 17-19 | 4.2.1.4; Required practical activity 4 |
| Series and parallel circuits | 19-20 | 4.2.2 |
| Mains electricity | 21 | 4.2.3.1 and 4.2.3.2 |
| Energy changes in circuits  | 21-23 | 4.2.4.2 |
| Electrical power | 24 | 4.2.4.1 |
| The National Grid | 25-26 | 4.2.4.3  |
| Static electricity | 26 | 4.2.5.1 (Physics only) |
| Electric fields | 27 | 4.2.5.2 (Physics only) |
| **3 Particle model of matter** | Density | 28-30 | 4.3.1.1; Required practical activity 5 |
| Changes of state | 30-31 | 4.3.1.2 |
| Internal energy and specific latent heat | 31-33 | 4.3.2.1, 4.3.2.3 (NB specific heat capacity, 4.3.2.2 has been included in Section1 Energy changes in systems ) |
| Particle motion in gases | 34 | 4.3.3.1 |
| Increasing the pressure of a gas | 35-36 | 4.3.3.2 and 4.3.3.3 (both Physics only) |
| **4 Atomic structure** | Protons, neutrons and electrons | 37 | 4.4.1.1 (part) |
| The size of atoms | 37-38 | 4.4.1.1 (remainder) |
| Elements and isotopes | 38-39 | 4.4.1.2 (part) |
| Electrons and ions | 39 | 4.4.1.2 (remainder) |
| Discovering the structure of the atom | 40-41 | 4.4.1.3 |
| Radioactive decay | 41 | 4.4.2.1 (part) |
| Comparing alpha, beta and gamma radiation | 41-42 | 4.4.2.1 (remainder) |
| Radioactive decay equations | 43 | 4.4.2.2 |
| Half-lives | 43-45 | 4.4.2.3 |
| Radioactive contamination | 46 | 4.4.2.4 |
| Background radiation | 47-48 | 4.4.3.1 (Physics only) |
| Uses and hazards of nuclear radiation | 48 | 4.4.3.2, 4.4.3.3 (both Physics only) |
| Nuclear fission | 49-50 | 4.4.4.1 (Physics only) |
| Nuclear fusion | 50-51 | 4.4.4.2 (Physics only) |
| **5 Forces** | Scalars and vectors | 52 | 4.5.1.1, 4.5.4.1.1, 4.5.1.2 (part) |
| Speed and velocity | 52-53 | 4.5.6.1.2, 4.5.6.1.3, 4.5.6.1.4  |
| Acceleration | 54-55 | 4.5.6.1.5 (part) |
| Equation for uniform acceleration | 55-56 | 4.5.6.1.5 (part) |
| Forces | 56-57 | 4.5.1.1 (again) and 4.5.1.2 (remainder) |
| Moment of a force | 57-58 | 4.5.4 (Physics only) |
| Levers and gears | 58-59 | 4.5.4 (Physics only) |
| Pressure in a fluid | 59 | 4.5.5.1.1 and 4.5.5.1.2 (both Physics only) |
| Atmospheric pressure | 60 | 4.5.5.2 (Physics only) |
| Gravity and weight | 61 | 4.5.1.3 |
| Resultant forces and Newton's first law | 61-62 | 4.5.1.4 and 4.5.6.2.1 |
| Forces and acceleration  | 62-65 | 4.5.6.2.2; Required practical activity 7 |
| Terminal velocity | 65-66 | 4.5.6.1.5 (last part) (Physics only) |
| Newton's third law | 66-67 | 4.5.6.2.3 |
| Work done and energy transfer | 67-68 | 4.5.2 (NB work done is also covered in section 1) |
| Stopping distance | 68-70 | 4.5.6.3.1 (part is Physics only), 4.5.6.3.2, 4.5.6.3.3 and 4.5.6.3.4  |
| Force and extension | 70-72 | 4.5.3; Required practical activity 6 (NB energy stored in a spring is also included in Section1 Energy changes in systems) |
| Momentum | 72-73 | 4.5.7.1 |
| Conservation of momentum | 73-74 | 4.5.7.2 (part is Physics only) |
| Rate of change of momentum | 74-75 | 4.5.7.3 (Physics only) |
| **6 Waves** | Transverse and longitudinal waves | 76 | 4.6.1.1 |
| Frequency and period | 77 |  4.6.1.2 (part) |
| Wave speed  | 77-79 |  4.6.1.2 (remainder, part is Physics only); Required practical activity 8 |
| Reflection and refraction of waves | 79-80 | 4.6.1.3; Required practical activity 9 (both Physics only) |
| Sound waves | 80-81 | 4.6.1.4 (Physics only) |
| Ultrasound and echo sounding | 81-82 | 4.6.1.5 (Physics only) |
| Seismic waves | 82-83 | 4.6.1.5 (Physics only)  |
| The electromagnetic spectrum | 83-84 | 4.6.2.1 |
| Absorption, transmission, refraction and reflection of electromagnetic waves | 84-85 | 4.6.2.2 (part) |
| Emission and absorption of infrared radiation | 86 | 4.6.3.1 (part); Required practical activity 10 (both Physics only) |
| Uses and hazards of the electromagnetic spectrum | 87 | 4.6.2.2 (part), 4.6.2.3 (part), 4.6.2.4 |
| Radio waves | 88 | 4.6.2.3 (remainder) |
| Colour | 89-90 | 4.6.2.6 (Physics only) |
| Lenses | 90-91 | 4.6.2.5 (Physics only) |
| A perfect black body | 91-92 | 4.6.3.1 (remainder) and 4.6.3.2 (part) (both Physics only) |
| Temperature of the Earth | 92-93 | 4.6.3.2 (remainder on radiation balance) (both Physics only) |
| **7 Magnetism and electromagnetism** | Magnets and magnetic forces  | 94 | 4.7.1.1 |
| Magnetic fields  | 95 | 4.7.1.2 |
| The magnetic effect of a current | 95-96 | 4.7.2.1 (part is Physics only) |
| Fleming's left-hand rule | 96-97 | 4.7.2.2 |
| Electric motors | 97-98 | 4.7.2.3 |
| Loudspeakers | 98 | 4.7.2.4 (Physics only) |
| Induced potential | 99 | 4.7.3.1 (Physics only) |
| Uses of the generator effect | 100 | 4.7.3.2 (Physics only) |
| Microphones | 101 | 4.7.3.3 (Physics only) |
| Transformers | 101-102 | 4.7.3.4 (Physics only) |
| **8 Space physics** | Our solar system | 103 | 4.8.1.1 (Physics only) |
| The life cycle of a star | 103-104 | 4.8.1.2 (Physics only) |
| Orbital motion, natural and artificial satellites | 104-105 | 4.8.1.3 (Physics only) |
| Red-shift | 105-106 | 4.8.2 (part) (Physics only) |
| Dark matter and dark energy | 107 | 4.8.2 (remainder) (Physics only) |