Menu of **GCSE** training courses

(September 2021 onwards)

Course title	Content
1. Forces and motion – Day 1	• Scalars and vectors • Newton's 1st law of motion • Newton's 2nd law of motion, F = ma • Floating and sinking • $v^2 - u^2 = 2as$ • inertia • resolving forces ***AQA* 8.2.7 Required practical activity 7 -** Investigate the effect of varying the force on the acceleration of an object of constant mass and the effect of varying the mass of an object on the acceleration produced by a constant force.
2. Forces and motion – Day 2	• Newton's 3rd law of motion • Momentum • Conservation of momentum • Stopping distances • Work done • Kinetic energy • Dangers of large decelerations • Car safety features • Calculating stopping distances (KE = work done whilst braking)
3. Forces & matter	• Elastic and inelastic distortion • $F=k \times x$ • $E=1/2 \times k \times x^2$ • Energy stores and pathways • Energy efficiency • Work done ***AQA* 8.2.6 Required practical activity 6 -** Investigate the relationship between force and extension for a spring.
4. Radioactivity	• Structure of the atom • Plum pudding, Rutherford scattering and Bohr model • Alpha, beta minus, positron, gamma and neutron emission • Background radiation • Uses and dangers of radioactivity • Penetration and ionisation • Half-life • Belt of stability • Nuclear equations
5. Electricity Day 1	• Series and parallel circuits • Voltage, current and resistance • Ohm's law • Resistors in series and parallel • VI graphs (filament lamp, diode and fixed resistor) • Electrical power • Heating effect of an electric current

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	***AQA* 8.2.3 Required practical activity 3 -** Use circuit diagrams to set up and check appropriate circuits to investigate the factors affecting the resistance of electrical circuits. This should include: • the length of a wire at constant temperature ***AQA* 8.2.4 Required practical activity 4 -** Use circuit diagrams to construct appropriate circuits to investigate the I–V characteristics of a variety of circuit elements including a **filament lamp** and a **resistor** at constant temp.
6. Electricity Day 2	• Making sense of electricity equations • Diodes • Thermistors • Light dependent resistors • Sensor circuits and potential dividers ***AQA* 8.2.3 Required practical activity 3 -** Use circuit diagrams to set up and check appropriate circuits to investigate the factors affecting the resistance of electrical circuits. This should include: • combinations of resistors in series and parallel ***AQA* 8.2.4 Required practical activity 4 -** Use circuit diagrams to construct appropriate circuits to investigate the I–V characteristics of a variety of circuit elements including a **diode**.
7. Magnetism & electromagnetism Day 1	• Magnetic fields • Magnetic field created by a current in a long straight conductor • Magnetic field around a solenoid • A current carrying conductor placed near a magnet experiences a force • Fleming's left-hand rule • F = B I L
8. Magnetism & electromagnetism Day 2	• Force on a conductor in a magnetic field causes rotation in electric motors • Electromagnetic induction • Lenz's law • How electromagnetic induction is used in alternators to generate a.c. and in dynamos to generate d.c. • How a loudspeaker works • How a microphone works Transformers
9. Waves Day 1 - (light and lenses)	• Law of reflection • Refraction • Effects of differences in velocities of electromagnetic waves in different substances • Total internal reflection (TIR) and critical angle • Specular and diffuse reflection • Power of a lens • Converging and diverging lenses • Real and virtual images ***AQA* 8.2.9 Required practical activity 9 (physics only)-** Investigate the reflection of light by different types of surface and the refraction of light by different substances.

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10. Waves Day 2 - (sound & the e.m.s.)	• Frequency and wavelength • Sound waves • Transverse and longitudinal waves • Seismic waves • Electromagnetic waves • Effect of temperature of a black body object on its wavelength distribution graph • Harmful effects of electromagnetic radiation • Uses of electromagnetic radiation ***AQA* - 8.2.8 Required practical activity 8 -** Make observations to identify the suitability of apparatus to measure the frequency, wavelength and speed of waves in a ripple tank and waves in a solid and take appropriate measurements.
11. Particle model	• Kinetic theory • Density • Doing work on a gas • Specific heat capacity • Specific latent heat ***AQA* 8.2.1 Required practical activity 1 -** An investigation to determine the specific heat capacity of one or more materials. The investigation will involve linking the decrease of one energy store (or work done) to the increase in temperature and subsequent increase in thermal energy stored. ***AQA* 8.2.5 Required practical activity 5 -** Use appropriate apparatus to make and record the measurements needed to determine the densities of regular and irregular solid objects and liquids. Volume should be determined from the dimensions of a regularly shaped object and by a displacement technique for irregularly shaped objects. Dimensions to be measured using appropriate apparatus such as a ruler, micrometer or Vernier callipers.
12. Stretch and challenge in physics lessons – getting more level 9s!	***This course will be ready soon***
13. Teaching the harder triple science aspects of the physics curriculum	***This course will be ready soon***
14. Effective delivery of physics required practicals	***This course will be ready soon***