Physics – Key Stage 4

AQA Physics 8463

https://www.aqa.org.uk/subjects/science/gcse/physics-8463

	What pupils will learn	How it builds on learning
Year 10	**Electricity 1** Standard circuit symbols, electrical charge and current, current, resistance, potential difference, series and parallel circuits,	Topic needs to be taught before electromagnetism so that students can draw on concepts from electricity topic. Students build on their understanding of electricity from the Year 9 Electricity and Magnetism topic. This topic also allows the more mathematical nature of GCSE science to be introduced.
	Atomic Structure Atoms and isotopes, structure of atom, mass number and atomic number, development of atomic model, radioactive decay, nuclear equations, half-lives and the nature of radioactive decay, contamination and irradiation, hazards and uses of radioactive emissions and background radiation, fission and fusion *Foundation tier* *Students do not study net decline*	Students study this unit early in year 10 as the concepts are relatively simple, and in order to not overwhelm students with the amount of maths in GCSE physics. Students able to draw on knowledge from Year 8 Matter topic.
	Energy 1 Energy stores and systems, kinetic energy, elastic potential energy, gravitational potential energy, power, efficiency, conservation of energy Foundation tier Students do not study ways of increasing the efficiency of energy transfers	Topic is taught before forces, as a number of concepts in forces draw on the Energy unit. Students build on their knowledge from the Year 9 Energy unit, as well as energy content embedded within KS3.
	Particle model of matter Density, changes of state, internal energy, specific latent heat, particle motion in gases, pressure in gases *Foundation tier* *Students do not study how doing work on a gas increases pressure*	Topic is taught in year 10 as the concept are easier than later topics. Students draw on knowledge from Year 7 Core Chemistry unit, Year 8 Matter topic and Year 9 Pressure unit.
	Energy 2 Thermal conductivity, insulation and rates of cooling, specific heat capacity, national and global energy resources	Topic is taught before forces, as a number of concepts in forces draw on the Energy unit. Students build on their knowledge from the Year 9 Energy unit, as well as energy content embedded within KS3. Topic is taught separately to Energy 1 as all content relates to heat energy.
	Electricity 2 Resistance of a wire; IV characteristics; LDRs, thermistors and sensing circuits; direct and alternating potential difference; mains electricity; the national grid	Topic is taught after Electricity 1 as Electricity 1 contains foundation knowledge for this unit, which primarily looks at applications of electricity.

	What pupils will learn	How it builds on learning
Year 11	**Forces 1** Scalar and vector quantities, contact and non-contact forces, gravity and weight, speed, acceleration, distance time graphs, velocity time graphs, Newton's laws of motion, terminal velocity and weight, resultant forces and resolving forces *Foundation tier* *Students do not study resolving forces* *Students do not study velocity in the context of circular motion* *Students do not study that the tangent to a velocity time graph is the acceleration* *Students do not study that the area under velocity time graph is the distance* *Students do not study intertia*	Forces is taught after Energy as knowledge of energy is required. Students draw on knowledge, which is acquired in a number of units KS3, including Year7 Core Physics, Yr8 Forces and Year 9 Pressure and moments. Topic is also taught late because cognitive demand is high.
	Electromagnetism Magnetic poles, magnetic fields, the motor effect, Fleming's left hand rule, electric motors, Generator effect, transformers *Foundation tier* *Students do not study Fleming's left hand rule or electric motors or loudspeakers.* *Students do not study the generator effect or transformers*	Topic taught after Electricity topics in year 10 as knowledge from this unit is required. Students are able to draw on understanding developed in year 10 and year 11.
	Waves 1 Transverse and longitudinal waves, properties of waves, wave equation, relationship between period and frequency, electromagnetic spectrum, properties and uses of electromagnetic waves *Foundation tier:* *Students study the properties of EM waves in less detail*	Students able to draw on knowledge from Year 7 Light, Year 8 Waves topics and Year 9 Introduction to Physics Unit.
	Forces 2 Forces and elasticity, Hooke's law, stopping distances, reaction times, factors affecting braking distances, centre of mass, momentum and conservation of momentum, centre of mass, moments, pressure *Foundation tier* *Students do not study calculating pressure in a liquid* *Students do not study momentum*	Forces is taught after Energy as knowledge of energy is required. Students draw on knowledge, which is acquired in a number of units KS3, including Year7 Core Physics, Yr8 Forces and Year 9 Pressure and moments. Topic is also taught late because cognitive demand is high. Forces is taught in two parts due to the amount of content in the unit.
	Space Life cycle of a star, redshift, circular motion, the big bang	Topic is only taught in separate science. It is taught after forces as it draws on concepts from a number of units including Forces and Particle Model of Matter.
	Waves 2	Topic is taught after Waves 1 as Waves 1 contains foundation knowledge for this unit,

	Sound, seismic waves, colour, reflection and refraction, lenses, black body radiation, waves for detection and exploration *Foundation tier* *Students do not study sound waves* *Students do not study waves for detection and exploration* *Students do not study black bodies*	which mainly focus on applications of waves or deep focus on a number of aspects of waves. Students able to draw on knowledge from Year 7 Light, Year 8 Waves topics and Year 9 Introduction to Physics Unit.

Assessment

Students undertake formative assessments at the end of each topic. The aim of these is for students to be able to improve their understanding of the topic that they have just completed and to consolidate their learning. Students also undertake summative tests. In year 10 students have an exam after the Christmas holidays which focuses on Electricity and Radioactivity. Students have another exam at the end of year 10 which covers all content covered in year 10 (content studied in year 10 is primarily Paper 1 content). In year 11 students take a mock exam in December, which covers paper 1 material, giving students an opportunity to revise and consolidate. Students then undertake a second mock in March which covers all the content covered in year 11.

Supporting your child

What you can do at home:

Parents can support students in a number of ways, including:

- Supporting students with revision for tests – revision resources for these are provided via SatchelOne and Teams, along with instructions. It can be really helpful if parents can guide the students through using these resources.
- Reading about science – resources for could include texts provided by the school library or BBC Science Focus magazine.

Equipment:

In addition to standard school equipment, students should bring a green pen and a calculator to lessons.

Extended learning

Homework policy:

Homework set is meaningfully related to classwork and includes: planning and writing up experiments, reading, note-taking and answering questions to aid understanding, and extending understanding of a topic through research and revision for the end of unit tests and end of year examinations. Homework will usually be set every two weeks for each subject, but the exact frequency of this is at the discretion of the teacher

Clubs/ Enrichment opportunities:

Enrichment opportunities are provided throughout year 10 and 11. All students are given the opportunity to undertake the British Physics Olympiad.

Extended study suggestions and reading lists:

The library has a range of texts and study guides to support learning. The BBC Bitesize for GCSE Science website contains up-to-date subject content that can be used for revision.

Possible trips and visits:

A number of STEM based trips are typically offered over the course of the year.