



# THOMAS ALLEYNE'S HIGH SCHOOL

## Physics: LEARNING JOURNEY

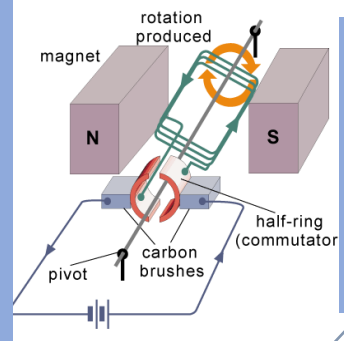
6TH FORM

In Summer Term, students complete their external exams consisting of two 100 mark papers, each counting for 50% of the final grade.

Paper 1 – Energy, Electricity, Particles (Density/Pressure/Heat) and Atoms (including radiation)

Paper 2 - Forces and Motion, Waves, Electromagnetism and Space

In the final topic of the course, students study electromagnetism. They develop an understanding of the range of applications of electromagnets. They learn about the motor effect and generator effect (induction) and how these are used in a range of applications in everyday life including motors, speakers and microphones. They finish by studying the function and construction of transformers which are ubiquitous in our use of electricity. They are able to link this with previous work in year 10 on mains electricity.



In the final parts of year 11, students use their maths skills, developed throughout both Maths and Physics to look at vectors and study motion in two dimensions. They also use new equations to review their work on acceleration and velocity.

CEIAG 6<sup>th</sup> Form interviews take place Jan of Y11

POST-16 PATHWAY

Final Exams

Electromagnetism Advanced Motion

College/Apprenticeships

By the end of Year 10, students will have completed all of the content on Energy, Waves, Electricity and most of Forces and Motion. They will have a good understanding of the scientific method and how sources of error in experiments can be managed. They will be confident in using complex equations to solve problems.

Using ideas about the structure of atoms developed in chemistry, students go on to learn about nuclear radiation and its properties. They will develop an understanding of how radiation can be used in a range of settings, including medicine. They finish this topic by looking at nuclear reactions (fission and fusion) and how these are used in nuclear power stations to release energy.



Mock Exam



Students end the year with an in-depth study of electrical circuits. Building on the foundations of circuits developed in year 9, they carry out a range of investigations into the behaviour of current, resistance and potential difference in circuits. This leads into how we use electricity at home.

Electricity

Year 11

Atoms and Radiation

Space

Waves

Students study density and then apply this, along with their understanding of forces, to explore the relationship between density, pressure and upthrust to understand why some objects float while others sink.

Year 10 starts by building on the force and motion work from year 9. Students will develop confidence in using more complex equations and graphs to analyse motion as well as understanding the link between force and changes in motion. Using their understanding of simple practicals developed in year 9, they carry out more sophisticated investigations exploring the relationship between force and acceleration.



Having developed an understanding of nuclear fusion, students go on to look at the most common fusion reactors in the world – stars. They learn about the life of a star and how our solar system formed. Using ideas from their study of waves, students learn about red shift of galaxies and how this provides evidence for the Big Bang model of the universe. We finish by exploring some of the cutting edge research taking place to understand more about the origins of the universe.

Calculating Energy and Heat

Pressure and Density

Forces and motion 2

Year 10

Students revisit and apply their understanding of waves developed in year 9 to a range of applications including the refraction of light through lenses, uses of ultrasound in medical physics and the study of seismic waves and Earth science.

Building on the qualitative understanding of energy stores in year 9, students develop an ability to analyse energy changes quantitatively by using a variety of more complex equations. They draw on their experience of using more difficult equations in the Autumn term to confidently apply equations to changes in kinetic, gravitational, elastic and thermal energy stores.



Year 9 finishes by looking at our uses of energy in society for heating, electricity and transport. As society moves away from fossil fuels to more renewables students learn about the benefits and challenges that this produces allowing them to make informed decisions about environmental issues.

By the end of year 9, students will have developed an awareness of a range of core physics principles which will support their future studies. They will have had hands on experience of simple physics practicals and understand how to use a range of equipment safely. They will also have developed experience in using simple equations.

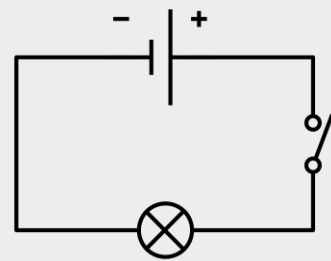
Intro to Waves

Basic Circuits

Energy Resources

Waves are one way in which energy can be transferred and students spend time exploring what waves are and how they feature throughout everyday life. They will develop an appreciation for the range of applications of the electromagnetic spectrum including the use of X-ray and Gamma in medicine and Radio, Microwave and Infrared in communications.

Another way in which energy is transferred is by electrical circuits. Students get hands on building simple circuits and developing an understanding of current and potential difference (voltage). This lays the foundation for more detailed study of electricity in Y10



Energy Stores

Forces and Motion

WELCOME

Year 9

Y8 Taster Sessions / Transition days

Students are introduced to the idea of energy stores and transfers which is a common theme throughout Physics. They will be able to use this understanding to identify energy changes in various scenarios that they meet throughout the course. In the final topics in Y9, they will explore two methods of energy transfer in more depth.

Within the force and motion topic, students will encounter their first equations and develop experience in using and manipulating these. Being able to apply equations to the real world is a core skill in Physics which will continue to be developed throughout the course.

Students start the Physics journey by looking at forces such as weight, tension and friction in familiar settings. They meet their first practical work in investigating elastic materials. They then go on to look at speed and car stopping distances. This introduction to forces provides a foundation for future study on motion

