

LEARN, LEAD AND MAKE A DIFFERENCE



CITY OF LONDON
FREEMEN'S SCHOOL



Freemen's Global A Level Options

2022 - 2023

Making Choices

P1

Careers and
Higher Education

P2

Extended Project
Qualification

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Making choices

This is your guide to all the courses that City of London Freeman’s Global has to offer in the Sixth Form. Each page details what you can expect from a course, what the requirements are and how the course is assessed. You will also find information on the Extended Project Qualification (EPQ) and Freeman’s Global university support programme.

OPTIONS

Students may select one option from each block in A to C, up to a maximum of three options, the only exception for this is if they wish to take Further Maths. Students who take Further Maths will have additional lessons to accommodate the fact they will be doing four A Levels.



A LEVEL BLOCKS				
BLOCK A	BLOCK B	BLOCK C	ADDITIONAL 1	ADDITIONAL 2
MATHS	PHYSICS	CHEMISTRY	IELTS AND EPQ	FURTHER MATHS
MATHS AND FURTHER MATHS	BIOLOGY	ECONOMICS	EPQ (1/2)	
	BUSINESS	COMPUTING		

Our blocks have been designed to allow popular combinations of subjects to be chosen together to enable applications to aspirational courses – such as Engineering (FM, Maths, Physics and Chemistry), Economics (Maths, FM, Business Studies and Economics), Computer Science (Maths, FM, Physics and Computing) or Medicine (Maths, Biology and Chemistry).

There are many valid reasons for pupils to choose different subjects but we always advise pupils should choose subjects because they enjoy them or because they excel in them, indeed these two reasons often go hand in hand. Pupils are more likely to work hard in subjects that they enjoy and are therefore more likely to enjoy success in them.

Some pupils will have an idea of what they may wish to go on and study at University. Even if it is only a vague

idea at this stage, this can still be used to guide subject choices and at the very least, ensure that good options remain open to them through their subject choices. If you have an idea about what you want to study when you leave school please check course expectations on university websites. Things have changed a lot in the last twenty years and universities are very clear in what they do (and don’t) need students to study. Although we do everything we can to ensure that students can study the subjects they wish Freeman’s Global reserves the right to withdraw a subject from the option list, for example when too few students choose the subject for it to be viable.

All offers are conditional on the students meeting the entry requirements for admission to the Sixth Form and the subject specific requirements. If you have any questions please ask your local school’s Admissions Office or equivalent, who are there to help.

Careers and Higher Education

The Careers and Higher Education programme at Freeman's Global provides students with the knowledge, opportunity awareness, support and motivation to successfully take the next step in their lives. Our ambition is to achieve, alongside students and parents, the best possible outcome for our leavers.

OUR PROVISION TO YOU

At the beginning of your Sixth Form career at Freeman's Global you will be assigned a university tutor. They will start by examining your ambitions with you and helping you to plot your course towards university. They will help you explore your interests and aptitudes and identify achievable goals. They will then work with you to help you achieve those goals and check in with you periodically to consider the progress you are making.

Whilst your tutor will help you identify what you can do it will be up to you to build your CV. You will do this through intellectual development; reading and attending talks, lectures and competitions. You should seek to obtain relevant experience by joining clubs and societies which can help you develop the skills and strengths. We hope that you will seek work experience opportunities and internships.

YOUR PERSONAL STATEMENT

If you choose to apply to a UK university you will be asked to submit a personal statement. This is a supporting essay of 4000 characters, written by yourself, which describes your ambitions, skills and experiences to prospective universities, colleges and conservatoires. It's a chance for you to show yourself off, to show these institutions why you would be a great student for them to have on their course. Your tutor will help guide you to make sure it is the best it can be.

OXFORD AND CAMBRIDGE

If a Sixth Form student wishes to apply to the universities of Oxford and Cambridge, additional information sessions and specialist information are provided. This programme aims to give Freeman's Global candidates the best possible chance of making a successful application. Support includes guidance on



admissions assessments, mock interviews, and advice from Old Frees currently studying at Oxbridge.

Any students wishing to study medicine, veterinary science and dentistry at university are also provided with a specialist plan to increase their chances of success. This programme of interviews, speakers and discussion is led by Mrs Fox who sits on a university medical applications panel.

Extended Project Qualification (EPQ)

HEAD OF DEPARTMENT: Mrs H Pennington

EXAM BOARD: AQA – Oxford- Extended Project Qualification (EPQ)

ASSESSMENT: Project based (no examination)

QUALIFICATION REQUIREMENTS: Freeman’s Global standard entry requirements

BACKGROUND

The Extended Project Qualification (EPQ) is a stand-alone AS Level qualification (worth half an A Level) which offers opportunities for students to develop critical independent learning skills within a structured and supportive environment.

The EPQ is regarded as excellent preparation for both university and a future career. It enables students to demonstrate a capability for working independently and under their own initiative, having the freedom and responsibility to select topics and projects in which they are really interested – it may be a topic that is connected with a new subject they wish to study at university, or one linked to a future career, or it might be looking with much greater depth into a topic they are already studying at A Level.

COURSE CONTENT

When completing a project qualification, students follow a clearly structured process: they plan and research their topic, and from that create a report. They are given a supervisor to help them through the whole process. The product of their project is a research-based written report (5000 word essay).

The research process is recorded in their Production Log and, finally, students deliver a presentation. During the process, students develop as independent, reflective learners and acquire knowledge and transferable skills that are invaluable for further study at university and eventually in the workplace. Students are assessed on the product of their project and on the whole research process itself. The EPQ is classed as a full AS Level qualification but, unlike other AS qualifications, it is possible to gain an A* grade, which is equivalent to 28 UK university entrance points (UCAS points).

In addition to the above students will receive regular lessons throughout the course, which focus on

developing academic skills and help them write their EPQ. This will include lessons on project planning and management, academic research skills, report writing, critical thinking, evaluation of resources, presentation and oral communication skills as well as critical self-reflection of the whole research project.

The EPQ complements three A Levels beautifully in that it allows a student to dive deeply into their three chosen A Level subjects whilst learning a breadth of skills in undertaking their EPQ project.

An increasing number of universities look very favourably upon the EPQ as it reflects an approach which is more aligned to university style learning.

WHY STUDY THE EPQ?

The benefits of the EPQ have been the focus of several research studies in recent years, which conclude the following:

- Students who take the qualification are 29% more likely to achieve a grade A*-B in most of their A-level subjects.
- Completing the qualification alongside A-level study is associated with better degree performance than taking A-levels only.
- The qualification gives students ‘sovereignty’ over what and how they study, and this helps to develop the independent study skills and self-regulated approach to learning that universities are looking for.
- Even when taking into account previous academic results, a significant positive relationship was found between qualification achievement and student motivation, as well as evidence that the qualification can help to lower participation barriers.

As well as giving students a potentially easier path into top universities Oxford University states:

“The EPQ encourages students to develop research and academic skills relevant to undergraduate study ... you will be a more convincing applicant if you can demonstrate breadth of reading and independent research into your chosen subject, if you have pursued study beyond that required by your school syllabus.”

Extended Project Qualification (EPQ)



King's College London consider that the EPQ is an excellent tool for supporting independent research skills and allows students to study a particular area in greater depth; this subject exploration could then be included in a personal statement. 28% of UCAS offers this year have included a reduced offer with the EPQ result, including plenty of Russell Group universities such as Exeter, Nottingham and Southampton.

EPQ FROM A STUDENT PERSPECTIVE:

“The skills that you develop are exactly the skills you need at university. I went into the interview with knowledge of my subject beyond my A Level syllabus and it meant that I could talk about something that I was passionate about and that I'd really enjoyed doing, and I think that genuine passion and enthusiasm comes across in the interview.”

Biology

HEAD OF DEPARTMENT: Mr J Graham

EXAM BOARD: Edexcel International A Level Biology

SPECIFICATION CODE: WBI

ENTRY REQUIREMENTS: IGCSE Biology Grade 7, IGCSE Mathematics Grade 6

COURSE CONTENT

The International A Level in Biology will develop students' knowledge and understanding of Biology by applying the concepts taught to a variety of different contexts. Many familiar topics from GCSE are studied together with new subjects such as Control of Gene Expression and Microbiology, giving a taste of the breadth of study Biology offers. Additionally, mathematical skills are taught and mathematical questions make up 10% of the examination. Students will develop a range of practical skills such as data analysis and evaluation that they will be expected to apply these to familiar and unfamiliar contexts.

COURSE ASSESSMENT

- **Paper 1:** (20%) 1 hour 30 minutes Molecules, Diet, Transport and Health
- **Paper 2:** (20%) Cells, Development, Biodiversity and Conservation
- **Paper 3:** (10%) Practical Skills in Biology I
- **Paper 4:** (20%) Energy, Environment, Microbiology and Immunity
- **Paper 5:** (20%) Respiration, Internal Environment, Coordination and Gene Technology
- **Paper 6:** (10%) Practical Skills in Biology II

SUCCESS IN BIOLOGY

Successful students are those who actively participate in lessons and reflect on their practice. Reading around the subject is a great way to foster a better understanding of the key Biological principles. There are lots of fantastic books you can read. A few favourites include Epigenetics Revolution by Nessa Carey, Silent Spring by Rachel Carson, Our Place by Mark Cocker and Entangled Life by Merlin Sheldrake. The key is to read what interests you. The internet is a wonderful source of Biology lectures. The Royal institute and Gresham lectures are well worth watching and have extensive back catalogues. Watching one of these a week could be an enjoyable and profitable addition to your academic lessons.

WHY STUDY BIOLOGY?

"I like to define Biology as the history of the earth and all its life - past, present, and future." Rachel Carson, author of 'The Silent Spring', thus describes the breadth and depth of the subject. There is no such thing as a typical biologist; entering a career in Biology could take you in almost any direction you can think of, and to anywhere in the world. Recent Freeman's alumni are now working in fields as diverse as biochemistry, genetic research, medicine, rainforest ecology and veterinary practice.

Biologists work in some of the most innovative and exciting areas of science, helping to solve the biggest challenges currently faced by people and the planet. Choosing Biology will give you a broad base of skills, developing your abilities in communication, teamwork and how to think logically and critically as well as gaining deeper subject knowledge. Having such a broad skill set gives opportunity to study a wide range of biological degree subjects and will make you more attractive to employers. It is often useful to choose Maths and Chemistry as your other A Levels, if you want to pursue a scientific career. Biology is not only for the pure scientists, however, and is a good choice if you want to combine your love of science with other subjects.



Business

HEAD OF DEPARTMENT: Mrs J Marvin

EXAM BOARD: Edexcel- International Advanced Level Business

SPECIFICATION CODE: YBS11

ENTRY REQUIREMENTS: Freeman's Global standard entry requirements

COURSE CONTENT

The International Advanced Level Business has been developed to be engaging for international learners. The qualification reflects today's global world, giving students an understanding of the global issues that will impact on business. Students are encouraged to relate their experience as a buyer of goods and services to business theory and economic events and to understand how government, businesses and consumers work together. Students will learn and use a variety of transferable skills throughout the course, including the important skills of decision-making and planning. Studying Business enables students to develop a critical approach through rational and logical arguments of both sides of a case.

Lessons will be delivered often through the use of case studies to really allow students to apply their understanding.

The IAL Business is structured into four units with four externally assessed examinations.

- **Unit 1:** Marketing and people
- **Unit 2:** Managing Business activities
- **Unit 3:** Business decisions and strategy
- **Unit 4:** Global business

In addition to understanding the Business content it is hoped that students will gain skills in critical thinking, the ability to understand data and to make judgements, problem solving, analysis and decision making. Students will develop both their creativity and innovative skills and we hope teamwork and collaboration will feature strongly in the delivery of any lesson.

COURSE ASSESSMENT

Students will sit four papers based on the four units. Each paper will be two hours and consist of a number



of short and extended response questions based on sources.

SUCCESS IN BUSINESS

Start to engage in the news, find out what is happening with both local and national businesses. Perhaps start to keep an online note book of links to news articles. There are some great podcasts and blogs on business activities and entrepreneurs, start engaging in building up your wider awareness.

WHY STUDY BUSINESS?

Students should have an interest in learning how a business is organised, operates, plans and makes its decision as well as how it interacts with the wider economic environment. It is not necessary to have studied Business before but a reasonable level of numeracy and the ability to write a written argument are important.

Business combines well with a range of social science, humanities and mathematical subjects. It could lead to university studies in such areas as business, management, economics, finance and accountancy. The course covers important elements in the examination of many professional bodies and students will have a head start in careers within marketing, accountancy and human resources.

Chemistry

ACTING HEAD OF DEPARTMENT: Ms A Mistry

EXAM BOARD: Edexcel- International Advanced Level Chemistry

SPECIFICATION CODE: YCH01

ENTRY REQUIREMENTS: Chemistry and GCSE Mathematics grade 7

COURSE CONTENT

The International A Level in Chemistry will develop students' knowledge and understanding of Chemistry by applying the concepts taught to a variety of different contexts. Many familiar topics from GCSE are studied together with new subjects such as Atomic Structure and Bonding, giving a taste of the breadth of study Chemistry offers. Additionally, mathematical skills are taught. Students will develop a range of practical skills such as data analysis and evaluation that they will be expected to apply these to familiar and unfamiliar contexts.

COURSE ASSESSMENT

Students will sit six written papers at the end of the A Level course.

1. The Core Principles of Chemistry.
2. Application of Core Principles of Chemistry.
3. Chemistry Laboratory Skills I Alternative to Practical Work.
4. General Principles of Chemistry I – Rates, Equilibria and Further Organic Chemistry.
5. General Principles of Chemistry II – Transition Metals and Organic Nitrogen Chemistry.
6. Chemistry Laboratory Skills II Alternative to Practical Work.

Later papers will also make synoptic links between different areas of the specification.

SUCCESS IN CHEMISTRY

Students should study Chemistry if they are interested in its applications and ways of thinking and particularly if they wish to study a related subject, such as Pure Chemistry, Engineering or Materials Science at university. Chemists are always in demand across a wide range of careers because of their logical skills and ability to interpret data.



WHY STUDY CHEMISTRY?

The course is suitable for those wishing to study chemistry or related subjects to degree level, including Oxford and Cambridge. It is useful not only for those who need A Level Chemistry as a 'tool' for further studies (e.g., those wishing to become doctors, vets, or dentists), but also for those who wish to extend their chemical knowledge and understanding further before seeking employment. Chemists develop skills in scientific methods, logical thinking, critical analysis, and mathematical ability that are in demand in many non-scientific as well as science-based courses and careers.

We hope you will find International A Level Chemistry stimulating and informative. It will be demanding, but if you work hard, you should enjoy yourself and find it rewarding.

Computer Science

HEAD OF DEPARTMENT: Mr O James

EXAM BOARD: Cambridge- International AS and A Level Computer Science

SPECIFICATION CODE: 9618

ENTRY REQUIREMENTS: Freeman's Global standard entry requirements

COURSE CONTENT

Students will study:

- Computational thinking.
- Programming paradigms.
- Communication.
- Computer architecture and hardware.
- Data representation and structures.

This course enables learners to develop:

- An understanding of and ability to apply the fundamental principles and concepts of computer science.
- The ability to analyse problems in computational terms through practical experience of solving problems and writing programs.
- The capacity to think creatively, innovatively, analytically, logically and critically.
- The capacity to see relationships between different aspects of computer science.
- An understanding of the impact that technology is having and may have in the future on us individually and on society.

COURSE ASSESSMENT

Each examination paper will consist of a variable number of short-answer and structured questions of variable mark value.

- **Paper 1:** Theory fundamentals (25% of the A Level)
- **Paper 2:** Fundamental problem solving and programming skills (25% of the A Level)
- **Paper 3:** Advanced theory (25% of the A Level)
- **Paper 4:** Further problem solving and programming skills (25% of the A Level)

The assessment is by written papers, but the learning will be done in a mainly practical way: problem solving and programming. Questions on the papers will require the candidate to think, use knowledge with understanding and demonstrate understanding gained through practising practical skills.

“Computing is not about computers anymore. It is about living.” – Nicholas Negroponte

SUCCESS IN COMPUTER SCIENCE

In order to be truly successful in the discipline of computer science, you'll need to be personally dedicated to your craft. Being a good student is a step in the right direction, but it's not enough. You need to think beyond the classroom, instead of seeing course or program completion as your only goal, use it as a launchpad for your learning. Practice your skills every day both in and out of the classroom, and know that the sky is the limit in terms of what you can learn in the Computer Science field. Mathematical ability and previous Computer Science learning are both extremely helpful in enabling students to access the highest grades and being prepared to practice writing code in your own time will also help enormously.

WHY STUDY COMPUTER SCIENCE?

Students who wish to study Computer Science at university must take A Level Mathematics and should consider Further Mathematics. A Level Computer Science is highly regarded by both universities and employers. It is a great enabling subject to choose alongside a range of other options; previous students at Freeman's have gone on to study Business, Economics and Engineering at university as well as various branches of Computer Science.

Computer Science can also help with any subject that involves data analysis including all of the sciences and social sciences. Careers within Computer Science are extraordinarily diverse with options from cyber security, networking, games development, systems analysis, software development to consultancy, web content management, artificial intelligence and machine learning development and forensic computer analysis.

Economics

HEAD OF DEPARTMENT: Mrs J Marvin

EXAM BOARD: AQA- Oxford International Economics

SPECIFICATION CODE: 9640

ENTRY REQUIREMENTS: Freeman's Global standard entry requirements

COURSE CONTENT

The Oxford AQA International Advanced Level has been developed to inspire, challenge and motivate students. It is designed to provide a stimulating course that students will enjoy through studying topics and issues relevant in today's society. Students will gain a firm foundation in both macro and microeconomics and will have the opportunity within lessons to apply this to both national and global issues. Economics is the study of the science of human behaviour, in relation to the choices that people make. This course allows students to understand how individuals and organisations choose how to use their scarce resources, the role of markets in this decision making and how governments might influence behaviour. It is very much hoped that students taking this course will have the opportunity to engage in discussions and develop a critical approach to problem solving.

The IAL Economics is structured into four units with four externally assessed examinations:

- **Unit 1:** The operation of markets, market failure and the role of government.
- **Unit 2:** The national economy in a global environment.
- **Unit 3:** The economics of business behaviour and the distribution of income.
- **Unit 4:** Economic development and the global economy.

The variety of assessment styles used, including multiple choice, short answer, data response and essays allow students to develop a wide range of skills such as the ability to analyse data, develop their competence in applying quantitative techniques, logical thinking and making informed, well-supported judgements. The skills they acquire will be very valuable for further study and employment. In addition students will be assessed on their quantitative skills across all areas of the papers.



COURSE ASSESSMENT

Students will sit 4 papers based on the four units. Units 1 and 2 will be 105 minutes long and worth 20% of the total A Level. Units 3 and 4 will be assessed through a 120 minute exam and will each be 30% of the A Level. The papers will be made up of short and longer answer questions as well as multiple choice questions.

SUCCESS IN ECONOMICS

A main requirement is an interest in the world outside of school and in current affairs. It is not necessary to study Mathematics at A Level but students should have a very good pass at GCSE and be confident with interpreting a range of data and with writing extended essay answers to questions.

Engaging in the news is an absolute must ahead of starting this course. Keep a diary of what is happening both in the UK and in the country you live in. In addition to online news sites try to engage in regular reading of blogs such as those found at [tutor2u](#) or [Ian's Stewart weekly blog](#).

WHY STUDY ECONOMICS?

In the past the majority of our Economics students who have studied in the UK have gone on to read either Economics or Business related courses at a range of Universities including Oxford, Cambridge, LSE, Bristol, UCL, Bath, Durham and Warwick. Economics A Level can lead to a wide range of careers in economics and finance-related professions including: accountant, analyst, finance and banking, investment analyst, statistician and stockbroker.

Mathematics

HEAD OF DEPARTMENT: Mrs M Cast

EXAM BOARD: Edexcel International A Level
Mathematics

SPECIFICATION CODE: YMA01

ENTRY REQUIREMENTS: GCSE Mathematics Grade 7

COURSE CONTENT

The International A Level in Mathematics is designed to build on and formalise the expertise gained at GCSE. Pure mathematics involves the study of algebra, trigonometry, geometry, calculus, vectors, and numerical methods. Students learn to construct rigorous mathematical arguments and to apply their knowledge in a variety of contexts. In statistics, students learn a variety of techniques to analyse and represent data. They set up statistical models to represent real life situations and to draw conclusions about them and undertake practical data collection and analysis to test hypotheses. The study of mechanics involves students setting up mathematical models to represent situations in the real world. They apply their knowledge of physical principles and mathematical techniques to solve problems involving forces and movement.

COURSE ASSESSMENT

All papers are 1 hour 30 minutes and are 75 marks.

- **Paper P1:** (16.7%) Algebra and functions, coordinate geometry, trigonometry, differentiation, integration.
- **Paper P2:** (16.7%) Proof; algebra and functions; coordinate geometry in the (x, y) plane; sequences and series; exponentials and logarithms; trigonometry; differentiation; integration.
- **Paper P3:** (16.7%) Algebra and functions; trigonometry; exponentials and logarithms; differentiation; integration; numerical methods.
- **Paper P4:** (16.7%) Proof; algebra and functions; coordinate geometry in the (x, y) plane; binomial expansion; differentiation; integration; vectors.
- **Paper M1:** (16.7%) Mathematical models in mechanics; vectors in mechanics; kinematics of a particle moving in a straight line; dynamics of a particle moving in a straight line or plane; statics of a particle; moments.
- **Paper S1:** (16.7%) Mathematical models in probability and statistics; representation and summary of data; probability; correlation and regression; discrete random variables; discrete distributions; the Normal distribution.

SUCCESS IN MATHEMATICS

Mathematics is a network of linked ideas and students need to be able to connect new mathematical thinking to what they already know and understand. This gives them a toolkit from which to choose a method for solving a problem. Being able to work logically and explain their reasoning to others is a key skill. In addition to these any successful mathematician must invest time and energy in practicing, learning from any mistakes and therefore increasing their understanding. There is a wealth of material to enrich mathematical knowledge with many interesting books, podcasts and videos to enjoy. A few of my favourite books include *Seventeen equations that changed the world* (Ian Stewart), *The mathematics of love* (Hannah Fry) and *The Simpsons and Their Mathematical Secrets* (Simon Singh). BBC IPlayer's Radio 4 is a good source of podcasts with Tim Harford's *More or Less* as he explains the numbers and statistics used in political debate, the news and everyday life. YouTube is also great if you know what to look for with Numberphile and 3Blue1Brown extending ideas in an accessible way.

WHY STUDY MATHEMATICS?

Mathematics is superb at helping to develop your analytical, research and problem-solving skills. Not only will studying maths help give you the knowledge to tackle scientific, mechanical, coding and abstract problems, it will also help you develop logic to tackle everyday issues like planning projects, managing budgets and even debating effectively. As a facilitating subject it combines well with the study of Chemistry, Physics, Biology, Economics and Business.

Choosing Mathematics could open doors in engineering, accounting, medicine, business consultancy, teaching, scientific research, games development, civil service and astrophysics to name a few. A large proportion of our alumni go onto degree courses and then careers for which mathematics was essential in hugely diverse roles.

Further Mathematics

HEAD OF DEPARTMENT: Mrs M Cast

EXAMINATION BOARD: Edexcel – International A Level
Further Mathematics

SPECIFICATION CODE: YFM01

ENTRY REQUIREMENTS: GCSE Mathematics Grade 9.
Any additional Mathematics qualification would be an advantage.

COURSE CONTENT

The International A Level in Further Mathematics is a demanding but rewarding course for pupils who have achieved a high grade at GCSE and enjoy tackling challenging problems. Pupils opting to take Further Mathematics study the whole of the A Level Mathematics course in their first year before starting the A Level Further Mathematics course in the summer term. In the second year of their A Levels, pupils complete the Further Mathematics course. The Further Mathematics course covers many of the same areas of mathematics as the first year course, but at a higher level. Students learn to use matrices and complex numbers in Pure Mathematics and learn the skills to attack more complicated problems in Statistics and Mechanics.

COURSE ASSESSMENT

All papers are 1 hour 30 minutes and are 75 marks.

- **Paper FP1:** (16.7%) Complex numbers; roots of quadratic equations; numerical solution of equations; coordinate systems; matrix algebra; transformations using matrices; series; proof.
- **Paper FP2:** (16.7%) Inequalities; series; further complex numbers; first order differential equations; second order differential equations; Maclaurin and Taylor series; Polar coordinates.
- **Paper S2:** (16.7%) The Binomial and Poisson distributions; continuous random variables; continuous distributions; samples; hypothesis tests.
- **Paper S3:** (16.7%) Combinations of random variables; sampling; estimation, confidence intervals and tests; goodness of fit and contingency tables; regression and correlation.
- **Paper M2:** (16.7%) Kinematics of a particle moving in a straight line or plane; centres of mass; work and energy; collisions; statics of rigid bodies.

- **Paper M3:** (16.7%) Further kinematics; elastic strings and springs; further dynamics; motion in a circle; statics of rigid bodies.

SUCCESS IN FURTHER MATHEMATICS

Further Mathematics is a challenging course and successful students are thorough and painstaking in their work. They need to be organised to meet deadlines. Students will spend a lot of time working independently and they will need to cooperate with others to solve common problems.

WHY STUDY FURTHER MATHEMATICS?

If you are planning to take a degree such as Engineering, sciences, Computing, Finance, Economics, or perhaps Mathematics itself, you will benefit enormously from taking Further Mathematics. This is because you are introduced to new topics such as matrices and complex numbers that are vital in many STEM degrees. Further Mathematics qualifications are highly regarded and are warmly welcomed by universities. Students who take Further Mathematics are really demonstrating a strong commitment to their studies, as well as learning mathematics that is very useful for any mathematically rich degree. Some prestigious university courses require you to have a Further Mathematics qualification and others may adjust their grade requirements more favourably to students with Further Mathematics.



Physics

HEAD OF DEPARTMENT: Mr J Hallam

EXAM BOARD: Edexcel – International A Level Physics

SPECIFICATION CODE: YPH11

ENTRY REQUIREMENTS: GCSE Physics and GCSE Mathematics Grade 7

As Bill Bryson says, *“Physics is really nothing more than a search for ultimate simplicity, but so far all we have is a kind of elegant messiness.”*

COURSE CONTENT

Theory and skills from GCSE are developed and studied in far greater depth. Many Year 1 topics will be familiar, such as mechanics, electricity and waves, but the approach at A Level will be much more mathematical and will really stretch students' understanding of these areas. New topics include materials and quantum physics, in which the familiar world is tipped on its head. Year 2 topics are largely new to students and include momentum, circular motion, electric, magnetic and gravitational fields, nuclear and particle physics, thermodynamics, astrophysics, nuclear radiation and oscillations. As a result of the increase in demand from GCSE, students often struggle at first, until they learn to apply their knowledge and take far more responsibility for their own learning.

Alongside the theory, students will develop practical skills, which will be applied to the sixteen core practicals. We will film all practical work to ensure students develop all the skills they would normally develop during practical work. Students will need to plan methods, take readings from the films, analyse results, draw conclusions, evaluate the procedures and calculate percentage uncertainties.

Students must be competent in their use of mathematics, for example rearranging equations such as $v^2 = u^2 + 2as$ to make s the subject. Combining equations is also important, so $\frac{4}{3}\pi r^3 \rho g$ represents the weight of a sphere, given ρ is its density. Rearranging equations into the form $y = mx + c$ is also required as it allows us to find physical constants from the gradient or y-intercept of a line. If you are unsure about your mathematical ability, you must talk to your Physics and Mathematics teachers.

#LOVEFREEMENS



COURSE ASSESSMENT

Students will sit six written papers at the end of the A Level course.

- Mechanics and Materials
- Waves and Electricity
- Practical Skills based on Units 1 and 2
- Further Mechanics, Fields and Particles
- Thermodynamics, Radiation, Oscillations and Cosmology
- Practical Skills based on Units 4 and 5

Later papers will also make synoptic links between different areas of the specification.

SUCCESS IN PHYSICS

To do well in Physics, you need to learn a lot of content in a lot of detail. Being proactive and coming up with good, ideally weekly, revision strategies is a must. Once students have learnt the content, they must then learn to apply their knowledge as well as all the skills they have been taught to unfamiliar situations. This may sound easy, but it requires a lot of practice and determination. Those students who independently pay attention to detail and look to improve their work are the ones most likely to do well.

WHY STUDY PHYSICS?

Students should study Physics if they are interested in its applications and ways of thinking and particularly if they wish to study a related subject, such as Physics, Engineering or Materials Science at university. Physicists are always in demand across a wide range of careers because of their logical skills and ability to interpret data.



**CITY OF LONDON
FREEMEN'S SCHOOL**
