

## SCIENCE, MATHEMATICS AND ECONOMICS PROGRAMMES -OVERVIEW

Concord College has an excellent academic record in the Sciences. It was placed in the top 10 UK schools for the provision of Science, Technology, Engineering and Mathematics subjects in October 2017. This accolade received by Concord is the result of new rankings produced by the UK government backed education campaign Your Life. The full details are available to view on the website.

In accord with its top rating, Concord is currently building a new science block which will be ready for Summer School 2018. The two storey science block covering 4,100 square metres – nearly treble the size of the existing facility – will create 22 laboratories. There will be 7 laboratories for each of the disciplines, biology, physics and chemistry and a research laboratory.

On all Science courses the syllabus includes theory work and will be accompanied by practical work in our new laboratories, supported by a team of skilled Laboratory Technicians. There are no “English only” classes for students selecting a course from our Science programme - but they are practising their English reading, speaking, listening and writing skills in all the Science lessons.

Students should have a good level of English to benefit fully from our Science programme, we would recommend **CEFR Level B1**.

### JUNIOR SCIENCE (Age 10-12)

- For students aged 10-12 years
- Primary/elementary school level
- Elements of Biology, Chemistry and Physics
- Age relevant and dynamic practical lessons and experiments to engage our younger scientists
- Aims to make science interesting for the student and to build a platform for future study
- Taught by Concord main term teachers and science teachers who return regularly to teach at our Summer School
- Maximum class size 10



### SCIENCE (Age 13-15)

- For students aged 13-15 years
- Secondary/Year 7-9 school level
- Choice of 2 subjects from Biology, Chemistry, Physics, Mathematics or Economics
- Follows the British General Certificate of Secondary Education (GCSE) syllabus
- Aims to give students as much practical, hands on experience as possible
- Develops and improves manipulative skills, design of experiments, data recording and evaluation of results
- Supports theory they may have covered already in their school at home



- Weekly tests to assess progress
- Taught by Concord main terms teachers and science teachers who return regularly to teach at our Summer School
- Maximum class size 14

### SAMPLE OF TOPICS FOR SCIENCE (Age 13-15)

Biology	Chemistry
Diet and Digestion Enzymes Food chains Food tests Food types, structure, importance of each food Photosynthesis Respiration	Chemical analysis Elements, compounds and mixtures Rates of reaction Separating mixtures Titrations Types of chemical reactions
Physics	Mathematics
Density Elasticity Electricity and Ohm's Law Frequency and tension Gravity Heat and kinetic energy Hooke's Law Light refractions, prisms and lenses Magnetism Measurement Momentum and impulse Newton's Laws Pendulum Pulleys The gas laws Vectors and linear motion Velocity of sound Work, energy and power	Algebra Basic algebraic methods Factorisation Linear equations Quadratic equations Simultaneous equations Surds Geometry Arithmetic and geometric progressions Calculus Polygons Quadrilaterals Triangles Trigonometry Statistics

### SCIENCE (Age 16+)

- For students aged 16+ years
- Secondary/Year 10-11 school level
- Choice of 2 subjects from Biology, Chemistry, Physics, Mathematics or Economics
- Follows the British Advanced level syllabus
- Designed to make the transition from GCSE level work to Advanced level as smooth as possible
- Past paper exam questions will be studied
- Provides guidance on the style of exam question and techniques to produce good quality answers
- Weekly tests to assess progress



- Taught by Concord main terms teachers and science teachers who return regularly to teach at our Summer School
- Maximum class size 14

### SAMPLE OF TOPICS (Age 16+)

Biology	Chemistry
Biochemistry of foods and food tests Enzymes and their roles in the body Photosynthesis and digestion Anatomy with an introduction to dissection Some Physiology theory Blood and the genetic code	Rates of reaction and the effect of concentration, temperature and particle size Acids and bases – titration reactions and indicators Tests for chemicals including gas tests and tests for positive and negative ions Competitions based on what has been learnt in previous lessons Building a “Rube Goldberg” machine
Physics	Mathematics
Measurements and units Electric current Direct current circuits Electricity and magnetism Electronics Forces in equilibrium Motion and force Work, energy and power On the move; Materials Waves Particles physics	Quadratic function Exponential function Logarithmic function Trigonometric function Sketching curves Integration Differentiation Challenging problems to develop mathematical thinking and problem-solving skills
Economics	
Microeconomics - how we model the decisions people make and how prices are decided Macroeconomics – how the whole economy is modelled and measured, GDP and its individual components and other measures such as inflation The Theory of the Firm - how businesses set price, their revenue, costs Competition – Perfect Competition, Monopoly, Monopolistic Competition, Oligopoly, and examples of remedies for Monopoly Famous economists, their ideas and how they still influence today’s economy	