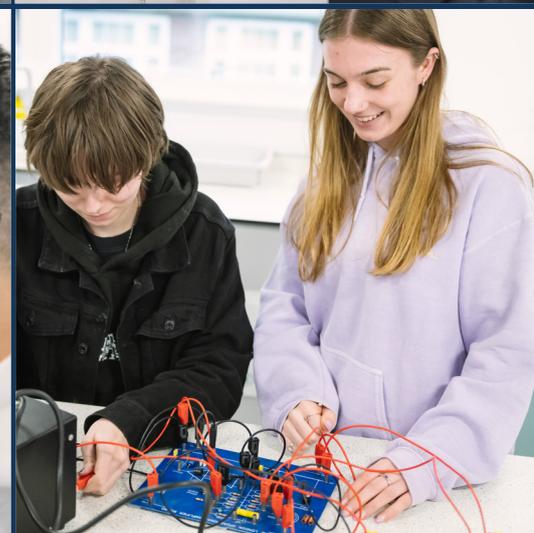
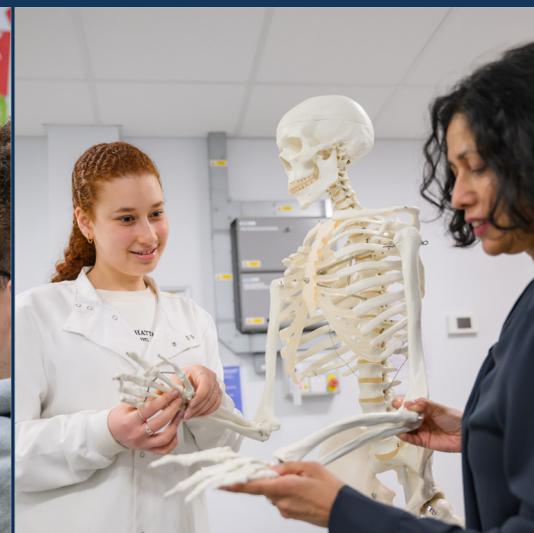
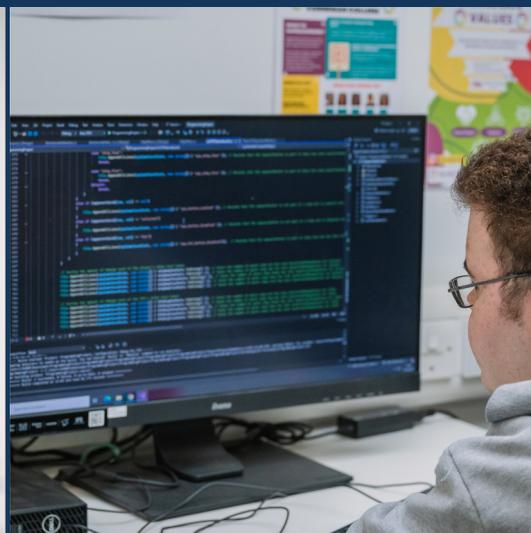




STEM

AT VARNDEAN SIXTH FORM COLLEGE



A close-up photograph of a student with braided hair, wearing a white lab coat, using a pipette to transfer liquid into a small vial. The student is focused on the task, and the background is slightly blurred, showing other laboratory equipment.

At Varndean Sixth Form College, through our challenging and engaging teaching, we hope to inspire and motivate the next generation of scientists, technologists, engineers and mathematicians.

With the opening of our £2.9m STEM Centre in September 2020, Varndean Sixth Form College is at the forefront to offer those students wishing to pursue a career in the field of Science, Technology, Engineering and Maths, the finest opportunity to progress to the next stage of their careers.

We offer a wide range of STEM subjects: **A Levels in Biology, Chemistry, Physics, Mathematics and Computer Science**, as well as vocational courses in **Applied Biology (Medical Science) and Engineering**.

The rigorous academic framework of these subjects, combined with the requisite technical and practical skills developed during the course of study, make them ideal choices for those with enquiring minds and are the foundation stones for a number of important career routes.

Through our STEM teaching we encourage students to move on to higher level STEM courses and into a STEM career.

These students would hopefully go on to work on some of the biggest developments of the 21st Century.

STEM subjects are the foundations of the industrial and corporate world. Students who study these subjects will gain a diverse and comprehensive skill set. As such, these subjects present a high currency for universities and are especially sought after by a broad range of employers.

STEM skills are essential and not only contribute to the UK's manufacturing and research output, but they also offer exciting opportunities in emerging technologies. The promotion of these subjects by government is intended to 'help empower future generations through science, technology, engineering and mathematics to grow a dynamic, innovative economy.'

Varndean Sixth Form College is particularly keen to encourage a greater involvement in STEM by all students and, in particular, we want to see more female students studying and working in this area.

Varndean also offers the Level 3 **Carbon Literacy Qualification** for students who wish to enhance their CV or university application. This nationally recognised, self-study, short course designed in partnership with the Manchester Metropolitan University, enables students to gain a complete overview of the science of climate change and understand the actions required of the Government, organisations and individuals.

CAREER PATHS

Why a STEM career?

http://www.wherestemcantakeyou.co.uk/docs/Why_STEM_Careers.pdf

Where can STEM take you?

<http://www.wherestemcantakeyou.co.uk/signposting.html>



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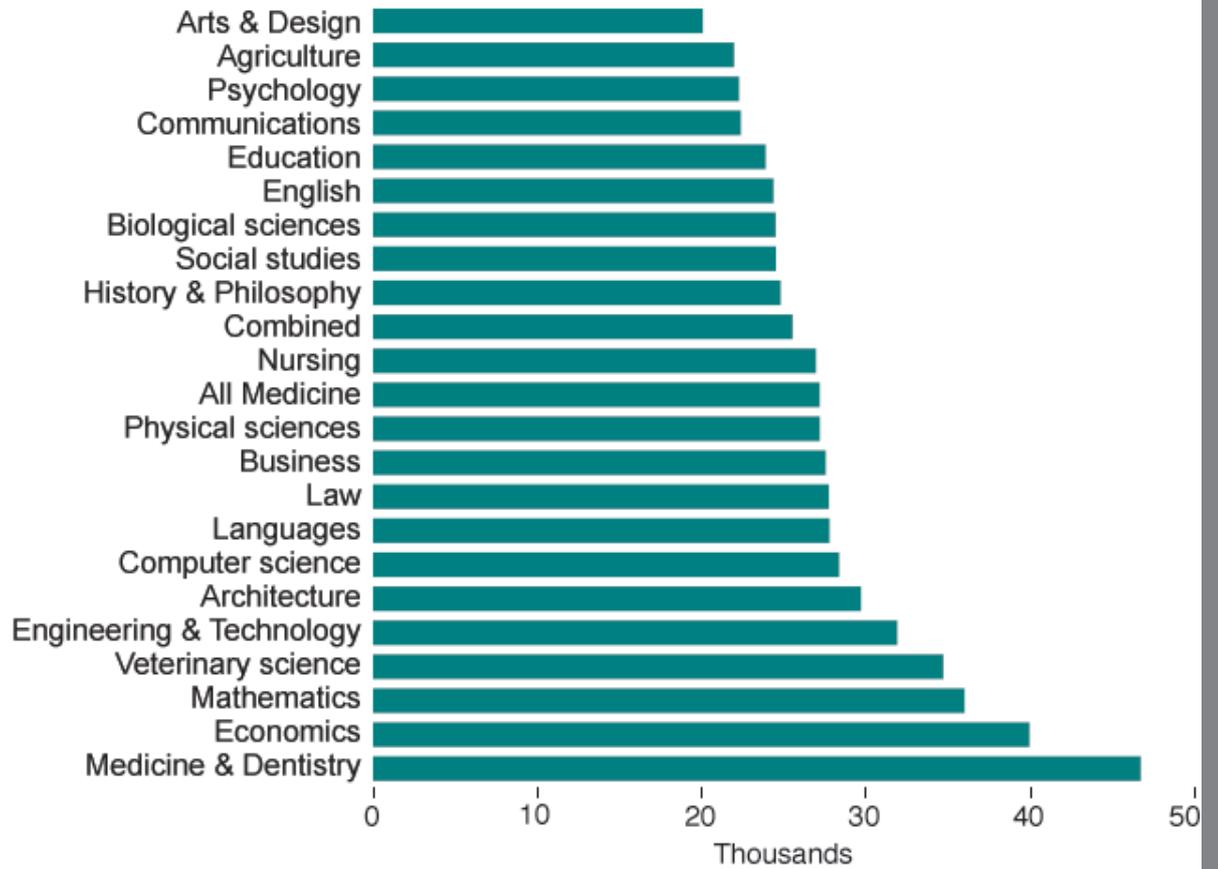
CAREER PATHS

Science jobs are among the highest paying and rewarding in the world.



Which graduates earn the most?

Median annual earnings (£) by subject, five years after graduating



Source: Institute for Fiscal Studies

BBC



STEM COMPUTER SCIENCE



COMPUTER SCIENCE

Computer Science is a subject that spans theory and practice. Through the study of this subject, you will become a confident programmer using different coding languages to solve problems. You will learn how to apply computational thinking to decompose larger problems into smaller ones and use a range of techniques to solve them. You will learn how computers work and how encryption allows the safe transfer of private data over public networks. You will also learn about security issues such as hacking and how viruses are spread.



TRANSFERABLE SKILLS

Problem solving, logical thinking, critical-thinking, research skills, teamwork.

CAREER PATHWAYS

Many students choose to study Computer Science and related subjects at degree level. Popular choices include computer science, robotics, artificial intelligence, computer forensics, software engineering, networking, digital media, web development, e-business and computer games design. Some students move onto foundation degrees or HND courses. Apprenticeships are also increasingly popular with the many technology firms in the Sussex area.



STEM MATHEMATICS

MATHEMATICS

Maths plays a valuable role in technology and the economy. It is used to solve real world problems and can open up solutions that were previously not understood. It is a system of reason and logic used to explain the universe and is both practical and creative. Pursuing an education in maths equips you with skills that are highly valued in most careers. Mathematical ability is very highly regarded by both universities and employers.

TRANSFERABLE SKILLS

Problem solving, logical thinking, conceptual ability, analysis and interpretation of data, research skills

CAREER PATHWAYS

Maths qualifications are considered essential or desirable for a whole host of degree subjects including virtually all sciences, economics and related courses and many social science courses. There is a national shortage of mathematicians, and employment prospects are good. To get some idea of careers open to those studying Maths at A Level and beyond, look at the careers section at <http://www.mathscareers.org.uk/>



STEM NATURAL SCIENCES



BIOLOGY

The field of biology is a complex and rapidly evolving science. It helps us understand the behaviour of living systems from the level of cells to whole organisms and ecosystems. The study of biology can include areas such as advanced genetics, evolutionary biology, plant biotechnology, tropical medicine, marine biology, animal and human physiology, zoology, microbiology, forensic biology, environmental biology, molecular biosciences and neuroscience.

If you are fascinated by life and living processes then biology is the subject for you. It will help you to develop a much more detailed scientific knowledge and understanding of the subject.

TRANSFERABLE SKILLS

Data analysis (including use of IT); problem solving; producing balanced ethical arguments; scientific literacy; teamwork.

CAREER PATHWAYS

Many students go on to degree courses in Medicine (with Chemistry A level), Nursing, Physiotherapy, and Biological Science degrees. It is essential for Medicine related and Biological Sciences but is also highly valued for subjects such as Law. This subject can lead to careers in the biotechnical services

CHEMISTRY

Chemistry has a worldwide impact. As a fundamental physical science it has a lasting effect on our planet and will be needed to help tackle the challenges society faces in changes to environment, food security and energy supply. Almost every new technological change and important discovery has its foundation in Chemistry.

Chemistry is the key to life and making the world a better place in which to live. It provides the basis for medicine, agriculture, food technology, environmental science, forensic science and many other fields. Having a chemistry qualification is like having an open flight ticket to any destination in the world!

TRANSFERABLE SKILLS

Chemistry graduates earn around 30% more during their career through having intellectual, communication, organisational, interpersonal, research, numeracy and IT skills.



CAREER PATHWAYS

Many students go on to degree courses in Chemistry, Biochemistry, Medicine and medically related subjects, Food Technology, Environmental Science, Agriculture, Law and Forensic Science.

PHYSICS

Physics tries to explain how the universe works as simply as possible. From Quarks to Quasars, Physics is all about understanding and predicting nature. You will look at how our world (and beyond) behaves and try to make sense of it. You will enjoy Physics if you want to find out about life, the universe and everything, develop models

to explain how the world we live in works, sharpen your problem-solving skills and see how physics is used all around us. You will discover that our ideas of how things work have changed over the centuries; scientists are not always 'right'. A theory only lasts until an experiment proves it wrong! Then we need a new one.

TRANSFERABLE SKILLS

Analysis, problem-solving, communication, modelling, research, mathematical skills, evidence-based decision-making.

CAREER PATHWAYS

Many students go on to degree courses in Physics, Astronomy, Mathematics, Engineering, Research, Financial Management, Law, Medicine and numerous other fields. Physics is an in-demand subject in the UK and, indeed, worldwide.



VOCATIONAL COURSES

APPLIED BIOLOGY (MEDICAL SCIENCE)

If you enjoyed Biology at school and want to increase your specialist knowledge and understanding in a practical context, then this is the course for you.

The new AAQ which has replaced BTEC Human Biology is a two-year course equivalent to one A Level, but the approach is different to A Level as there is a greater emphasis on practical work. Also, 42% of the final grade is based on coursework completed over the two-year period and 58 % on exams which are taken in Year 1 and Year 2. From the mandatory units, you will develop a knowledge and understanding of human physiology, anatomy and pathology; secondary research skills including collection and interpretation of data from valid sources and drawing

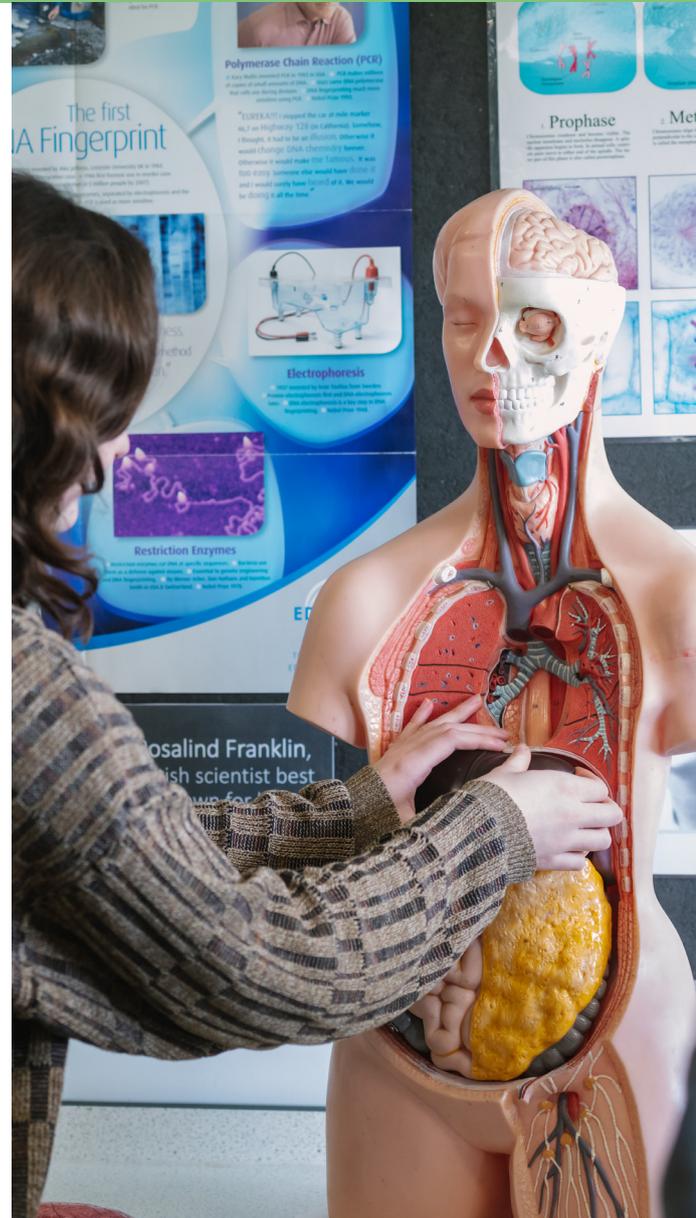
reasoned conclusions; practical skills in microbiology and their application in the diagnosis of disease, as well as critical thinking skills.

TRANSFERABLE SKILLS

Data analysis (including use of IT); problem solving; producing balanced ethical arguments; scientific literacy; teamwork and research skills.

CAREER PATHWAYS

If you are considering a career in the NHS, nursing, paramedicine, biomedical science or laboratory work, then this is the course for you. Students can also progress to other Biological Science degrees.



ENGINEERING

Electrical, Electronic and Mechanical Engineers; Aerospace, Automotive and Nuclear Engineers; Civil Engineers and Environmental Engineers. What do they all have in common? They are all engineers!

If you are interested in Engineering then this course is for you! It is a modular course with a mixture of exams and project work and if you combine this with other suitable qualifications it will allow you to progress to your dream career in engineering.

You will study the following units:

UNIT 1: Principles of Engineering

UNIT 2: Materials Science and Technology

UNIT 3: Engineering in Practice

UNIT 4: Computer-Aided Design (CAD)

UNIT 5: Electrical Devices and Circuits



TRANSFERABLE SKILLS

The ability to learn independently, research actively and methodically, give presentations and group working. Analytical and problem-solving skills, reading technical texts, effective writing skills, interpersonal skills such as communicating, working collaboratively, negotiating and project management.

CAREER PATHWAYS

BTEC Engineering is welcomed by universities. However, you are advised strongly to check the specific entry requirements of individual universities via the UCAS website. It can also lead to apprenticeships in engineering and supports direct progression to a variety of jobs in the sector.

STUDENT PROGRESSION



"I chose Varndean because it felt really friendly, like the teachers actually cared about getting to know you as a person. They know how to create a real sense of community and are able to offer personalised help, which meant I never felt lost in the crowd. Despite only doing Double Science GCSE at school, I chose to continue doing STEM subjects because I enjoy problem solving and wanted to understand more about the world around me. I've found that studying Chemistry at degree level and working in labs require a huge amount of collaboration and creativity, and those are reasons I still love it as a subject."

Eliza McHugh, Chemistry, University of Oxford



Natasha studied Biology, Chemistry, Maths, Modern History and French at Varndean before studying Medicine at University College London (UCL) in 2015. After a gruelling six years, the last eighteen months during a pandemic, she graduated in 2021 as a fully qualified junior doctor and is now working in a London hospital. She has been a frequent visitor back to Varndean, regularly assisting the Chemistry Department in giving talks to our aspiring medical students about what it is like to train as a doctor. She is also a voice for those learners who are deaf or hard of hearing and is passionate about accessibility for deaf people in education. **Natasha Wilcock, Medicine, University College London**



Labib studied Biology, Chemistry, Maths and Economics at Varndean, before going on to study a six year degree in Medicine. He is now working as a junior doctor at the Royal Sussex County Hospital with the aim is to pursue a career in surgery.

Labib Syed, Medicine, Bartholomews & the London School of Medicine & Dentistry



"During my time at Varndean Sixth Form College, I studied A Level Biology, Chemistry and Early Modern History, all of which I thoroughly enjoyed. Being a part of Varndean has always felt like an extended family to me and I feel very lucky to have had the opportunity to study there. The support from my tutors was invaluable, and something I will always be extremely thankful for. My greatest ambition has always been to become a vet and it is without doubt that the support I have received, especially from the Science Department, has been invaluable in my journey. I must say, being at 'vet school' now is surreal."

Jessica Duke, Veterinary Medicine & Science, University of Surrey



"I've really enjoyed being able to understand how the world around us works, from the smallest of microorganisms and subatomic particles to entire species, planets, galaxies and the laws of our universe. I gained so much knowledge during my two years at Varndean Sixth Form College, it's unbelievable. I think my life would have been significantly different had I not gone there."

Danny Duffill, Biomedical Engineering, Imperial College London



"I chose Varndean because of the strong Science department and the support it offered for aspiring medics. I was always interested in the sciences so it was a natural progression for me to study medicine. During my time at Varndean I went on a trip to CERN in Geneva, as well as the United Nations. I also attended Chemistry Conferences and won awards in various Chemistry competitions by the RSC and the University of Cambridge. Outside of college I also won 'UK's Young Scientist of the Year' award, as well as a seven year scholarship by The Army. After studying medicine at university, I aspire to be a military doctor in The Army." **Anya-Niamh Tidey, Medicine, St George's College, University of London**



"I chose to study all STEM subjects because I wanted a real challenge and be provided with a source of aspiration and knowledge. I studied Chemistry, Physics, Maths and AS Biology and also achieved a silver award in both the C3L6 and Chemistry Olympiad. Outside of college, I also gained an award for attending an HE programme at Sussex University. I then went on to study Physics with Astronomy at university and hope to specialise in fusion in stars. Learning what I did at Varndean was a true honour, something that I will cherish and never forget."

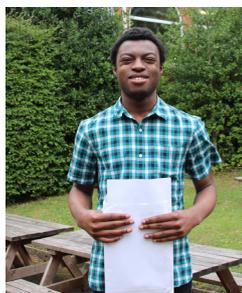
Owen Beardwell, Physics with Astronomy, University of Southampton



"I've always questioned why things around me are why they are and my passion for studying Biology, Chemistry and Maths began when I understood that science was the means by which I could answer these questions and understand the world around me. I've really enjoyed the problem-solving aspect of Chemistry and Maths and discovering new things in Biology. I believe there's virtually no limit when it comes to learning new things. I've also liked how all the subjects I've studied are interconnected and how everything I learn can be effectively seen by many different perspectives. In the future I would like to be able to open my own lab and pursue a career in research, both as a scientist and as an entrepreneur."
Omar Abd El Maboud, Neuroscience, University of Bristol



"I chose to study Biology and Chemistry as I wanted to go on to study a Science-based degree. Whilst at Varndean I really enjoyed the specification in Biology, in particular the mini projects, my favourite being the HIV group project. I took part in many Chemistry competitions, including the Cambridge Chemistry Challenge and Chemistry Olympiad in which I achieved a silver medal. The dedication and support of my teachers was amazing and after university I hope to follow a career in some form of lab research, either pathology or histology."
Natalie Lamont, Biomedical Sciences, University of Edinburgh



"Upon starting at Varndean, I was slightly nervous about studying IB Biology and everything it entailed. However, having completed the course under the tutelage of Yaso Shan, the fears I might have once had were replaced by a new and genuine passion and understanding of the subject. Undeniably, this was because of Yaso's innovative and holistic approach to teaching the course material by frequently incorporating tasks that helped the class understand what we'd been taught. Lessons were never limited to the scope allowed by the syllabus, but instead, discussions about current and future applications of course material were very much encouraged. Additionally, Yaso's caring nature and overall enthusiasm particularly shone through when designing and setting up my experiment for the Internal Assessment, where she was totally dedicated to ensuring that I understood the project. It was these things, amongst many others, that made my Biology class an absolute pleasure to go to, even during the most challenging parts of the IB."
Fy Oladipo, Medicine, Imperial College London



"I chose to study at Varndean because I was drawn to the breadth, complexity and international nature of the IB. I had always felt torn between Humanities and Sciences, so loved the combination of subjects with the IB. Studying History, Chemistry and Biology at HL allowed me to expand my interest in the overlap between science and people, which I explored in my Extended Essay on vaccine hesitancy in Hong Kong. Studying sciences at this level and learning from deeply enthusiastic tutors, made my experience at Varndean invaluable, and I loved learning about the intricate mechanisms and theories as to why things happen. Due to my aspiration to study medicine, I attend the MedVetDent Society where we discussed the application process, explored work experience opportunities and found out about any medicine-related talks that we could attend. I led a team to the final of the Oxford University Practical Ethics and Responsibility competition, competed in the Royal Society of Chemistry Analytical Competition where our team came first, as well as the Cambridge Chemistry Challenge in which I received a silver award."
Anna Zhang, Medicine, University College London

*During my time at Varndean as an aspiring medical student, I think one of the most useful (but also fun) experiences has been the 12-week intensive **Clinical Case Study Workshop**. We got to take part in diagnosing different cases, allowing us to understand the experience of being a doctor in a truly unique way. The workshop gave me a competitive edge in my personal statement, which helped me get medical interviews at City St George's. The programme also brought in professionals, who walked us through chicken leg dissections and taught us how to perform a cranial nerve exam, helping me cement my love for medicine, as well as giving great discussion points for my medical interview. Yaso, the programme lead is an amazing teacher, ensuring no one is left behind, despite covering difficult and medically complex subject material. Her knowledge of biology was clear, while also creating a fun environment where everyone felt comfortable to take part and ask questions. Thank you Yaso, for running this programme, but also for having such a positive energy that made every lesson such a highlight, and something we all looked forward to!"*
Alexis Antoniadis (IB Diploma) 2024-26