

SCIENCE

COURSE GUIDE 2019

BIOLOGY
CHEMISTRY
PHYSICS
APPLIED SCIENCE



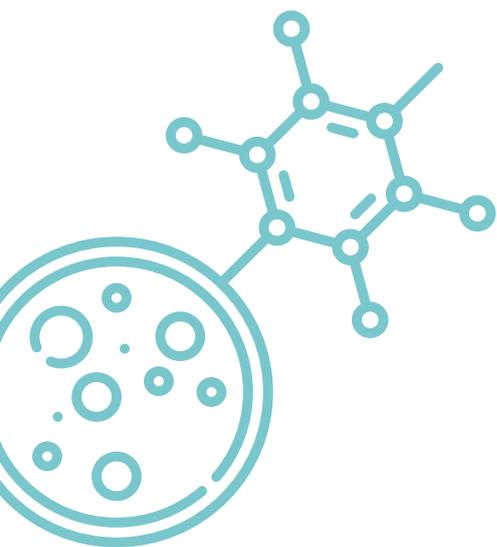
Science is a great game.
It is inspiring and refreshing.
The playing field is the universe itself.

ISIDOR ISAAC RABI



BIOLOGY

Linear A Level
Exam Board AQA



OUR STUDENTS SAY...

Carmel is a rewarding place to study as it has a friendly community feel that allows you to work to the best of your abilities.

There is great support from all staff with lots of places around college for independent study. The open door policy of subject teachers means that when you need advice, or are stuck on questions etc, there is always somebody there to help.

A Level Biology is a rewarding subject that is really interesting and varied as it encompasses a range of different aspects of Biology, from human transport to gene expression. Biology also allows you to gain skills in maths, problem solving and exam techniques which can also be used for your other subjects. At Carmel there's fantastic support with regards to work placements. I personally benefited from a week's work experience at the Cardio Respiratory ward at Whiston Hospital. This not only gave me plenty to talk about in my university interviews, but also set me apart from other applicants.

Lewis Howard
Scarisbrick Hall School
Studying: Biology, Chemistry, Geography



Why choose Biology at Carmel?

The Biology Department is excellent and students are highly successful. Out of the 134 students who studied Biology last year 55% achieved A*-C grades.

You will be taught by an enthusiastic, caring team who are committed to your success in the subject. All members of the department are very experienced teachers and some are current examiners. You will have the opportunity to experience a wealth of enrichment activities. Over the years, excursions have included visits to Chester Zoo and trips to London, Holland, Costa Rica, Yellowstone National Park, and The Gambia. Students have also visited the Life Science department at Manchester University to make use of a rare opportunity to look at their ground breaking current animal research and the Christmas lectures on microbiology at Liverpool University. The department also welcomes visiting lecturers every year and enters national and regional Olympiad Competitions.

What will the course involve?

You will enjoy a wide range of learning experiences, including practical work, practice exam questions, comprehensive printed notes and interactive activities. The practical work will reinforce and consolidate key concepts to help you achieve highly, as well as developing invaluable laboratory skills.

The course covers fundamental biological principles and how this knowledge is used in the 21st century. In your first year, you will study a wide variety of units from cells and mammalian transport and digestion, through to genetics and health and disease. In your second year, you will study more detailed aspects of Biology such as the nervous system, muscles and homeostasis, evolution and genetic engineering. Their applications in modern scientific research are emphasised.

Homework is set regularly to test your understanding, as well as end of unit tests. These are used to provide feedback on your progress, as well as providing you with targets to help you achieve your potential. We provide the opportunity to reflect on your own learning to help prepare you for your next steps.

How will I be assessed?

Biology is a linear A Level so assessment will take place at the end of the two year course. This will consist of three exams based on eight topics which will all be examined in May/June. There is a large practical element to the course and the students must complete certain practical tasks over the two years to pass the course. This is not examined but forms the practical endorsement on your exam certificate.

Where does this course lead?

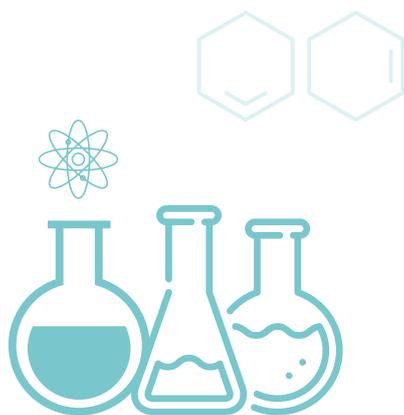
There are many careers for which Biology is either essential or very useful - zoology, medicine, nursing, dentistry, physiotherapy, forensics, criminology, veterinary science, pharmacy, pharmacology, biochemistry, sports therapy, psychology, speech therapy, forestry, biotechnology, food science, microbiology, radiography, teaching, business, science writing or art.

How successful are our Biology students?

	Number of entries	A*-B	A*-C	A*-E
2015	107	47%	66%	99%
2016	100	30%	59%	97%
2017	127	38%	58%	98%
2018	134	37%	55%	99%

CHEMISTRY

Linear A Level
Exam Board OCR



OUR STUDENTS SAY...

Joining Carmel in September studying Chemistry was one of the best decisions I have made so far.

The excellent facilities and resources available at the college enable us to take part in regular advanced practicals, which are not usually offered in high schools and colleges alike.

I enjoy studying Chemistry as the combination of theoretical and practical learning ensures that each lesson is like no other. The Chemistry department is extremely helpful, offering extra support most days of the week so you can reach your full potential. They also provide continual feedback and encourage students to think about life after college.

Throughout the two years at Carmel there are lots of enrichment opportunities that you can take part in such as the Cambridge Chemistry Challenge, the Young Analyst competition and the Chemistry Olympiad. I would recommend studying Chemistry as it is extremely relevant to the world around us and is beneficial in a wide range of career choices. I have always enjoyed Chemistry, and hope to continue at university studying Chemical Engineering.

Emily Roberts
Byrchall High School
Studying - Chemistry, Physics, Maths, Further Maths



Why choose Chemistry at Carmel?

In 2018, A Level results were outstanding with students achieving 84% A*-C grades. These results are significantly higher than the national average and much greater than those of other local colleges. The Chemistry tutors are extremely committed to ensuring that you will be given the help you need to achieve at your highest possible level.

All the tutors are very friendly and develop good relationships with students, so they will support you fully and ensure that you are successful. Three members of the Chemistry team are experienced OCR examiners, which is extremely valuable when helping to prepare you for external examinations.

What will the course involve?

You will be given a comprehensive set of interactive notes and access to online resources, which provide a detailed coverage of the course specification. The notes also include many practice questions that will allow you to consolidate your understanding of the material being covered. Regular practical sessions will

help to develop your laboratory techniques and evaluative skills, which will be invaluable for future science related careers. These practical sessions are closely linked to the theory taught in lessons and are an effective way of developing your grasp of the theoretical concepts covered. Regular homework and end of topic tests are used to inform both you and your tutor of your progress throughout the course.

How will I be assessed?

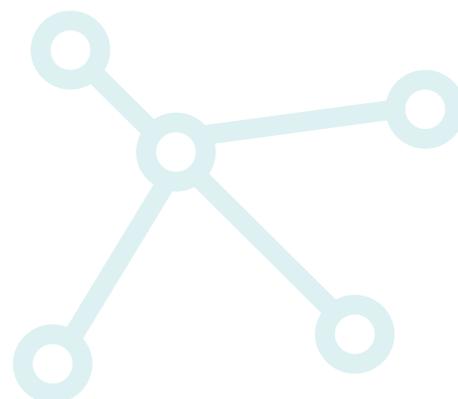
Chemistry is a linear A Level so assessment will take place at the end of the two year course. This will consist of three exams based on six modules which will all be examined in June. You will also complete a range of practical tasks during the two years for which you will be awarded a practical endorsement, which will supplement your A Level certificate.

How successful are our Chemistry students?

	Number of entries	A*-B	A*-C	A*-E
2015	104	51%	74%	97%
2016	97	47%	71%	98%
2017	120	56%	74%	98%
2018	110	50%	84%	100%

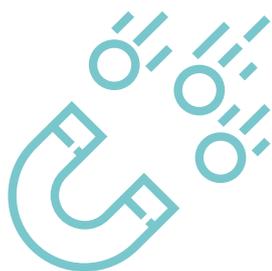
Where does this course lead?

As well as being an important subject in its own right, Chemistry is an essential requirement for medicine, dentistry, and veterinary science. In the past our students have entered university to follow many different courses - pharmacy, medicine, dentistry, physiotherapy, analytical chemistry, pure chemistry, forensic science, biological and environmental sciences, law, engineering and business.



PHYSICS

Linear A Level
Exam Board AQA



OUR STUDENTS SAY...

Physics is a useful subject for all students. The analysis and problem solving skills gained can be applied to a broad range of subjects.

As I hope to study Engineering at university, I also find the subject matter interesting in its own right. At Carmel the course material is taught well and students are always informed about how each topic is relevant to them. The Physics department has also helped me to choose my future career path and given me confidence to pursue it. From organising enrichment opportunities and guest speakers to encouraging me to apply for summer schools and the Nuffield placement. Also the daily help available from the Physics tutors at Carmel has given me the best possible foundation for moving forward in my education.

Beth Austin
Sts Peter & Paul Catholic College
Studying - Chemistry, Physics, Maths, Further Maths



Why choose Physics at Carmel?

The Physics department at Carmel is excellent and students taking Physics are highly successful. All the tutors are very friendly and approachable and have a wealth of experience. Three members of the department are established examiners and this expertise will help you to succeed at Carmel.

You will have the opportunity to experience a wide range of extra-curricular activities including our bespoke enrichment programme 'Tomorrow's Engineers'. In recent years, excursions have included visits to London, Jodrell Bank, Daresbury and CERN.

What will the course involve?

Over the two years you will study the following modules:

- 1 - Measurements and their errors
- 2 - Particles and radiation
- 3 - Waves
- 4 - Mechanics and materials
- 5 - Electricity
- 6 - Further mechanics and thermal physics
- 7 - Fields and their consequences
- 8 - Nuclear physics
- 9 - Astrophysics

You will be given a full set of resources which include many practice questions that will allow you to consolidate your knowledge and understanding of the content covered. Regular laboratory sessions will help to develop your practical and data analysis skills which are invaluable for physics related careers. Your progress will be very closely monitored with regular assignments and end of topic tests. You are advised to study A Level Mathematics alongside A Level Physics.

How will I be assessed?

A Level Physics is a linear course so assessment will take place at the end of the two years. This will consist of three exam papers based on the nine modules, practical skills and data analysis. There is a practical element to the course and the students must complete a minimum of 12 practical tasks over the two years. This forms the practical endorsement on your exam certificate.

Where does this course lead?

Physics is a fascinating subject to study at higher level and Physics graduates are in demand because of their analytical and problem solving skills. Physics is an essential requirement for a number of careers and in the past our students have entered a broad range of areas including engineering, medicine, architecture, computer science as well as physics.

How successful are our Physics students?

	No of Entries	A*-B	A*-C	A*-E
2016	52	42%	62%	96%
2017	69	36%	61%	99%
2018	64	34%	59%	97%

APPLIED SCIENCE

BTEC Level 3
Exam Board PEARSON

100%
of our students passed
in 2018.

OUR STUDENTS SAY...

The thing I enjoy most about Carmel is the other students and staff, they are all so kind and caring. The college has a calm atmosphere which takes away the stress of exams and coursework.

BTEC Applied Science is an important course for me as I am going on to do a nursing degree at university. This course is the highlight of my week in college as the tutors are lovely and so interesting to talk to. As part of the first year of the science course we were taken to a power station to widen our knowledge of how power is generated and also the health and safety procedures that need to be taken. Carmel is such a great learning environment; I have enjoyed every day here. BTEC Applied Science has developed my skills that I will need later on in life when I become a nurse.

Ethan Peers
Byrchall High School
Studying - BTEC Applied Science, Statistics



Why choose Applied Science at Carmel?

Carmel College has a strong tradition of successful science teaching over many years.

Level 3 Applied Science is a very well structured, practical science course leading to nationally recognised qualifications: National Extended Certificate equal to 1 A Level; National Diploma equal to 2 A Levels. The course covers all three sciences of Biology, Physics and Chemistry but in an "applied" context. That means that you will learn the science in a "real life" context through specially developed assignments. You will sometimes work on your own and sometimes in small groups.

We will teach you the research and study skills you will need for success. There will also be opportunities to visit scientific workplaces to learn how science and scientific skills are used professionally. Such visits will allow you to gain ideas about career opportunities in science. As well as using ICT for presenting your work, you will also be encouraged to use it for research and for monitoring and recording experimental work.

You will benefit from extensive support and guidance throughout your time on the course and we pride ourselves on taking a personal interest in your success.

What will the course involve?

From the start of the course you will work towards the new Level 3 BTEC Extended Certificate in Applied Science. This is comprised of four units:

- Unit 1: Principles and Applications of Science
- Unit 2: Practical Scientific Procedures and Techniques
- Unit 3: Science Investigation Skills
- Unit 8: Physiology of the Human Body Systems

If you choose to study the Level 3 Diploma, equivalent to 2 A Levels, you will complete 8 units in total over the 2 years.

How will I be assessed?

Assessment is a combination of assignment based tasks and formal examinations. For the internally assessed assignments, clear objective criteria are used to assess competency in all the key science areas and you will be able to see how your achievements build up as the course proceeds.

Unit 1 and unit 3 are assessed by formal examination. Unit 1 takes the form of a 1.5 hour written examination, while unit 3 is a practical investigation designed to assess the skills you have learned during the completion of unit 1 and unit 2.

This combination of assignment tasks and formal examinations will provide you with an excellent skills base which will help you progress in your future career.

How successful are our Applied Science students?

		No of Entries	Distinction* - Distinction	Distinction* - Merit	Distinction* - Pass
2016	Subsidiary Diploma	38	82%	95%	100%
2017	Subsidiary Diploma	36	92%	100%	100%
2018	Subsidiary Diploma	49	88%	100%	100%

(Distinction* = grade A*, Distinction grade A at A Level)

Where does this course lead?

This course will prepare you for a career in many science-based industries as Primary Teaching, Childcare, Nursing, Sports Management or Sports Training. Many students have progressed to study a wide range of subjects including Forensics, Construction, Animal Behaviour, Biochemistry, Physiotherapy and Biomedical Sciences. Other students have chosen to follow Apprenticeships in laboratory work or Engineering.

Biology trip to London

Students spent the afternoon in the Natural History Museum, visiting exhibits on everything from dinosaurs and earthquakes through to evolution and human biology. After this there was an opportunity for a spot of shopping in Covent Garden.

Following an evening meal in a French restaurant, the students went on the London Eye. This was great as all the Sights of London were visible, including historic landmarks such as the Houses of Parliament, Waterloo Station and Wembley. As part of this, the students experienced a 4D show prior to boarding the pods.

On the second day, students visited London Zoo before heading home. Favourite animals included the giraffes, painted dogs and the sloth!



Enriching

Applied Science visit to Power Station

BTEC Applied Science students had the opportunity to look behind the scenes at Fiddlers Ferry in Cheshire which is the 2nd largest coal fired power station in the country. The students who are working towards their 'Working in the Science Industry' unit found out about the company and learnt more about how electricity gets into our homes. It was a very educational and enjoyable trip.

Biologists attend Science and Technology Taster Day at Lancaster University

This event is designed to give students the chance to experience what it's like to study a science or technology degree at a top UK institution. Activities included meeting current students and lecturers, taking part in a campus tour and having a go at a variety of practical activities including a DNA investigation and techniques used to measure climate change.

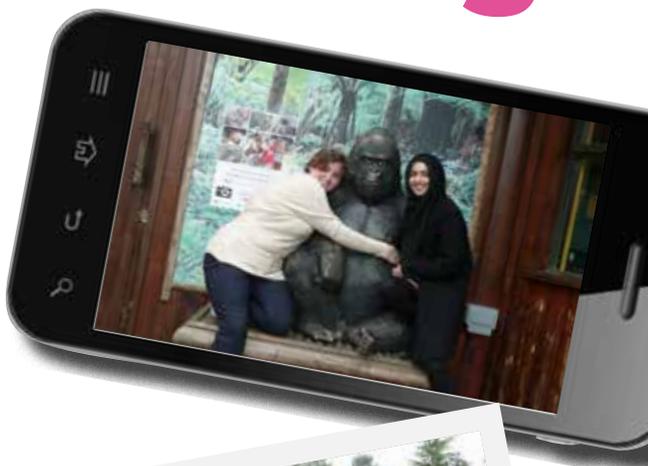
Manchester University Trip

A small group of students made the most of a rare opportunity to visit the Manchester University Life Sciences Department to look at ground breaking current animal research.

The Upper Sixth Biology students also benefitted from listening to a visiting lecturer from Manchester University delivering a session on the Biochemistry of Cell Signalling.

Biology trip to Chester Zoo

In March, all of the Upper Sixth students spent the day at Chester Zoo. The main purpose of the trip was to attend talks given by the Zoo's education department on natural selection and evolution. This is always a valuable experience as this is on the specification and included the opportunity to handle specimens kept at the zoo. After the lecture, students were free to enjoy the Zoo, see all the animals and of course, have an ice cream!





Merseyside Young Analyst Competition



Olympiad Competition

Royal Society of Chemistry Young Analyst Competition

Each March, a team of three Chemistry students take part in the Merseyside heat of the RSC Young Analyst competition. They spend a day working in the Chemistry labs at Liverpool University, carrying out chemical analysis and doing calculations as a team, with the winning answer being the closest to the standard.

Cambridge Chemistry Challenge

Every year Lower Sixth Chemistry students sit the CCC exam to stretch and challenge their ability to apply their chemistry knowledge to unfamiliar contexts beyond the A Level specification.

RSC Olympiad Competition

Every year, Upper Sixth Chemistry students sit the RSC Olympiad paper. Last year 12 students took part and all were awarded certificates - 1 Gold, 2 Silver and 9 Bronze – congratulations!

STEM Masterclass at the University of Liverpool

Every June, students participate in Science and Engineering masterclasses at Liverpool University's state of the art Central Teaching Laboratories.



Cambridge Chemistry Challenge

Experiences

Physics CERN Trip

Carmel's Physics department took 20 students to CERN which has the world's largest particle physics laboratory. They stayed in Geneva for 4 days and were lucky enough to have four guides who were physicists and engineers from all around the world.

The group stayed at the CERN hotel which had amazing views of the Jura Mountains. On the first day the group took a tram to Geneva city and explored the historical city.

The following morning they visited CERN's super conducting magnet test facility where they saw the main components that make up the LHC (Large Hadron Collider). In the afternoon they were taken 100m underground to see CMS which is one of the main detectors on the 27 km Large Hadron Collider. This is where the Higgs Boson was discovered.

On day three students spent the morning in CERN's 'Globe' Exhibition Centre and then walked back to the city along Geneva Lake, with the view of Mont Blanc.

On the final day they visited the LEIR (Low Energy Ion Ring) and the Data Centre where they saw the 'Worldwide LHC Computing Grid'. The trip proved to be very interesting and was a fantastic opportunity for our Physics students.



Meet the Tutors

BIOLOGY

Philip Colls
Head of Department

Carmen Nunez
Daniel Wilson
Lindsey Delve
Kim Edgell
Liz O'Brien

CHEMISTRY

Sarah Savage
Head of Department

Gill Townsend
Adam Munro
Graham Marshall

PHYSICS

Mala Sandhu
Head of Department

Charlie Burton
Jamie Bickley
Mary Heaton

BTEC SCIENCE

Jim Ashbrook
Head of Department

Rachel Dickinson
Jamie Bickley

TECHNICAL SUPPORT STAFF:

Paul Whorton
Lynn Parr
Mark Kelly

Frequently Asked Questions

What is the Science Faculty like?

Science students study in the West Park building which provides a modern and spacious, state-of-the-art learning environment. The facilities for Science are outstanding with nine very well equipped laboratories, two computer suites and four tutorial bases. The majority of the laboratories "belong" to a single department and you will therefore generally attend the same room throughout the week for your lessons. All rooms are equipped with interactive white boards, multi-media projectors and wireless internet connection enabling internet research to be done in the laboratories.

What support will I receive in the Science Faculty?

Tutors within science will "go the extra mile" to ensure that you will succeed. In addition tutors will make themselves available should you feel that individual help is required. Revision skills tutorials are provided to help you to develop the techniques that you will need to succeed both at A Level and in Higher Education. Tutors have regular contact with your parents and will keep them informed regarding your progress.

Enrichment sessions will be provided to extend even the most able, including preparation for the BMAT exams and competitions such as the Physics and Chemistry Olympiads and National Competitions. High Achievers' Programmes are available in Science & Engineering as well as Medicine, Dentistry and Vet Science.

What other activities do Science students get involved in?

At Carmel we provide students with many opportunities to become involved with external activities. These range from involvement in Nuffield Research Placements and vocational work placements, to competitions such as the Physics and Chemistry Olympiads. All the departments regularly undertake trips and destinations include Daresbury Atomic Laboratories, Fiddlers Ferry Power Station, Chester Zoo and London. There are also opportunities for overseas visits which have included Biology trips to the Azores, Holland, Costa Rica and the USA, plus a Physics trip to CERN in Geneva. We have strong links with all the local universities and so use their expertise whenever possible, for example, the Chemistry department uses the spectroscopy equipment in both Manchester and Liverpool Universities. Enrichment options also include MedSoc and SciSoc.

What are the entry requirements for these Science courses?

Biology

You will need **grade 5 in GCSE Biology** or **55 in Combined Science** plus **grade 5 in GCSE Maths** and **grade 4 in English Language**.

Chemistry

You will need **grade 5 in GCSE Chemistry** or **55 in Combined Science** plus **grade 5 in GCSE Maths** and **grade 4 in English Language**.

Physics

You will need **grade 5 in GCSE Physics** or **55 in Combined Science** plus **grade 6 in GCSE Maths** and **grade 5 in GCSE English Language**.

BTEC Level 3 Applied Science

You will need **grade 4 in GCSE Maths, English and Science**.



Prescot Road, St Helens
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www.carmel.ac.uk

More Information

The specification for Chemistry can be obtained from: www.ocr.org.uk

The specification for BTEC Science can be obtained from:

www.qualifications.pearson.com

The specifications for Biology and Physics can be obtained from: www.aqa.org.uk