Science is a great game. It is inspiring and refreshing.

THE PLAYING FIELD IS THE UNIVERSE ITSELF.

ISIDOR ISAAC RABI
Where does this course lead?

This course will prepare you for a career in many science-based industries such 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.

How will I be assessed?

Assessment is through 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.

For the Extended Certificate, 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.

For the Level 3 Diploma, four units are externally assessed and four internally assessed over the 2 years.

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.

What will the course involve?

From the start of the course you will work towards the 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.

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.

How successful are our Applied Science students?

<table>
<thead>
<tr>
<th>Year</th>
<th>No of entries</th>
<th>Distinction*</th>
<th>Distinction* - Merit</th>
<th>Distinction* - Pass</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>Subsidiary Diploma</td>
<td>36</td>
<td>92%</td>
<td>100%</td>
</tr>
<tr>
<td>2018</td>
<td>Subsidiary Diploma</td>
<td>49</td>
<td>88%</td>
<td>100%</td>
</tr>
<tr>
<td>2019</td>
<td>Subsidiary Diploma</td>
<td>47</td>
<td>94%</td>
<td>100%</td>
</tr>
<tr>
<td>2020</td>
<td>Subsidiary Diploma</td>
<td>49</td>
<td>94%</td>
<td>100%</td>
</tr>
</tbody>
</table>

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

Check this out!

100% of our students passed in 2020.

Lauran Rimmer
Prescot School
Studying: BTEC Applied Science, BTEC Health & Social Care

Carmel is a fantastic college. The tutors are very supportive and are willing to help you in overcoming any challenges you may have.

I love studying BTEC Applied Science as no week is the same. The course covers a range of different, interesting topics that will be beneficial to me in my future career. I also enjoy conducting different experiments and learning about how the processes in the experiments work. You get the opportunity to work in the Laboratory Preparation Room as part of your work experience placement. The skills gained from the experience are transferable into both the practical and coursework elements of the course.

When I leave college, I hope to extend my knowledge of science through an apprenticeship within the science industry. I’d also like to work abroad, volunteering to teach children various aspects of science.
Why choose Applied Human Biology at Carmel?

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

Level 3 Applied Human Biology is the newest addition to the suite of qualifications offered by the successful Applied Science department. The Applied Human Biology qualification is very well structured leading to a nationally recognised qualification equivalent to 1 A Level, namely the National Extended Certificate, which is recognised by the DFE as an Applied General qualification for the purpose of performance measures.

By studying Applied Human Biology you will learn how to carry out your own investigations using a variety of tests and techniques essential to laboratory practice. You will complete a range of written reports, projects, practical assessments and presentations.

What will the course involve?

You will work towards achieving the Level 3 National Extended Certificate in Applied Human Biology from the very start of the course. The course consists of the following four units which are studied over the two-year course:

- **Unit 1**: Principles of Applied Human Biology
- **Unit 2**: Practical Microbiology and Infectious Diseases
- **Unit 3**: Human Biology and Health Issues
- **Unit 4**: Functional Physiology

In addition to gaining knowledge, understanding and application skills, you will also gain transferable skills valued by employers and universities, such as:

- Self-reflection
- Critical thinking
- Collaborative work
- Presentation skills
- Analytical skills

How will I be assessed?

Assessment is through a combination of assignment-based tasks and formal examinations. For the internally assessed assignments, clear objective criteria are used to assess competency in key areas of the Applied Human Biology course. 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 assessment takes the form of a 1.5 hour written examination. Unit 3 is a synoptic assessment involving a practical investigation designed to assess the skills you have developed during Unit 1 and 2. Units 2 and 4 are internally assessed.

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

Where does this course lead?

The BTEC National Extended Certificate in Applied Human Biology is a great choice for students looking for a career where they can make a difference to the health and lives of others. The course gives students a broad understanding of biological principles including cells, tissues, biological molecules, genetics, immunology and practical microbiology as well as diseases, diagnostic techniques and treatments. As such, this qualification is an excellent preparation for many careers such as Nursing, Sports Science, Midwifery, Occupational Health and Health & Social Care.

In addition, the course can lead to progression into allied health professions such as diagnostic and therapeutic radiography, paramedicine, dietetics and many other routes.
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.

Linear A Level

Exam Board: AQA
Full course specification: www.aqa.org.uk

Why choose Biology at Carmel?

The Biology Department is excellent and students are highly successful. Out of the 153 students who studied Biology in 2020, 72% 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 visit universities to attend lectures on a variety of topics ranging from medical to brain function to future inventions. You will also get the opportunity to attend an annual trip. In 2019 students visited Malham Tarn to study small mammals and other habitats. The Biology department also enters Olympiad competitions both onsite (national) and at Edge Hill University. This year saw one of our students awarded a Gold certificate in the national competition!

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.

Regular Biology competitions also allow students to understand Biology in a wider context and help students to aim higher.

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 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.

Studying at Carmel has really helped me to become a well-rounded person. My teachers are very supportive and always happy to offer help and advice when I need it.

What I enjoy about Biology is the combination of practical and scientific knowledge that can be applied to theories and everyday life. I like that the Biology department provides concise booklets for each topic we study in class which provide valuable knowledge tailored to the specification.

The department also provides opportunities for students to achieve to the best of their ability by setting ‘stretch and challenge’ questions and involvement in competitions such as the Biology Olympiad. Not only does this stand out on university applications, but I’ve also found this really useful because it tests my knowledge of the course and allows me to go beyond the specification, aiding my lateral thinking skills.

When I leave college, I hope to study Medicine. Carmel has provided me with the support and confidence to aim to study such a competitive degree. Carmel’s MedDentVet Club, MedSoc, has helped me improve my personal statement and interview technique, as well as increased my knowledge of current affairs in the medical profession.

Jasmine Lee

Wade Deacon

Studying: Biology, Chemistry, Maths

Now studying Medicine at Lancaster University

How successful are our Biology students?

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of entries</th>
<th>A*-B</th>
<th>A*-C</th>
<th>A*-E</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>127</td>
<td>38%</td>
<td>58%</td>
<td>98%</td>
</tr>
<tr>
<td>2018</td>
<td>134</td>
<td>37%</td>
<td>55%</td>
<td>99%</td>
</tr>
<tr>
<td>2019</td>
<td>118</td>
<td>40%</td>
<td>58%</td>
<td>95%</td>
</tr>
<tr>
<td>2020</td>
<td>153</td>
<td>51%</td>
<td>72%</td>
<td>100%</td>
</tr>
</tbody>
</table>
Why choose Chemistry at Carmel?
In 2020, A Level results were outstanding with 91% of students achieving 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. Some members of the Chemistry team are experienced OCR examiners, which is extremely valuable when helping to prepare you for external examinations.

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.

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 - chemistry, medicinal chemistry, chemical engineering, pharmacy, medicine, dentistry, biochemistry, environmental sciences, law, accountancy and business.

Choosing to study Chemistry at Carmel was a great decision for me, as I have found the course very interesting and the standard of teaching is consistently excellent.

I always come out of my lessons understanding what we have covered, but if I ever need extra help outside of lessons, I know there are many opportunities to ask. This includes Chemistry Clinic, which is run twice a week by the Chemistry department, where students can drop in to ask for clarification with anything or help with any work. I can also ask any of the teachers in the department for help at any time in college by going to the science work base and I know they are happy to help.

I have really enjoyed the enrichment opportunities on offer for Chemistry, such as the Cambridge Chemistry Challenge and the RSC Olympiad, both of which I participated in and which have given me a broader view of the subject outside of the A Level course.

I am currently set to go to university to study a Masters in Chemistry. One of the ways the department at Carmel supports myself and others to do the best we can, is by putting on A/A* masterclasses. These give us further insight on more difficult questions bordering into degree level content to challenge us. I have found this really helpful as it has pushed me to improve my problem-solving skills and to think outside the box more when approaching difficult questions.

How successful are our Chemistry students?

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of entries</th>
<th>A*-B</th>
<th>A*-C</th>
<th>A*-E</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>120</td>
<td>56%</td>
<td>74%</td>
<td>98%</td>
</tr>
<tr>
<td>2018</td>
<td>110</td>
<td>50%</td>
<td>84%</td>
<td>100%</td>
</tr>
<tr>
<td>2019</td>
<td>116</td>
<td>59%</td>
<td>85%</td>
<td>99%</td>
</tr>
<tr>
<td>2020</td>
<td>138</td>
<td>74%</td>
<td>91%</td>
<td>100%</td>
</tr>
</tbody>
</table>
**Physics**

**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. The department has experienced 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. Particle Physics
3. Quantum Physics
4. Waves
5. Mechanics and materials
6. Electricity
7. Further mechanics and thermal physics
8. Magnetic Fields
9. Electric Fields
10. Gravitational Fields
11. Nuclear physics
12. 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 strongly 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 listed modules, practical skills and data analysis. There is a practical element to the course and 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, computer science, architecture as well as physics.

**How successful are our Physics students?**

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of entries</th>
<th>A*-B</th>
<th>A*-C</th>
<th>A*-E</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>69</td>
<td>36%</td>
<td>61%</td>
<td>99%</td>
</tr>
<tr>
<td>2018</td>
<td>64</td>
<td>34%</td>
<td>59%</td>
<td>97%</td>
</tr>
<tr>
<td>2019</td>
<td>63</td>
<td>44%</td>
<td>67%</td>
<td>98%</td>
</tr>
<tr>
<td>2020</td>
<td>51</td>
<td>59%</td>
<td>80%</td>
<td>100%</td>
</tr>
</tbody>
</table>

**Linear A Level**

Exam Board: AQA

Full course specification: www.aqa.org.uk

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**Physics trip to Daresbury Labs**
Royal Society of Chemistry Young Analyst Competition

Students working in the Chemistry labs at Liverpool University, carrying out chemical analysis and doing calculations. In 2019 Team Carmel’s Chemists won!

Cambridge Chemistry Challenge

Every year Lower 6th Chemistry students sit the CCC exam to stretch and challenge their ability to apply their knowledge to unfamiliar contexts beyond the A Level specification.

Physics trip to CERN

Students visited CERN in Geneva, one of the world’s largest and most respected centres for scientific research and home to the renowned Large Hadron Collider.

RSC Olympiad Competition

2020 saw another fantastic set of results for our Chemistry Department’s entry to the Royal Society of Chemistry Olympiad competition, with 19 silver and 11 bronze certificates being awarded.

Enriching Experiences

Tomorrow’s Engineers

Physics students took part in the ‘Tomorrow's Engineers’ enrichment to build a LEGO robot ‘Jeremiah’ that can solve a Rubik’s Cube!

Applied Science trip to Power Station

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.

STEM Masterclass at the University of Liverpool

Every June, Chemistry and Physics students participate in Science and Engineering masterclasses at Liverpool University’s state of the art Central Teaching Laboratories.
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 BMAT exams and competitions such as the Physics, Biology 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, Biology in action lectures and vocational work placements, to competitions such as the Physics, Biology and Chemistry Olympiads. All the departments regularly undertake trips and destinations include Daresbury Atomic Laboratories, Fiddlers Ferry Power Station, Chester Zoo, Malham Tarn and London. There are also opportunities for overseas visits including the 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?
BTEC Level 3 Applied Science / Applied Human Biology
You will need grade 44 in Combined Science or 2 grade 4s in separate Sciences (one of which should be Biology if applying for Applied Human Biology), along with grade 4 in both GCSE English and GCSE Maths.

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 6 in GCSE Physics or 66 in Combined Science plus grade 6 in GCSE Maths and grade 5 in GCSE English Language.