SUBJECT LISTED:

- Biology [AS]
- Chemistry [AS]
- Physics [AS]
- Applied Science [BTEC L3]
- Applied Science [BTEC L3]
- Applied Science [BTEC L2]
Biology [AS]
What are the main features of this course?
The first year of the A-level course covers microscopy, cells, biochemistry, exchange transport in animals and plants, health, biodiversity, classification and evolution. The second year completes the A-level with topics such as communication, homeostasis and energy, excretion, biotechnology and gene technologies, genetics, ecosystems and responding to the environment.

Hours of lessons per week: 5

Indicative group size: 20

How is the course assessed?
By externally set and marked examinations in the summer. The practical endorsement is a non-exam assessment which is achieved by meeting a set of twelve practical skills that are assessed by your teacher during the course.

Where can I go next?
Biology is a key subject for lots of STEM careers (Science, Technology, Engineering, and Mathematics), particularly in healthcare, medicine and jobs involving plants or animals. Some of these include: nursing, dentistry, forensic science, psychology, physiotherapy, botany, environmental science, zoology, geology, oceanography, pharmaceuticals, energy, teaching, science writing, genetics and research.

Need More Information? Contact:
Katherine Jones
(Head of Biology and Life Sciences)
kjones@jcc.ac.uk
A-level Biology – covers a range of topics which are assessed purely by exams.

Practical Endorsement - You will do a range of practical activities over the two years which you must PASS.

Entry requirements: Grade 5 in Math and a Grade 5 in English Language or English Literature, plus one of the following:
- 2 x Grade 6 in GCSE Core + Additional Science
- Grade 6 in GCSE Biology

Exam board: OCR A

Wider learning – Opportunities for work experience, Masterclasses and Medical Workshops

Careers - Biology a key subject for lots of STEM careers (Science, Technology, Engineering, and Mathematics), particularly in healthcare, medicine and jobs involving plants or animals.
SUMMER CHALLENGE

- Make a table/poster showing the structures and functions of organelles found in plant and animal cells.
- Compare and contrast the organelles found in eukaryotic and prokaryotic (bacterial) cells.
- You will be given a quiz on this topic in your first week. Let's see who the best student and the best class is!

HINTS & TIPS

- Get organised – buy an A4 lever arch folder and dividers ready to file your notes.
- Be well resourced – buy lined paper, a pen, a pencil, a ruler, a highlighter, a rubber and a calculator which you will need to bring to each lesson. This will be checked in the first week.
- Re-cap your GCSE Biology work in preparation for the start of the year.
Summer Tasks

The foundation of all biology topics is cells and molecules, produce revision notes on each of the following topics using your notes from GCSE and online sources such as GCSE bitesize.

- cells and microscopy,
- biological molecules
- enzymes

Start to add A-level content to your notes using websites, videos and books.

Useful websites:
https://studyrocket.co.uk/
http://www.biologymad.com/
https://www.physicsandmathstutor.com/biology-revision/a-level-ocr-a/module-2/
Crash course biology on you tube


New Students’ Day 2020
Joseph Chamberlain College
FAQs

What is the Specification?
OCR Biology A

Does it matter that I studied a different exam board at GCSE?
No, all the GCSE specification cover broadly the same content. The style of questions at A level is different from GCSE and you will be prepared for this during the year.

Does it matter that I have done combined sciences?
No, as long as you meet the entry requirements, however you may find it useful to look at the topics covered by the single science course and read up on these in preparation for the start of the AS.

Do you do a lot of practical work?
Practical work is done as part of the assessed practical endorsement and to support learning, you will do practical work throughout the year. Some topics will be more practical based whereas some are more theoretical.

Is there any coursework?
No, your grade is purely based on the 2 exams at the end of the year. There is a practical endorsement which is marked as pass/fail, and is completed in a series of assessed practical sessions throughout the 2 years and requires you to complete a practical lab book which is also assessed. Some degree courses require you to pass the practical endorsement as well as getting a specific grade, especially science based degrees.
FAQs

Do I need to buy a textbook?
No, you will be provided with a textbook and access to an online e-book and learning platform. If you wish to get a book prior to starting the course any A-level Biology revision guide for OCR Biology A is recommended.

Is there a lot of homework?
Yes, you will be expected to at least 1 hour of independent work for every hour of teaching. This will include regular homework, and revision for monthly assessments.

How will you track my progress?
You will have monthly assessments which will assess the content you have learnt. These will be used to measure your progress towards your target grade and allow appropriate intervention if you are struggling. These will also allow you to see what your areas of strength and weakness are and develop your examination technique.

Are support classes available?
Yes, additional workshops, support sessions and academic coaching are available throughout the year, some students will be directed towards these and some will be available to students to attend on a voluntary basis.

What courses can I study at university with this A-level?
Biology in combination with other science A-levels can be used to study any life science, medical or health related degree at university. In combination with other A-levels it can be useful for areas such as psychology, geography, sport and PE, and education courses.
What are the main features of this course?

An insight into the everyday uses of chemistry and the impact it has on our lives. A combination of challenge and practical work. Topics covered include moles, acids and bases, energy changes, rates of reaction, reversible reactions and organic chemistry. You will also carry out regular practical work which will contribute towards the practical endorsement.

- Hours of lessons per week: 5
- Indicative group size: 20
- How is the course assessed?

By externally set and marked examinations in the summer. The practical endorsement is a non-exam assessment which is achieved by meeting a set of twelve practical skills that are assessed by your teacher during the course.

- Where can I go next?

Chemistry is an excellent basis for university students studying Health Care, including Medicine, Pharmacy, Pharmacology and Dentistry as well as other many Science courses. It is also highly desirable for many other degree courses such as Law and Finance as it shows an ability to think logically and to cope with abstract concepts.

Need More Information? Contact:
Awais Naeem
(Head of Physical Sciences)
anaeem@jcc.ac.uk
SUBJECT OVERVIEW

A-level Chemistry – covers a range of topics which are assessed purely by exams.

Practical Endorsement - You will do a range of practicals over the two years which you must PASS.

Entry requirements: Grade 5/B in Maths and a Grade 5/B in English Language or English Literature, plus one of the following:
  2 x Grade 6 in GCSE Core + Additional Science
  or
  Grade 6 in GCSE Chemistry

Exam board: OCR

Wider learning – Opportunities for work experience, extension classes.

Careers – Chemistry is a key subject for lots of STEM careers (Science, Technology, Engineering, and Mathematics). It is essential for dentistry, medicine and veterinary science. It is also needed as a basis for careers in analytical chemistry, chemical engineering, clinical biochemistry, forensics, pharmacy, toxicology and pharmacology.
SUMMER CHALLENGE

The Periodic Table is a list of all the known elements. Pick one element and write a short essay about this element, giving its physical and chemical properties, its structure, its group (if relevant), its discovery (if relevant) as well as its uses in everyday life.

The amount of substance (mol/moles) is an important concept in Chemistry and will form a foundation to all of your work in A level Chemistry. Produce a short summary document on what a mol is and what the term "amount of substance" means, including any relevant formulae. Use the web-link below to start you off.

http://www.bbc.co.uk/education/guides/zysk7ty/revision/2

You will be given a quiz in your first week on ‘mol’, so look over the summary you make as you will be tested in your first week.

HINTS & TIPS

Get organised – buy an A4 lever arch folder and dividers ready to file your notes.

Be well resourced – buy lined paper, a pen, a pencil, a ruler, a rubber and a calculator which you will need to bring to each lesson.

Look over your GCSE work and see how it links to the AS level specification OCR Chemistry (Specification A) which can be found at http://www.ocr.org.uk/qualifications/as-a-level-gce-chemistry-a-h032-h432-from-2015/
What are the main features of this course?

Students will extend their range of mathematical and analytical skills and techniques and use them in more difficult, unstructured problems. They will develop practical skills and use scientific methods to investigate physical phenomena. They will apply mathematical and scientific reasoning to explain the world around us, ranging from the atomic level to the universe.

Hours of lessons per week: 5

Indicative group size: 20

How is the course assessed?

Externally set and marked examinations in the summer. The practical endorsement is a non-exam assessment which is achieved by meeting a set of twelve practical skills that are assessed by your teacher during the course.

Where can I go next?

There are a range of degrees that students who have studied A-level Physics could progress on to. These include Mechanical Engineering, Civil Engineering, Electrical Engineering, Astrophysics, Astronomy, Theoretical Physics, Architecture, Materials & Design, Manufacturing Engineering and Robotics.
AS PHYSICS

SUBJECT OVERVIEW

AS-level physics is separated into 5 distinct topics, Newtonian Mechanics, Materials, Electricity, Waves and Quantum phenomenon.

A2 Physics includes all of the As topics as well as Kinetic theory, Simple Harmonic motion, Astrophysics, Particle and Nuclear physics and Medical Physics.

Practical Endorsement - You will do a range of investigations over the two years which you must PASS.

Entry requirements: Grade 6/B in Maths and a Grade 5/B in English Language or English Literature, plus one of the following:
- 2 x Grade 6 in GCSE Core + Additional Science
- Grade 6 in GCSE Physics

Exam board: OCR

Careers - Physics is an incredibly well sought after A level when applying to universities and will afford access to almost all degree courses. Physics will be a required A-level for many engineering courses, Physics single and double honours, and some Medical pathways, such as Radiology.
Access the website above and read through the chapter extracted from ‘Einstein’s dice and Schrödinger’s cat’ (Paul Halpern). Summarize in no more than 300 words what new physics you have encountered.

Practical task: Using only materials you have at home, complete a practical that verifies the acceleration due to gravity as 9.81 ms^{-2}.

**Hints & Tips**

- Get organised – buy an A4 lever arch folder and dividers ready to file your notes.
- Be well resourced – buy lined paper, a pen, a pencil, a ruler, a rubber and a calculator which you will need to bring to each lesson.
- Complete the summer challenges.
- Look over your GCSE work and see how it links to the AS level specification which can be found at: [http://www.ocr.org.uk/qualifications/as-a-level-gce-physics-a-h156-h556-from-2015/](http://www.ocr.org.uk/qualifications/as-a-level-gce-physics-a-h156-h556-from-2015/)
What are the main features of this course?
The Level 3 Extended Certificate in Applied Science course is a two year course that introduces a variety of science concepts in a vocational context. As such, students on this course will study fundamental concepts in biology, chemistry, physics and mathematics as well as units designed to develop practical laboratory skills.

Successful completion of year one will result in achieving a Pearson BTEC Level 3 National Certificate in Applied Science allowing progression in year two on the Pearson BTEC Level 3 National Extended Certificate in Applied Science. Successful completion of the two-year course carries the same number of UCAS points as 1 A Level.

- Hours of lessons per week: 5
- Indicative group size: 20
- How is the course assessed?
The two year course is comprised of four units of which one is assessed through an exam, one through externally set and marked tasks and two through internally set and marked assignments. The grades achieved for each unit are combined to give an overall final grade.

- Where can I go next?
Students can progress onto higher level studies at university in a range of non-science based subject areas depending on the other subjects studied alongside the Extended Certificate.

Need More Information? Contact:
Becky Homer
(Head of Applied Sciences)
rhomer@jcc.ac.uk
BTEC Extended Certificate in Applied Science – The two year course is equivalent to 1 A level and covers a number of specialist areas within biology, chemistry and physics.

Assessment: This course is assessed through a mixture of exams, externally marked tasks and internally marked assignments. There will be three exams in the first year and an externally marked task in the second year. You will need to complete a number of assignments in both years which must be submitted to meet firm deadlines in order to complete the course.

Entry requirements: Grade 4 in Maths and a Grade 4 in English Language or English Literature, plus 4 other GCSEs at grade 4 or above which should include at least one of Core or Additional science.

Exam board: Pearson.
SUMMER CHALLENGE

➢ List the similarities and differences between plant and animal cells and produce a table of all the components found in cells with their functions.

➢ Drawing dot and cross diagrams for sodium chloride, magnesium chloride, methane and oxygen and explain ionic and covalent bonding.

➢ Describing the differences between longitudinal and transverse waves. Then label and define the following on a diagram of these waves: wavelength, frequency and amplitude.

HINTS & TIPS

➢ Get organised – buy an A4 lever arch folder and dividers ready to file your notes. A notebook to keep the results of practical work in.

➢ Be well resourced – buy lined paper, a pen, a pencil, a ruler, a rubber and a calculator (Casio fx83 or similar) which you will need to bring to each lesson. And a memory stick as all your coursework needs to be submitted electronically.

➢ Complete the summer challenges.
LEVEL 3 BTEC EXTENDED CERTIFICATE IN APPLIED SCIENCE

FAQs

Q – How many exams will we have to complete?
You will complete three exams in the first year of this course and there are no exams in the second year, but there is the externally set and marked task. The exams are set and marked by the exam board. Each exam is 45 minutes long and covers one of the main scientific disciplines: Biology, Chemistry and Physics. The exams will be sat over a day and a half with dates and times decided by the exam board.

Q – Will we do lots of practical work?
As a science course, there will be practical work embedded throughout your teaching and will be required for many of your assignments as well. The externally set and marked task you complete in the second year of this course will also be based on practical work.

Q – How do assignments work?
In your lessons, you will be taught the relevant content by your teacher and they will constantly assess your knowledge in class to ensure you have understood the content and help you when you are stuck. Once the teaching is completed, you will be given an assignment brief which documents what work you are required to produce, what criteria you are being assessed against (pass, merit and distinction criteria) and a deadline for the completion of the work. This deadline must be met. Once you have handed in your work, your teacher will assess it and will provide you with feedback on what criteria you have achieved and if you haven’t achieved a criteria, this feedback will tell you why. If you met the initial deadline, have made a full attempt at the work and your teacher believes you could improve the work without further help you may be authorised a resubmission. This allows you one final opportunity to improve your work to achieve criteria that you didn’t achieve the first time. This will then be marked and your final achievement for that assignment recorded.
FAQs

Q – How is my grade worked out?
Over the whole course, you will complete 4 units (two in each year). Each unit will be awarded a grade and each grade corresponds to a certain number of points. These points are added up and used to work out your total grade. For an assignment based unit, you will be assessed against many pass, merit and distinction criteria. To achieve a pass grade in a unit, you need to achieve all of the pass criteria. To achieve a merit grade in a unit, you need to achieve all of the pass and merit criteria. To achieve a distinction grade in a unit, you need to achieve all of the pass, merit and distinction criteria.

Q – Will there be homework?
You will be set homework when your teacher thinks suitable and this could involve a variety of different tasks including revision and assignment work. Your teacher will also set you homework to assess your understanding of the content before setting assignments to make sure you are ready to complete the assignment. It is important that this homework is completed as it will help prepare you for your exams, tasks and assignments.

Q – How many lessons will I have?
You will have one lesson a day for this course, equalling five hours in a week. You will then have other lessons every day for the other A Levels/Extended Certificates you are completing.
Applied Science
[BTEC L3]
What are the main features of this course?
The course is designed for students wishing to progress to higher education courses in the applied science sector before entering employment. Students will study Biology, Chemistry, Physics, Math's and contemporary issues in science.

Successful completion of year one will result in achieving a Pearson BTEC Level 3 National Foundation Diploma in Applied Science allowing progression in year two on the Pearson BTEC Level 3 National Extended Diploma in Applied Science. Successful completion of the two-year course carries the same number of UCAS points as 3 A Level.

Hours of lessons per week: 15

Indicative group size: 20

How is the course assessed?
The two year course is comprised of 13 units of which two are assessed through exams, two through externally set and marked tasks and nine through internally set and marked assignments. The grades achieved for each unit are combined to give an overall final grade.

Where can I go next?
The BTEC Extended Diploma in Applied Science is an excellent base for university studies in health care, such as biomedical science, pharmacy and pharmaceutical science*, pharmacology, physiotherapy, audiology, nursing, radiography and optometry*. It could also lead to a degree in Engineering or Finance & Accounting.

(*selected universities only)

Need More Information? Contact:
Becky Homer
(Head of Applied Sciences)
rhomer@jcc.ac.uk
BTEC Extended Diploma in Applied Science – The two year course is equivalent to 3 A levels and covers a number of specialist areas within biology, chemistry and physics.

Assessment: This course is assessed by a mixture of exams, externally marked tasks and internally marked assignments. There will be three exams both years and one externally marked task each year. You will need to complete a number of assignments in both years which must be submitted to meet firm deadlines in order to complete the course.

Entry requirements: Grade 4 in Maths and a Grade 4 in English Language or English Literature, plus 3 other GCSEs at grade 4 or above which should include at least one of Core or Additional science.

Exam board: Pearson.
SUMMER CHALLENGE

- List the similarities and differences between plant and animal cells and produce a table of all the components found in cells with their functions.

- Drawing dot and cross diagrams for sodium chloride, magnesium chloride, methane and oxygen and explain ionic and covalent bonding.

- Describing the differences between longitudinal and transverse waves. Then label and define the following on a diagram of these waves: wavelength, frequency and amplitude.

HINTS & TIPS

- Get organised – buy an A4 lever arch folder and dividers ready to file your notes. A notebook to keep the results of practical work in.

- Be well resourced – buy lined paper, a pen, a pencil, a ruler, a rubber and a calculator (Casio fx83 or similar) which you will need to bring to each lesson. And a memory stick as all your coursework needs to be submitted electronically.

- Complete the summer challenges.
FAQs

Q – How many exams will we have to complete each year?
You will complete three exams in each year. They are set and marked by the exam board. Each exam is 45 minutes long and covers one of the main scientific disciplines: Biology, Chemistry and Physics. The exams will be sat over a day and a half with dates and times decided by the exam board.

Q – Will we do lots of practical work?
As a science course, there will be practical work embedded throughout your teaching and will be required for many of your assignments as well. The externally set and marked task you complete in the first year of this course will also be based on practical work.

Q – What can I do after finishing the course?
Students who successfully complete the course can apply to University for many science related degrees. Many of our students have gone on to complete degrees in Biomedical Science, Radiography (with the relevant experience), Pharmaceutical Science and many others. Please see UCAS for university requirements.

Q – How do assignments work?
In your lessons, you will be taught the relevant content by your teacher and they will constantly assess your knowledge in class to ensure you have understood the content and help you when you are stuck. Once the teaching is completed, you will be given an assignment brief which documents what work you are required to produce, what criteria you are being assessed against (pass, merit and distinction criteria) and a deadline for the completion of the work. This deadline must be met. Once you have handed in your work, your teacher will assess it and will provide you with feedback on what criteria you have achieved and if you haven’t achieved a criteria, this feedback will tell you why. If you met the initial deadline, have made a full attempt at the work and your teacher believes you could improve the work without further help you may be authorised a resubmission. This allows you one final opportunity to improve your work to achieve criteria that you didn’t achieve the first time. This will then be marked and your final achievement for that assignment recorded.
Q – How is my grade worked out?
Over the whole course, you will complete 13 units (six in the first year and seven in the second year). Each unit will be awarded a grade and each grade corresponds to a certain number of points. These points are added up and used to work out your total grade. For an assignment based unit, you will be assessed against many pass, merit and distinction criteria. To achieve a pass grade in a unit, you need to achieve all of the pass criteria. To achieve a merit grade in a unit, you need to achieve all of the pass and merit criteria. To achieve a distinction grade in a unit, you need to achieve all of the pass, merit and distinction criteria.

Q – Will there be homework?
You will be set homework when your teacher thinks suitable and this could involve a variety of different tasks including revision and assignment work. Your teacher will also set you homework to assess your understanding of the content before setting assignments to make sure you are ready to complete the assignment. It is important that this homework is completed as it will help prepare you for your exams, tasks and assignments.

Q – How many lessons will I have?
You will have 15 lessons a week, typically with three every day. Classes have three different teachers, a specialist in Biology, Chemistry and Physics, to teach you the different disciplines of science. This is a full-time course so these will be your only lessons other than your tutorial.
Applied Science
[BTEC L2]
What are the main features of this course?
This course is an alternative to GCSE science, which still allows students to study the core science subjects of Biology, Chemistry and Physics. As well as focusing on the necessary scientific concepts, the course also develops the practical skills necessary for careers within the science sector and how these skills are utilised in the workplace.

Hours of lessons per week: 13

Indicative group size: 20

How is the course assessed?
The course is assessed by a mixture of assignments and exams. There are two units assessed by external examinations and ten units assessed by assignments. The grades achieved in the assignments and exams are combined to give an overall final grade.

Where can I go next?
Successful completion of the course will allow students to progress onto the Level 3 National Extended Diploma in Applied Science, provided that the appropriate grades in GCSE Maths and English are also achieved.

Need More Information? Contact:
Becky Homer
(Head of Applied Sciences)
rhomer@jcc.ac.uk
Level 2 BTEC Extended Certificate in Applied Science – This one year course is equivalent to 3 GCSE’s and covers a number of specialist areas within biology, chemistry and physics. Alongside this, you will retake any GCSE English or GCSE Maths necessary.

Assessment: This course is made up of 12 different units, 10 are assessed through coursework and 2 are assessed through externally set exams. You will need to complete a number of assignments which must be submitted to meet firm deadlines and revise well for your exams in order to complete the course.

Entry requirements: Grade 3 in English Language or English Literature and a grade 2 in Maths, plus 4 other GCSEs at grade 3 or above.

Exam board: Pearson.
SUMMER CHALLENGE

- List the similarities and differences between plant and animal cells and produce a table of the parts found in cells and what they do.

- Research the properties of ionic and covalent compounds giving examples of each.

- Research the uses of alpha, beta and gamma radiation and produce a table that compares the types of radiation.

HINTS & TIPS

- Get organised – buy an A4 lever arch folder and dividers ready to file your notes. A notebook to keep the results of practical work in.

- Be well resourced – buy lined paper, a pen, a pencil, a ruler, a rubber and a calculator (Casio fx83 or similar) which you will need to bring to each lesson. And a memory stick as all your coursework needs to be submitted electronically.

- Complete the summer challenges.
LEVEL 2 BTEC EXTENDED CERTIFICATE IN APPLIED SCIENCE

FAQs

Q – How many exams will we have to complete?
You will complete two exams. They are set and marked by the exam board with the date and time also being decided by the exam board. One exam covers the main scientific disciplines: Biology, Chemistry and Physics. The second exam covers scientific investigations and assesses your knowledge on how to plan, carry out, analyse and evaluate a scientific investigation.

Q – Will we do lots of practical work?
As a science course, there will be practical work embedded throughout your teaching and will be required for many of your assignments as well. One of the exams will assess knowledge you have gained by completing all of your practical activities.

Q – What can I do after finishing the course?
If you successfully complete your course and get the entry requirements for the Level 3 National Extended Diploma in Applied Science BTEC course, you could progress onto that. Successful completion of the level 3 course can lead you into many scientific degrees, including Biomedical Science, Radiography (with the relevant experience), Pharmaceutical Science and many others. Please see UCAS for university requirements.

Q – How do assignments work?
In your lessons, you will be taught the relevant content by your teacher and they will constantly assess your knowledge in class to ensure you have understood the content and help you when you are stuck. Once the teaching is completed, you will be given an assignment brief which documents what work you are required to produce, what criteria you are being assessed against (pass, merit and distinction criteria) and a deadline for the completion of the work. This deadline must be met. Once you have handed in your work, your teacher will assess it and will provide you with feedback on what criteria you have achieved and if you haven’t achieved a criteria, this feedback will tell you why. If you met the initial deadline, have made a full attempt at the work and your teacher believes you could improve the work without further help you may be authorised a resubmission. This allows you one final opportunity to improve your work to achieve criteria that you didn’t achieve the first time. This will then be marked and your final achievement for that assignment recorded.
FAQs

Q – How is my grade worked out?
Over the whole course, you will complete 12 units. Each unit will be awarded a grade and each grade corresponds to a certain number of points. These points are added up and used to work out your total grade. For an assignment based unit, you will be assessed against many pass, merit and distinction criteria. To achieve a pass grade in a unit, you need to achieve all of the pass criteria. To achieve a merit grade in a unit, you need to achieve all of the pass and merit criteria. To achieve a distinction grade in a unit, you need to achieve all of the pass, merit and distinction criteria.

Q – Will there be homework?
You will be set homework when your teacher thinks suitable and this could involve a variety of different tasks including revision and assignment work. Your teacher will also set you homework to assess your understanding of the content before setting assignments to make sure you are ready to complete the assignment. It is important that this homework is completed as it will help prepare you for your exams and assignments.

Q – How many lessons will I have?
For the Applied Science course, you will have 13 lessons a week. Typically, classes will have three teachers who will cover different content with you. Alongside your science lessons, you may also have Maths or English lessons if you need to resit either of these GCSE’s.
Joseph Chamberlain College
New Students’ Information
Online 2020

Summer Preparation Booklet

SCIENCE

WWW.JCC.AC.UK