

Sir John Cass Sixth Form Transition Guide 2019

We will achieve excellence and inspire generations the Cass Way

WE LEARN TOGETHER WE PRAY TOGETHER **WE ACHIEVE TOGETHER**

“Do unto others as you would have them do unto you.” Luke 6:31

Dear Year 11 student

We are delighted that you are intending on studying at Sir John Cass Sixth Form.

This booklet is designed to make the transition from Year 11 to 12 easier. We hope it will be very useful to you and help you prepare for life in the Sixth Form.

You will have received a separate letter informing you about the arrangements for enrolment. We look forward to seeing you then.

In the meantime, if you have any questions at all, please do not hesitate to call or email us, or to drop in to the Sixth Form reception.



A copy of this booklet can be found on our school website in the Sixth Form section

Ms Rowley-Conwy

Assistant Headteacher - Year 13

Mrs James

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Mrs Katme

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Cass Futures



UNIVERSITY OF
CAMBRIDGE

KING'S
College
LONDON

Imperial College London

At Sir John Cass we pride ourselves on ensuring that every student has access to high quality enrichment. In the Academic Year 2017-18, we have hosted speakers from a wide range of universities, including Oxford and Cambridge University, Kings College London, UCL, Queen Mary's, Southampton University, Goldsmiths University and Imperial.

We have a weekly enrichment session that all Year 12 students take part in. This is a programme of academic and careers lectures, workshops led by inspiring professionals, trips to universities and places of interest, and independent enrichment, where students are able to visit and organise their own enrichment programme.

There are also a large number of weekly societies that run in addition to this, including:

- Medicine Society, where students have the opportunity to meet
- Debate Club
- Equalities group
- Fitness Club

As well as this, we run specific programmes for students who are interested in applying to Oxbridge, Medicine and Russell Group Universities. We also have a popular 'Career Ready' programme, where we work together with Barclays Bank to provide skills workshops, practice interviews, and visits to places of employment.



Our students took part in judging young fiction at the world famous Hay on Wye Literary festival

Work Experience

All students in Year 12 will be able to take part in at least one work experience placement; some students often access more than one. We organise placements at the UK Civil Service, in NHS hospitals and surgeries where students shadow doctors, in large banks and firms in the City such as Lloyds TSB and Barclays, and in a wide range of businesses and organisations across London.

We also host regular workplace visits, and networking events which take place in school and are open to all students. We have hosted visits from a wide range of professionals, including NHS surgeons, CEOs of large organisations, lawyers and entrepreneurs.

Sixth Form students attend a variety of workshops from Careers professionals in workplaces- this is one at Lloyds Bank in Canary Wharf



Students having a small group discussion with a professional as part of our 'Speed Networking' events

Careers Education, Information, Advice and Guidance (CEIAG) at Sir John Cass Sixth Form

Our vision in the Careers Faculty is “to inspire the next generation to make more informed decisions, helping them to aspire to reach new heights and challenge stereotypes”

- Sir John Cass’s Foundation & Red Coat CofE Secondary School and Sixth Form pursues to offer comprehensive careers education, information advice and guidance (CEIAG) in order to better equip our students to make informed decisions and widen participation in education, employment and training
- to find out about technical education qualifications and apprenticeships opportunities, as part of a careers programme which provides information on the full range of education and training options available at each transition point
- to hear from a range of local providers about the opportunities they offer, including technical education and apprenticeships – through options events, assemblies and group discussions and taster events

Here at Sir John Cass Sixth Form we have a dedicated Careers Manager (Mr Mohammad Uddin) who is available 5 days a week to help students with any careers related issue. We offer the following opportunities to all our sixth form students regardless of what courses they are studying:

- Volunteering opportunities with the Royal London Hospital
- Construction site visits and career talks
- Mentoring with various organisations such as Barclays ‘Aim2Attain’ programme
- Career Ready programme with world of work visit and summer placements
- Work experience opportunities for all year 12 students
- NCS (National Careers Service)
- Duke of Edinburgh Award (Silver and Gold) all paid for no costs to students
- Civil Service opportunities
- Cass Futures programme with speakers from various organisations and sectors
- Access to online careers portal with ‘Start’
- Apprenticeship guidance with 1-2-1 support with applications
- UCAS support
- Partake in careers and university fairs
- Interview and application workshops
- Bespoke Para-Legal Apprenticeship for year 13s with DAC Beachcroft


DAC BEACHCROFT



Civil Service



UCAS

In Year 12, you will begin working on your applications for university. These are managed by UCAS. Your applications will need to be completed and submitted online when you are in Year 13.

In Year 12 you will be given the opportunity to start working on your personal statements and towards the end of the academic year you will have the chance to register and begin your applications. There will be lots of guidance available throughout Year 12 and 13 to help you with this process.

Russell Group

Every year, more than 160,000 students from the UK and nearly 90,000 from the rest of the world choose to join the 320,000 students who are already studying at a Russell Group university. There you will learn from some of the world's finest minds, have access to the very best teaching facilities and be part of a talented, diverse peer group. A top class honours degree from a Russell Group university can give job applications certain sparkle – and may open up some extra doors into competitive career sectors.

There are currently 24 universities belonging to the Russell Group:

- University of Birmingham
- University of Bristol
- University of Cambridge
- Cardiff University
- Durham University
- University of Edinburgh
- University of Exeter
- University of Glasgow
- Imperial College London
- King's College London
- University of Leeds
- University of Liverpool
- London School of Economics & Political Science
- University of Manchester
- Newcastle University
- University of Nottingham
- University of Oxford
- Queen Mary, University of London
- Queen's University Belfast
- University of Sheffield
- University of Southampton
- University College London
- University of Warwick
- University of York

There are a number of things you can do this summer in preparation for your university application:

- Look for volunteering opportunities in the field you wish to pursue at degree level
- Secure a part time job
- Acquire new and exciting hobbies that you can discuss in your personal statement

Transition Activities:

1. Brainstorm the different degree options you may be interested in

2. Research different universities and their entry requirements

Key dates



These are some key dates for the Autumn Term. Further dates will be given to students at enrolment.

Wednesday 4th September: Year 12 Induction begins at 8.40am and ends at the end of period 4 (1.10pm)

Thursday 5th September: Year 12 lessons begin, starting at 8.40am

All term dates are on the school website.

Your timetable

In Year 12, you will have a mixture of taught lessons and study periods. This will be different to Year 11, where you will have had

For each A Level lesson, you will have 10 hour long lessons over a two week period.

For each BTEC Level 3 course, you will have approximately 30 hour long lessons over a two week periods.

Every Wednesday afternoon, students take part in the Cass Futures programme from 2pm-3.30pm

Study periods will be spent on site.

Preparing for Year 12: Checklist



- **Dress Code-** make sure you have suitable clothing that meets the requirements for the dress code(more information about this at the back of this booklet)

- **Bag and equipment-** you will need a schoolbag than can fit A4 papers in it. Make sure you have a pencil case, and appropriate equipment, for example, if you are taking Mathematics, you will need a scientific calculator
- **Books** – textbooks for all your subjects will be provided. There is no need to buy these in advance
- **Email** –it is important that you have an appropriate email address. Make sure you have an email address that is yourname@***.com

Transition Materials

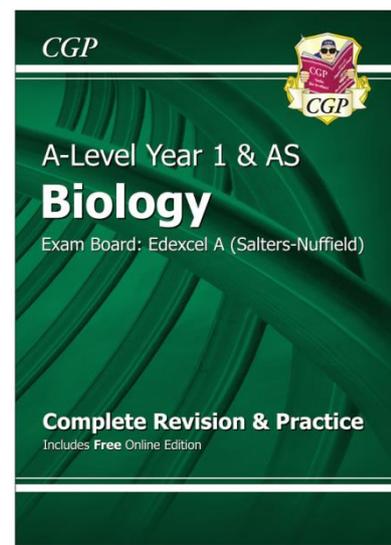
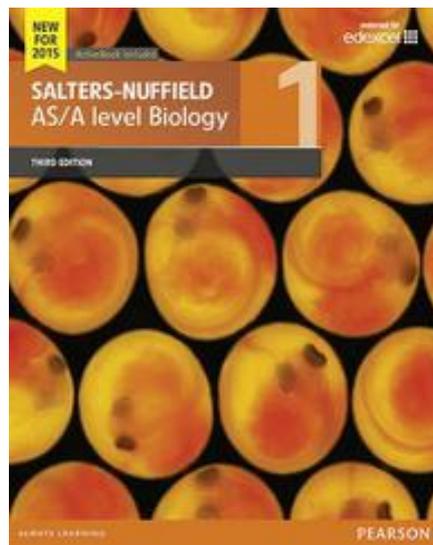
Over the next pages, our teachers have prepared some transition activities.

This is to help you prepare for life in the Sixth Form.

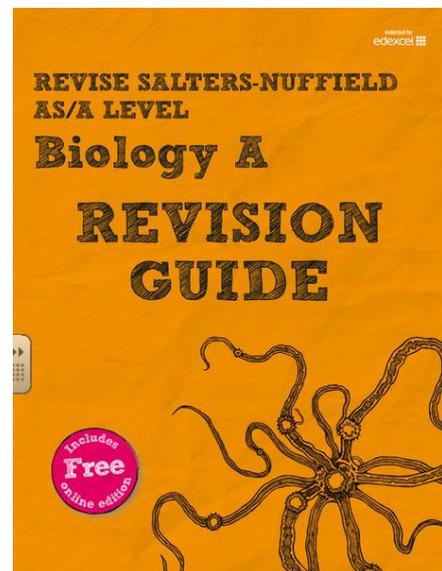
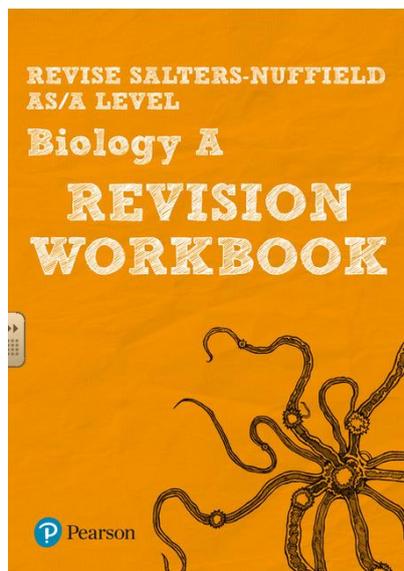
The work will be collected in by your subject teachers over the first week of term. Please ensure you have your work with you for your first lesson.

A-Level Biology

A guide to help you get ready for A-level Biology, including everything from topic guides to online learning resources. Exam board: Edexcel A (Salters-Nuffield).

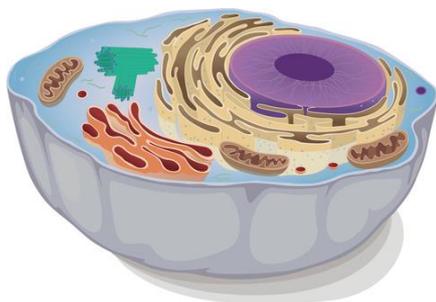


Other excellent resources include:



:

The
of
the Science Practical Endorsement.



Course structure:

Pearson Edexcel Level 3
Advanced GCE in Biology A
(Salters-Nuffield) consists
three externally examined papers



and

Students are expected to carry out the **18 core practical experiments** that are identified in the content. The course includes three exam papers (each weighing 33.3%) on the following topics:

Paper 1: The Natural Environment and Species Survival	
*Paper code: 9BN0/01	
<ul style="list-style-type: none"> Externally assessed Availability: May/June First assessment: 2017 	33.33% of the total qualification
<p>Overview of content</p> <p>This paper will examine the following topics:</p> <ul style="list-style-type: none"> Topic 1: Lifestyle, Health and Risk Topic 2: Genes and Health Topic 3: Voice of the Genome Topic 4: Biodiversity and Natural Resources Topic 5: On the Wild Side Topic 6: Immunity, Infection and Forensics. 	
<p>Overview of assessment</p> <ul style="list-style-type: none"> Assessment is 2 hours. The paper consists of 100 marks. The paper may include multiple-choice, short open, open-response, calculations and extended writing questions. The paper will include questions that target mathematics at Level 2 or above (see <i>Appendix 6: Mathematical skills and exemplifications</i>). Overall, a minimum of 10% of the marks across the three papers will be awarded for mathematics at Level 2 or above. The paper will include questions that target the conceptual and theoretical understanding of experimental methods. 	

Paper 2: Energy, Exercise and Co-ordination

*Paper code: 9BN0/02

- Externally assessed
- Availability: May/June
- First assessment: 2017

**33.33% the
total
qualification**

Overview of content

This paper will examine the following topics:

- Topic 1: Lifestyle, Health and Risk
- Topic 2: Genes and Health
- Topic 3: Voice of the Genome
- Topic 4: Biodiversity and Natural Resources
- Topic 7: Run for your Life
- Topic 8: Grey Matter.

Overview of assessment

- Assessment is 2 hours.
- The paper consists of 100 marks.
- The paper may include multiple-choice, short open, open-response, calculations and extended writing questions.
- The paper will include questions that target mathematics at Level 2 or above (see *Appendix 6: Mathematical skills and exemplifications*). Overall, a minimum of 10% of the marks across the three papers will be awarded for mathematics at Level 2 or above.
- The paper will include questions that target the conceptual and theoretical understanding of experimental methods.

Paper 3: General and Practical Applications in Biology

*Paper code: 9BN0/03

- Externally assessed
- Availability: May/June
- First assessment: 2017

**33.33% of
the total
qualification**

Overview of content

- This paper will include questions from topics 1-8.
- A scientific article will be pre-released on our website 8 weeks before the examination.

Overview of assessment

- Assessment is 2 hours.
- The paper consists of 100 marks.
- The pre-released scientific article will underpin one section of the paper.
- The paper will include synoptic questions that may draw on two or more different topics.
- The paper will include questions that target mathematics at Level 2 or above (see *Appendix 6: Mathematical skills and exemplifications*). Overall, a minimum of 10% of the marks across the three papers will be awarded for mathematics at Level 2 or above.
- The paper will include questions that target the conceptual and theoretical understanding of experimental methods.

For further information and details please visit the website below and read through the specification A:

<https://qualifications.pearson.com/en/qualifications/edexcel-a-levels/biology-a-2015.html>

Pre Knowledge Topics

A level Biology will use your knowledge from GCSE and build on this to help you understand new and more demanding ideas. Complete the following tasks to make sure your knowledge is up to date and you are ready to start studying:

The cell is a unifying concept in biology, you will come across it many times during your two years of A level study. Prokaryotic and eukaryotic cells can be distinguished on the basis of their structure and ultrastructure. In complex multicellular organisms cells are organised into tissues, tissues into organs and organs into systems. During the cell cycle genetic information is copied and passed to daughter cells. Daughter cells formed during mitosis have identical copies of genes while cells formed during meiosis are not genetically identical

Read the information on these websites (you could make more Cornell notes if you wish):

<http://www.s-cool.co.uk/a-level/biology/cells-and-organelles>

<http://www.bbc.co.uk/education/guides/zviycdm/revision>

And take a look at these videos:

<https://www.youtube.com/watch?v=gcTuQpuJyD8>

<https://www.youtube.com/watch?v=L0k-enzoeOM>

<https://www.youtube.com/watch?v=qCLmR9-YY7o>

Task:

Produce a one page revision guide to share with your class in September summarising one of the following topics: Cells and Cell Ultrastructure, Prokaryotes and Eukaryotes, or Mitosis and Meiosis.

Whichever topic you choose, your revision guide should include:

Key words and definitions

Clearly labelled diagrams

Short explanations of key ideas or processes.

Biological Molecules

Biological molecules are often polymers and are based on a small number of chemical elements. In living organisms carbohydrates, proteins, lipids, inorganic ions and water all have important roles and functions related to their properties. DNA determines the structure of proteins, including enzymes. Enzymes catalyse the reactions that determine structures and functions from cellular to whole-organism level. Enzymes are proteins with a mechanism of action and other properties determined by their tertiary structure. ATP provides the immediate source of energy for biological processes.

Read the information on these websites (you could make more Cornell notes if you wish):

<http://www.s-cool.co.uk/a-level/biology/biological-molecules-and-enzymes>

<http://www.bbc.co.uk/education/guides/zb739j6/revision>

And take a look at these videos:

<https://www.youtube.com/watch?v=H8WJ2KENIK0>

<http://ed.ted.com/lessons/activation-energy-kickstarting-chemical-reactions-vance-kite>

Task:

Krabbe disease occurs when a person doesn't have a certain enzyme in their body. The disease effects the nervous system. Write a letter to a GP or a sufferer to explain what an enzyme is.

Your poster should:

Describe the structure of an enzyme

Explain what enzymes do inside the body

DNA and the Genetic Code

In living organisms nucleic acids (DNA and RNA) have important roles and functions related to their properties. The sequence of bases in the DNA molecule determines the structure of proteins, including enzymes.

The double helix and its four bases store the information that is passed from generation to generation. The sequence of the base pairs adenine, thymine, cytosine and guanine tell ribosomes in the cytoplasm how to construct amino acids into polypeptides and produce every characteristic we see. DNA can mutate leading to diseases including cancer and sometimes anomalies in the genetic code are passed from parents to babies in disease such as cystic fibrosis, or can be developed in unborn foetuses such as Down's Syndrome.

Read the information on these websites (you could make more Cornell notes if you wish):

<http://www.bbc.co.uk/education/guides/z36mmp3/revision>

<http://www.s-cool.co.uk/a-level/biology/dna-and-genetic-code>

And take a look at these videos:

<http://ed.ted.com/lessons/the-twisting-tale-of-dna-judith-hauck>

<http://ed.ted.com/lessons/where-do-genes-come-from-carl-zimmer>

Task:

Produce a wall display to put up in your classroom in September. You might make a poster or do this using PowerPoint or similar. Your display should use images, keywords and simple explanations to:

Define gene, chromosome, DNA and base pair

Describe the structure and function of DNA and RNA

Explain how DNA is copied in the body

Outline some of the problems that occur with DNA replication and what the consequences of this might be.

Evolution

Transfer of genetic information from one generation to the next can ensure continuity of species or lead to variation within a species and possible formation of new species. Reproductive isolation can lead to accumulation of different genetic information in populations potentially leading to formation of new species (speciation). Sequencing projects have read the genomes of organisms ranging from microbes and plants to humans. This allows the sequences of the proteins that derive from the genetic code to be predicted. Gene technologies allow study and alteration of gene function in order to better understand organism function and to design new industrial and medical processes.

Read the information on these websites (you could make more Cornell notes if you wish):

<http://www.bbc.co.uk/education/guides/z237hyc/revision/4>

<http://www.s-cool.co.uk/a-level/biology/evolution>

And take a look at these videos:

<http://ed.ted.com/lessons/how-to-sequence-the-human-genome-mark-j-kiel>

<http://ed.ted.com/lessons/the-race-to-sequence-the-human-genome-tien-nguyen>

Task:

Produce a one page revision guide for an AS Biology student that recaps the key words and concepts in this topic. Your revision guide should:

Describe speciation

Explain what a genome is

Give examples of how this information has already been used to develop new treatments and technologies.

A Level Business

At A Level, we study AQA

The AQA Business Studies specification requires students to develop their ability to acquire a range of important and transferable skills including data skills, presenting arguments, making judgments and conducting research.

Students will develop the knowledge and skills needed to analyse data, think critically about issues and make informed decisions – all skills that are needed for further study and employment. You will study business in a variety of contexts (e.g. large/small. UK focused/global, service/manufacturing) and consider:-

- The importance of the context of business in relation to decision making
- The interrelated nature of business activities and how they affect competitiveness
- The competitive environment and the markets in which businesses operate
- The influences on functional decisions and plans including ethical and environmental issues
- The factors that might determine whether a decision is successful e.g. the quality of data and the degree of uncertainty
- How technology is changing the way decisions are made and how businesses operate and compete
- The impact on stakeholders of functional decisions and their response to such decisions
- Use of non-quantitative and quantitative data in decision making (including interpretation of index numbers and calculations such as ratios and percentages)

2.3 A-level

Assessments

Paper 1: Business 1	+	Paper 2: Business 2	+	Paper 3: Business 3
What's assessed All content above		What's assessed All content above		What's assessed All content above
Assessed <ul style="list-style-type: none"> written exam: 2 hours 100 marks in total 33.3% of A-level 		Assessed <ul style="list-style-type: none"> written exam: 2 hours 100 marks in total 33.3% of A-level 		Assessed <ul style="list-style-type: none"> written exam: 2 hours 100 marks in total 33.3% of A-level
Questions Three compulsory sections: <ul style="list-style-type: none"> Section A has 15 multiple choice questions (MCQs) worth 15 marks. Section B has short answer questions worth 35 marks. Sections C and D have two essay questions (choice of one from two and one from two) worth 25 marks each. 		Questions Three data response compulsory questions worth approximately 33 marks each and made up of three or four part questions.		Questions One compulsory case study followed by approximately six questions.

Before the qualification can be awarded, students must undertake **all** the assessments.

Paper 1: Business 1	+	Paper 2: Business 2
What's assessed 1 – 6 above		What's assessed 1 – 6 above
Assessed <ul style="list-style-type: none"> written exam: 1 hour 30 minutes 80 marks in total 50% of AS 		Assessed <ul style="list-style-type: none"> written exam: 1 hour 30 minutes 80 marks in total 50% of AS
Questions Three compulsory sections: <ul style="list-style-type: none"> Section A has 10 multiple choice questions (MCQs) worth 10 marks Section B has short answer questions worth approximately 20 marks Section C has two data response stimuli with questions worth approximately 25 marks. 		Questions One compulsory case study consisting of approximately seven questions.

Before the qualification can be awarded, students must undertake **both** the assessments.

Transition Activities:

Task 1

Businesses can be categorised into a range of different formats:

- a. By **market**: B2B or B2C
- b. By **sector**: primary, secondary, tertiary
- c. By **target market**: Niche or mass
- d. By **ownership**: Sole-trader, partnership, LTD, PLC, public sector & not-for-profit.

Explore each type of category above. For part d, include advantages and disadvantages of each type of ownership and ensure you are able to explain key terms such as: limited liability, unlimited liability & shares, shareholders & market capitalisation.

Task 2

Research and explain common objectives set by organisations (e.g. profit, growth, survival, cash flow, social, ethical and environmental objectives).

Task 3

Produce a one page work document answering the following question “To what extent is maximising profit always the most important objective for large well-known businesses whose activities are reported regularly in the media?”. You should use your knowledge from tasks 1 & 2 to answer it. Write a good conclusion for this too (aim for a conclusion that equates to one paragraph).

Tips to help you complete tasks:

- Use the Tutor2u website for key content and blogs
- AJIM (Answer, Justify, It depends on & Most important factor..) is a good acronym to help you write a good concluding paragraph. Find out more about this and try to apply this to your conclusion for task 3.
- Watch Tutor2u A Level Business YouTube clips for subject knowledge and advice on essay writing techniques.

A Level Chemistry

At A Level, we follow the OCR A specification. The course content is divided into six teaching modules and each module is further divided into key topics.

OCR A: Unit Overview & Course Structure A Level summary

Below is a breakdown of the 4 modules taught during Year 1 and the 2 modules taught in Year 2 (module one is integrated over the two years of the A Level course).

CONTENT OVERVIEW	ASSESSMENT METHOD & WEIGHTING
<ul style="list-style-type: none"> • Module 1 – Development of practical skills in chemistry (Year 1&2) • Module 2 – Foundations in chemistry (Year 1) • Module 3 – Periodic table and energy (Year 1) • Module 4 – Core organic chemistry (Year 1) • Module 5 – Physical chemistry and transition elements (Year 2) • Module 6 – Organic chemistry and analysis (Year 2) <p>Component 01 assesses content from modules 1, 2, 3 and 5.</p> <p>Component 02 assesses content from modules 1, 2, 4 and 6.</p> <p>Component 03 assesses content from all modules (1 to 6).</p>	<p><i>Periodic table, elements and physical chemistry (01)</i> 100 marks 2 hours 15 minutes WRITTEN PAPER</p> <p>A level = 37%</p>
	<p><i>Synthesis and analytical techniques (02)</i> 100 marks 2 hours 15 minutes WRITTEN PAPER</p> <p>A level = 37%</p>
	<p><i>Unified chemistry (03)</i> 70 marks 1 hour 30 minutes WRITTEN PAPER</p> <p>A level = 26%</p>
	<p><i>Practical endorsement in chemistry (04)</i> (non-exam assessment)</p>

A Level summary

Below is a breakdown of the modules by key topics.

MODULE	KEY TOPICS
Module 1 – Development of practical skills in Chemistry	<ul style="list-style-type: none"> • Practical skills assessed in a written examination • Practical skills assessed in the practical endorsement
Module 2 – Foundations in chemistry	<ul style="list-style-type: none"> • Atoms, compounds, molecules and equations • Amount of substance • Acid–base and redox reactions • Electrons, bonding and structure
Module 3 – Periodic table and energy	<ul style="list-style-type: none"> • The periodic table and periodicity • Group 2 and the halogens • Qualitative analysis • Enthalpy changes • Reaction rates and equilibrium (qualitative)
Module 4 – Core organic chemistry	<ul style="list-style-type: none"> • Basic concepts • Hydrocarbons • Alcohols and haloalkanes • Organic synthesis • Analytical techniques (IR and MS)
Module 5 – Physical chemistry and transition elements -YEAR 2	<ul style="list-style-type: none"> • Reaction rates and equilibrium (quantitative) • pH and buffers • Enthalpy, entropy and free energy • Redox and electrode potentials • Transition elements
Module 6 – Organic chemistry and analysis -YEAR 2	<ul style="list-style-type: none"> • Aromatic compounds • Carbonyl compounds • Carboxylic acids and esters • Nitrogen compounds • Polymers • Organic synthesis • Chromatography and spectroscopy (NMR)

Exams

End of Year 12: H032/01 (Paper 1), H032/02 (Paper 2)

End of Year 13: H432/01 (Paper 1), H432/02 (Paper 2), H432/03 (Paper 3)

1.2 Practical skills assessed in the practical endorsement

A range of practical experiences is a vital part of a learner's development as part of this course. Learners should develop and practise a wide range of practical skills throughout the course as preparation for the Practical Endorsement, as well as for the written examinations. The experiments and skills required for the Practical Endorsement will allow learners to develop and practise their practical skills, preparing learners for the written examinations.

Candidates are assessed on the following five skill areas:

- **Independent thinking** – apply investigative approaches and methods to practical work;
- **Use and application of scientific methods and practices** – safely and correctly use a range of practical equipment and materials; follow written instructions; make and record observations/measurements; keep appropriate records of experimental activities; present information and data in a scientific way; use appropriate software and tools to process data, carry out research and report findings;
- **Research and referencing** – use online and offline research skills including websites, textbooks and other printed scientific sources of information; correctly cite sources of information;
- **Instruments and equipment** – use a wide range of experimental and practical instruments, equipment and techniques appropriate to the knowledge and understanding included in the specification;
- **Use of apparatus and techniques** – use of appropriate apparatus to record a range of measurements (to include mass, time, volume of liquids and gases, temperature); use of a water bath or electric heater or sand bath for heating; measurement of pH using pH charts, or pH meter, or pH probe on a data logger; use of laboratory apparatus for a variety of experimental techniques including: (i) titration, using burette and pipette (ii) distillation and heating under reflux, including setting up glassware using retort stand and clamps (iii) qualitative tests for ions and organic functional groups (iv) filtration, including use of fluted filter paper, or filtration under reduced pressure; use of a volumetric flask, including accurate technique for making up a standard solution; use of acid–base indicators in titrations of weak/strong acids with weak/strong alkalis; purification of: (i) a solid product by recrystallization (ii) a liquid product, including use of a separating funnel; use of melting point apparatus; use of thin layer or paper chromatography; setting up of electrochemical cells and measuring voltages; safely and carefully handling solids and liquids, including corrosive, irritant, flammable and toxic substances; measurement of rates of reaction by at least two different methods, for example: (i) an initial rate method such as a clock reaction (ii) a continuous monitoring method.

Books:

You can borrow the essential course books from the Sixth form library on a long term loan. The books you will need to bring to all your lessons are:

- A Level Chemistry for OCR A (Rob Ritchie, Dave Gent)
- A-Level Year 1 & AS Chemistry: OCR A Revision guide (CGP)

Specimen papers:

Follow the link below:

<http://www.ocr.org.uk/qualifications/as-a-level-gce-chemistry-a-h032-h432-from-2015/>

Find 'Assessment materials', and choose the unit specimen paper you wish to view.

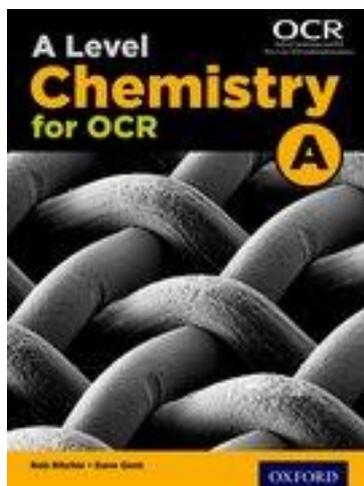
Support

Use the following resources for extra support:

- <http://www.creative-chemistry.org.uk/>
- <http://www.chembook.co.uk/>
- <http://www.franklychemistry.co.uk/>
- <http://www.franklychemistry.co.uk/20to9/gcse.html>
- <http://2012books.lardbucket.org/books/principles-of-general-chemistry-v1.0/index.html>
- http://www.docbrown.info/page19/OCR_GCE_chem_A_Level_2015.html
- <http://www.chemguide.co.uk/tp://crescentok.com/staff/jaskew/isr/tigerchem/index.html>

Book Recommendations (at Sir John Cass)

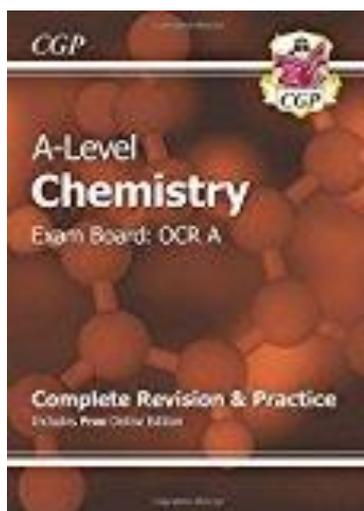
A Level Chemistry for OCR A (Paperback) Authors **Rob Ritchie** and **Dave Gent** Oxford University Press



Core textbook used in our school. Excellent preparation for the new A Level from OCR's Resource Partner. Covers both Year 1 and Year 2 content (will be provided at start of course).

ISBN: 978-0-19-835197-9

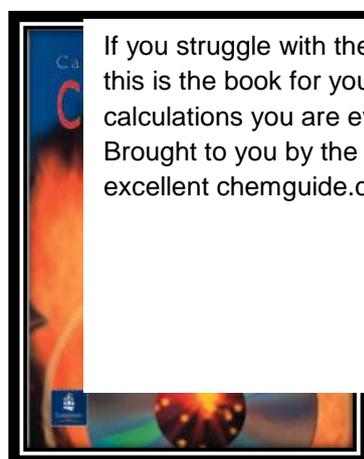
A Level Chemistry for OCR A Complete Revision & Practice (Paperback)



Complete Revision & Practice book has both years of OCR A A-Level Chemistry.

ISBN: 978-1-78294-302-0

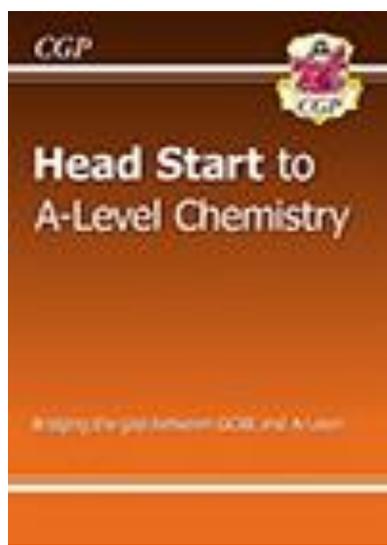
Calculations in AS/A Level Chemistry (Paperback) Author **Jim Clark**



If you struggle with the calculations side of chemistry, this is the book for you. Covers all the possible calculations you are ever likely to come across. Brought to you by the same guy who wrote the excellent chemguide.co.uk website.

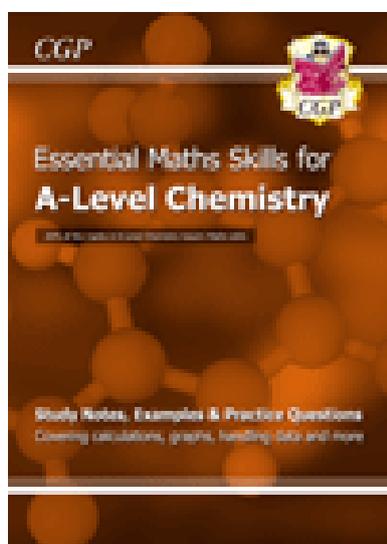
ISBN-10: 0582411270

Books to use over the summer



This Head Start book is perfect for helping you get off to a flying start in A-Level Chemistry... and it's suitable for all exam boards! It recaps all the crucial topics you'll need to remember from GCSE, with crystal-clear study notes and examples, plus practice questions to test your understanding. What's more, we've included introductions to some of the most important A-Level topics. Brilliant for preparation work over the summer before you start at sixth form!

ISBN: 978 1 78294 280 1



In the new AS and A-Level Chemistry exams, the use of maths is required for **20% of the marks** — and this brilliant book explains all the maths students will need to learn!

It covers Calculations, Units, Handling Data, Graph Skills and Geometry, with clear study notes and step-by-step examples in the context of Chemistry. And to make sure they've really got to grips with it all, there are practice questions for each topic — with answers included at the back of the book.

ISBN: 978 1 78294 472 0

Transition Activities

This pack contains a programme of activities and resources to prepare you to start an A level in Chemistry in September. It is aimed to be used after you complete your GCSE, throughout the remainder of the summer term and over the Summer Holidays to ensure you are ready to start your course in September.

Research activities

Use your online searching abilities to see if you can find out as much about the topic as you can. Remember, you are a prospective A level chemist, you should aim to push **your** knowledge.

You can make at least, a 1-page summary for each one you research using Cornell notes:

<http://coe.jmu.edu/learningtoolbox/cornellnotes.html>

Task 1: Model of the atom

Research how the model of the atom changed over time. Identify the various models of the atom, the scientists behind these models and the evidence that led to the changes that led to the present day accepted model.

Task 2: The chemistry of fireworks

What are the component parts of fireworks? What chemical compounds cause fireworks to explode? What chemical compounds are responsible for the colour of fireworks?

Task 3: Aspirin

What was the history of the discovery of aspirin, how do we manufacture aspirin in a modern chemical process?

Task 4: The hole in the ozone layer

Why did we get a hole in the ozone layer? What chemicals were responsible for it? Why were we producing so many of these chemicals? What is the chemistry behind the ozone destruction?

Pre-Knowledge Topics

Chemistry topic 1 – Electronic structure, how electrons are arranged around the nucleus

A periodic table can give you the proton / atomic number of an element, this also tells you how many electrons are in the *atom*.

You will have used the rule of electrons shell filling, where:

The first shell holds up to 2 electrons, the second up to 8, the third up to 8 and the fourth up to 18 (or you may have been told 8).

7
Li
lithium
3

Atomic number =3, electrons = 3, arrangement 2 in the first shell and 1 in the second or

Li = 2,1

At **A level** you will learn that the electron structure is more complex than this, and can be used to explain a lot of the chemical properties of elements.

The 'shells' can be broken down into 'orbitals', which are given letters: 's' orbitals, 'p' orbitals and 'd' orbitals.

You can read about orbitals here:

<http://bit.ly/pixlchem1>

<http://www.chemguide.co.uk/atoms/properties/atomorbs.html#top>



Now that you are familiar with s, p and d orbitals try these problems, write your answer in the format:

$1s^2, 2s^2, 2p^6$ etc.

Q1.1 Write out the electron configuration of:

a) Ca b) Al c) S d) Cl e) Ar f) Fe g) V h) Ni i) Cu j) Zn k) As

Q1.2 Extension question, can you write out the electron arrangement of the following **ions**:

a) K^+ b) O^{2-} c) Zn^{2+} d) V^{5+} e) Co^{2+}

Chemistry topic 2 – Oxidation and reduction

At GCSE you know that oxidation is adding oxygen to an atom or molecule and that reduction is removing oxygen, or that oxidation is removing hydrogen and reduction is adding hydrogen. You may have also learned that oxidation is removing electrons and reduction is adding electrons.

At A level we use the idea of **oxidation number** a lot!

You know that the metals in group 1 react to form ions that are +1, i.e. Na^+ and that group 7, the halogens, form -1 ions, i.e. Br^- .

g) KMnO_4 h) $\text{Cr}_2\text{O}_7^{2-}$ i) Cl_2O_4

Chemistry topic 3 – Isotopes and mass

You will remember that isotopes are atoms of the same element that have differing numbers of neutrons.

Hydrogen has 3 isotopes: Protium H_1^1 Deuterium H_1^2 Tritium H_1^3

Isotopes occur naturally, so in a sample of an element you will have a mixture of these isotopes. We can accurately measure the amount of an isotope using a **mass spectrometer**. You will need to understand what a mass spectrometer is and how it works at A level ('Time of Flight' type). You can read about a mass spectrometer here:



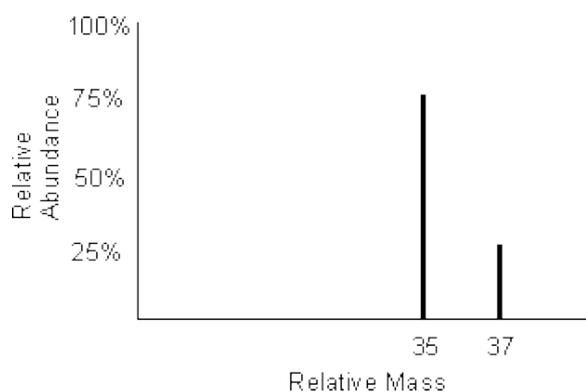
<http://bit.ly/pixlchem3>
<http://www.kore.co.uk/tutorial.htm>
<http://bit.ly/pixlchem4>
<http://filestore.aqa.org.uk/resources/chemistry/AQA-7404-7405-TN-MASS-SPECTROMETRY.PDF>



Q3.1 What must happen to the atoms before they are accelerated in the mass spectrometer?

Q3.2 Explain why the different isotopes travel at different speeds in a mass spectrometer.

A mass spectrum for the element chlorine will give a spectrum like this:



75% of the sample consist of chlorine-35, and 25% of the sample is chlorine-37.

Given a sample of naturally occurring chlorine $\frac{3}{4}$ of it will be Cl-35 and $\frac{1}{4}$ of it is Cl-37. We can calculate what the **mean** mass of the sample will be:

$$\text{Mean mass} = \frac{(75 \times 35)}{100} + \frac{(25 \times 37)}{100} = 35.5$$

If you look at a periodic table this is why chlorine has an atomic mass of 35.5.

<http://www.avogadro.co.uk/definitions/ar.htm>

An A level periodic table has the masses of elements recorded much more accurately than at GCSE. Most elements have isotopes and these have been recorded using mass spectrometers.

GCSE

A level

11 B boron 5	12 C carbon 6	14 N nitrogen 7	16 O oxygen 8	19 F fluorine 9
27 Al aluminium 13	28 Si silicon 14	31 P phosphorus 15	32 S sulfur 16	35.5 Cl chlorine 17

10.8 B 5 boron	12.0 C 6 carbon	14.0 N 7 nitrogen	16.0 O 8 oxygen	19.0 F 9 fluorine
27.0 Al 13 aluminium	28.1 Si 14 silicon	31.0 P 15 phosphorus	32.1 S 16 sulphur	35.5 Cl 17 chlorine

Given the percentage of each isotope you can calculate the mean mass which is the accurate atomic mass for that element.

Q3.3 Use the percentages of each isotope to calculate the accurate atomic mass of the following elements.

- Antimony has 2 isotopes: Sb-121 57.25% and Sb-123 42.75%
- Gallium has 2 isotopes: Ga-69 60.2% and Ga-71 39.8%
- Silver has 2 isotopes: Ag-107 51.35% and Ag-109 48.65%
- Thallium has 2 isotopes: Tl-203 29.5% and Tl-205 70.5%
- Strontium has **4** isotopes: Sr-84 0.56%, Sr-86 9.86%, Sr-87 7.02% and Sr-88 82.56%

Chemistry topic 4 – The shapes of molecules and bonding

Have you ever wondered why your teacher drew a water molecule like this?

The lines represent a covalent bond, but why draw them at an unusual angle?

If you are unsure about covalent bonding, read about it here:

<http://bit.ly/pixlchem5>

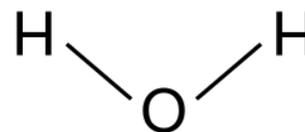
<http://www.chemguide.co.uk/atoms/bonding/covalent.html#top>

At A level you are also expected to know how molecules have certain shapes and why they are the shape they are.

You can read about shapes of molecules here:

<http://bit.ly/pixlchem6>

<http://www.chemguide.co.uk/atoms/bonding/shapes.html#top>



Q4.1 Draw a dot and cross diagram to show the bonding in a molecule of aluminium chloride (AlCl_3)

Q4.2 Draw a dot and cross diagram to show the bonding in a molecule of ammonia (NH_3)

Q4.3 What is the shape and the bond angles in a molecule of methane (CH_4)?

Chemistry topic 5 – Chemical equations

Balancing chemical equations is the stepping stone to using equations to calculate masses in chemistry.

There are loads of websites that give ways of balancing equations and lots of exercises in balancing.

Some of the equations to balance may involve strange chemical, don't worry about that, the key idea is to get balancing right.

<http://bit.ly/pixlchem7>

<http://www.chemteam.info/Equations/Balance-Equation.html>



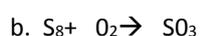
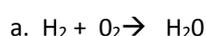
This website has a download; it is safe to do so:



<http://bit.ly/pixlchem8>

<https://phet.colorado.edu/en/simulation/balancing-chemical-equations>

Q5.1 Balance the following equations



- c. $\text{HgO} \rightarrow \text{Hg} + \text{O}_2$
- d. $\text{Zn} + \text{HCl} \rightarrow \text{ZnCl}_2 + \text{H}_2$
- e. $\text{Na} + \text{H}_2\text{O} \rightarrow \text{NaOH} + \text{H}_2$
- f. $\text{C}_{10}\text{H}_{16} + \text{Cl}_2 \rightarrow \text{C} + \text{HCl}$
- g. $\text{Fe} + \text{O}_2 \rightarrow \text{Fe}_2\text{O}_3$
- h. $\text{C}_6\text{H}_{12}\text{O}_6 + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$
- i. $\text{Fe}_2\text{O}_3 + \text{H}_2 \rightarrow \text{Fe} + \text{H}_2\text{O}$
- j. $\text{Al} + \text{FeO} \rightarrow \text{Al}_2\text{O}_3 + \text{Fe}$

Chemistry topic 6 – Measuring chemicals – the mole

From this point on you need to be using an A level periodic table, not a GCSE one you can view one here:

<http://bit.ly/pixlpertab>



https://secondaryscience4all.files.wordpress.com/2014/08/filestore_aqa_org_uk_subjects_aqa-2420-w-trb-ptds_pdf.png

Now that we have our chemical equations balanced, we need to be able to use them in order to work out masses of chemicals we need or we can produce.

The **mole** is the chemists equivalent of a dozen, atoms are so small that we cannot count them out individually, we weigh out chemicals.

For example: magnesium + sulfur \rightarrow magnesium sulfide



We can see that one atom of magnesium will react with one atom of sulfur, if we had to weigh out the atoms we need to know how heavy each atom is.

From the periodic table: Mg = 24.3 and S = 32.1

If I weigh out exactly 24.3g of magnesium this will be 1 mole of magnesium, if we counted how many atoms were present in this mass it would be a huge number (6.02×10^{23} !!!!), if I weigh out 32.1g of sulfur then I would have 1 mole of sulfur atoms.

So 24.3g of Mg will react precisely with 32.1g of sulfur, and will make 56.4g of magnesium sulfide.

Here is a comprehensive page on measuring moles, there are a number of descriptions, videos and practice problems.

You will find the first 6 tutorials of most use here, and problem sets 1 to 3.

<http://bit.ly/pixlchem9>

<http://www.chemteam.info/Mole/Mole.html>



Q6.1 Answer the following questions on moles.

- How many moles of phosphorus pentoxide (P_4O_{10}) are in 85.2g?
- How many moles of potassium in 73.56g of potassium chlorate (V) ($KClO_3$)?
- How many moles of water are in 249.6g of hydrated copper sulfate (VI) ($CuSO_4 \cdot 5H_2O$)? For this one, you need to be aware the dot followed by $5H_2O$ means that the molecule comes with 5 water molecules so these have to be counted in as part of the molecules mass.
- What is the mass of 0.125 moles of tin sulfate ($SnSO_4$)?
- If I have 2.43g of magnesium, how many g of oxygen (O_2) will I need to react completely with the magnesium? $2Mg + O_2 \rightarrow 2MgO$

Chemistry topic 7 – Solutions and concentrations

In chemistry, a lot of the reactions we carry out involve mixing solutions rather than solids, gases or liquids.

You will have used bottles of acids in science that have labels saying 'Hydrochloric acid 1M', this is a solution of hydrochloric acid where 1 mole of HCl, hydrogen chloride (a gas) has been dissolved in $1dm^3$ of water.

The dm^3 is a cubic decimetre, it is actually 1 litre, but from this point on as an A level chemist you will use the dm^3 as your volume measurement.

<http://bit.ly/pixlchem10>

http://www.docbrown.info/page04/4_73calcs11msc.htm



Q7.1

- What is the concentration (in $mol\ dm^{-3}$) of 9.53g of magnesium chloride ($MgCl_2$) dissolved in $100cm^3$ of water?
- What is the concentration (in $mol\ dm^{-3}$) of 13.248g of lead nitrate ($Pb(NO_3)_2$) dissolved in $2dm^3$ of water?
- If I add $100cm^3$ of $1.00\ mol\ dm^{-3}$ HCl to $1.9dm^3$ of water, what is the molarity of the new solution?
- What mass of silver is present in $100cm^3$ of $1\ moldm^{-3}$ silver nitrate ($AgNO_3$)?
- The Dead Sea, between Jordan and Israel, contains $0.0526\ moldm^{-3}$ of Bromide ions (Br^-), what mass of bromine is in $1dm^3$ of Dead Sea water?

Chemistry topic 8 – Titrations

One key skill in A level chemistry is the ability to carry out accurate titrations, you may well have carried out a titration at GCSE, at A level you will have to carry them out very precisely **and** be able to describe in detail how to carry out a titration - there will be questions on the exam paper about how to carry out practical procedures.

You can read about how to carry out a titration here, the next page in the series (page 5) describes how to work out the concentration of the unknown.

<http://bit.ly/pixlchem11>



http://www.bbc.co.uk/schools/gcsebitesize/science/triple_aqa/further_analysis/analysing_substances/revisio n/4/

Remember for any titration calculation you need to have a balanced symbol equation; this will tell you the ratio in which the chemicals react.

E.g. a titration of an unknown sample of sulfuric acid with sodium hydroxide.

A 25.00cm³ sample of the unknown sulfuric acid was titrated with 0.100mol dm⁻³ sodium hydroxide and required exactly 27.40cm³ for neutralisation. What is the concentration of the sulfuric acid?

Step 1: the equation $2\text{NaOH} + \text{H}_2\text{SO}_4 \rightarrow \text{Na}_2\text{SO}_4 + 2\text{H}_2\text{O}$

Step 2; the ratios $2 : 1$

Step 3: how many moles of sodium hydroxide $27.40\text{cm}^3 = 0.0274\text{dm}^3$

number of moles = $c \times v = 0.100 \times 0.0274 = 0.00274$ moles

step 4: Using the ratio, how many moles of sulfuric acid

for every 2 NaOH there are 1 H₂SO₄ so, we must have $0.00274/2 = 0.00137$ moles of H₂SO₄

Step 5: Calculate concentration. concentration = moles/volume ← in dm³ = $0.00137/0.025 = 0.0548 \text{ mol dm}^{-3}$

Here are some additional problems, which are harder, ignore the questions about colour changes of indicators.

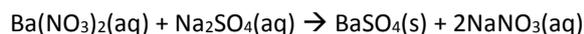
<http://bit.ly/pixlchem12>

<http://www.docbrown.info/page06/Mtestsnotes/ExtraVolCalcs1.htm>



Use the steps on the last page to help you

Q8.1 A solution of barium nitrate will react with a solution of sodium sulfate to produce a precipitate of barium sulfate.



What volume of 0.25mol dm⁻³ sodium sulfate solution would be needed to precipitate all of the barium from 12.5cm³ of 0.15 mol dm⁻³ barium nitrate?

Chemistry topic 9 – Organic chemistry – functional groups

At GCSE you would have come across **hydrocarbons** such as alkanes (ethane etc) and alkenes (ethene etc). You may have come across molecules such as alcohols and carboxylic acids. At A level you will learn about a wide range of molecules that have had atoms added to the carbon chain. These are called functional groups, they give the molecule certain physical and chemical properties that can make them incredibly useful to us.

Here you are going to meet a selection of the functional groups, learn a little about their properties and how we give them logical names.

You will find a menu for organic compounds here:

<http://bit.ly/pixlchem13>

<http://www.chemguide.co.uk/orgprosmenu.html#top>



And how to name organic compounds here:



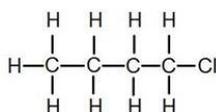
<http://bit.ly/pixlchem14>

<http://www.chemguide.co.uk/basicorg/conventions/names.html#top>

Using the two links see if you can answer the following questions:

Q9.1 Halogenoalkanes

What is the name of this halogenoalkane?



How could you make it from butan-1-ol?

Q9.2 Alcohols

How could you make ethanol from ethene?

How does ethanol react with sodium, in what ways is this a) similar to the reaction with water, b) different to the reaction with water?

Q9.3 Aldehydes and ketones

Draw the structures of a) propanal b) propanone

How are these two functional groups different?

Chemistry topic 10 – Acids, bases, pH

At GCSE you will know that an acid can dissolve in water to produce H^+ ions, at A level you will need a greater understanding of what an acid or a base is.

Read the following page and answer the questions

<http://bit.ly/pixlchem15>

<http://www.chemguide.co.uk/physical/acidbaseeqia/theories.html#top>



Q10.1 What is your new definition of what an acid is?

Q10.2 How does ammonia (NH_3) act as a base?

<http://bit.ly/pixlchem16>

<http://www.chemguide.co.uk/physical/acidbaseeqia/acids.html#top>

Q10.3 Ethanoic acid (vinegar) is a weak acid, what does this mean?

Q10.4 What is the pH of a solution of 0.01 mol dm^{-3} of the strong acid, hydrochloric acid?

Pre-Knowledge Topics Answers to problems

Q1.1a) $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2$ b) $1s^2 2s^2 2p^6 3s^2 3p^1$ c) $1s^2 2s^2 2p^6 3s^2 3p^4$ d) $1s^2 2s^2 2p^6 3s^2 3p^5$

e) $1s^2 2s^2 2p^6 3s^2 3p^6$ f) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^6 4s^2$ g) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^3 4s^2$

h) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^8 4s^2$ i) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^1$ j) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^2$

k) $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^3$

Q1.2a) $1s^2 2s^2 2p^6 3s^2 3p^6$ b) $1s^2 2s^2 2p^6 3s^2 3p^6$ c) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10}$

d) $1s^2 2s^2 2p^6 3s^2 3p^6$ e) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^7$

=====

Q2.1 a) +4 b) +6 c) +5 d) +4 e) +3 f) +5 g) +7 h) +6 i) +4

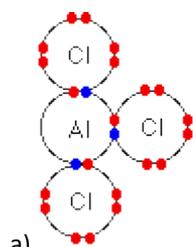
=====

Q3.1 They must be ionised / turned into ions

Q3.2 The ions are all given the same amount of kinetic energy, as $KE = \frac{1}{2} mv^2$ the lighter ions will have greater speed / heavier ions will have less speed.

Q3.3 a) 121.855 b) 67.796 c) 107.973 d) 204.41 e) 87.710 / 87.7102

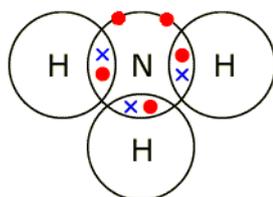
Q4.1



a)

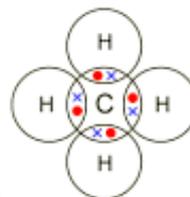
120°

b)

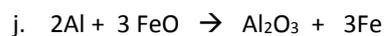
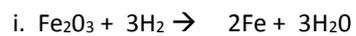
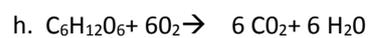
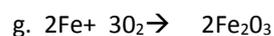
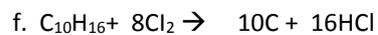
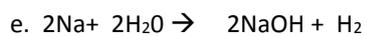
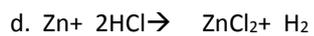
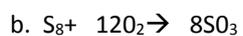
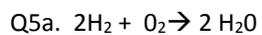


107°

c)



109.5°



Q6.1 a) $85.2/284 = 0.3$ moles b) $73.56/122.6 = 0.6$ moles c) $249.5/249.5 = 1.0$ moles Each mole contains 5 molecules of water, so $1 \times 5 = 5$ moles

d) $0.125 \times 214.8 = 26.85\text{g}$ e) $2\text{Mg} : 1\text{O}_2$ or 2:1 ratio 2.43g of Mg = 0.1moles so we need 0.1/2 moles of oxygen (O_2): $0.05 \times 32 = 1.6\text{g}$

7.1 a) $9.53\text{g}/95.3 = 0.1$ moles, in 100cm^3 or 0.1dm^3 in 1dm^3 $0.1\text{moles}/0.1\text{dm}^3 = 1.0 \text{ mol dm}^{-3}$

b) $13.284\text{g}/331.2 = 0.04$ moles, in 2dm^3 in 1dm^3 $0.04\text{moles}/2\text{dm}^3 = 0.02 \text{ mol dm}^{-3}$

c) 100cm^3 of $1 \text{ mol dm}^{-3} = 0.1$ moles added to a total volume of $2 \text{ dm}^3 = 0.1\text{moles}/2\text{dm}^3 = 0.05 \text{ mol dm}^{-3}$

d) in 1dm^3 of 1 mol dm^{-3} silver nitrate, 1 mole of Ag = 107.9g in $0.1\text{dm}^3 = 107.9 \times 0.1 = 10.79\text{g}$

e) $0.0526 \times 79.9 = 4.20274\text{g}$

=====
8.1

$\text{Ba}(\text{NO}_3)_2 : \text{Na}_2\text{SO}_4$

1 : 1 ratio

12.5cm^3 of $\text{Ba}(\text{NO}_3)_2 = 0.0125\text{dm}^3$

$0.15 \text{ mol dm}^{-3} \times 0.0125\text{dm}^3 = 0.001875$ moles

same number of moles of sodium sulfate needed, which has a concentration of 0.25 mol dm^{-3}

$0.001875 \text{ moles} / 0.25 \text{ mol dm}^{-3} = 0.0075 \text{ dm}^3$ or 7.5cm^3
=====

9.1 1-chlorobutane

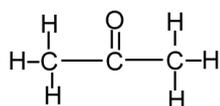
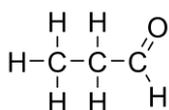
Heat butan-1-ol under reflux with concentrated H_2SO_4 and NaCl

9.2 react ethene with steam ($\text{H}_2\text{O}_{(\text{g})}$) in presence of phosphoric (V) acid catalyst at 300°C and 60-70 atm pressure

The reaction is similar in that it releases hydrogen but different as it proceeds much slower than in water

9.3 propanal

propanone

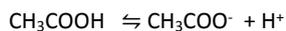


The carbon atom joined to oxygen in propanal has a hydrogen attached to it, it does not in propanone.
=====

10.1 An acid is a proton donor

10.2 Ammonia can accept a proton, to become NH_4^+

10.3 ethanoic acid has not fully dissociated, it has not released all of its hydrogen ions into the solution.



Mostly this Very few of these

10.4 $\text{pH} = -\log [0.01] = 2$ **The pH = 2** This equation will be introduced in Y13.

Places to visit

1. Go outdoors!

Have you actually spent any time observing the geology of the area you live in? What rocks or minerals are found in your area? Does your area have a history of extracting minerals? If so what were they, what were they used for, how did they obtain them? Are there any working or remains of mineral extraction industries?

2. Are there any chemical or chemistry based businesses in your area? A big ask, but one that could be really beneficial to you, write them a letter explaining that you are taking A level chemistry and you want to see how chemistry is used in industry and you would like to visit / have some work experience. You never know this could lead to great things!!!!

3. You could also try writing to / searching for your nearest university to see if they are running any summer schools for chemistry – they are usually free and give you the opportunity to experience the laboratories in a university.

4. Science museums.

You could visit your nearest science museum. They often have special exhibitions that may be of interest to you.

https://en.wikipedia.org/wiki/List_of_science_museums#United_Kingdom

5. Somerset Earth Science Centre:

<http://www.earthsciencecentre.org.uk>

6. The UK Association for Science and Discovery Centres (ASDC)

This association brings together over 60 major science engagement organisations in the UK.

<http://sciencecentres.org.uk/centres/weblinks.php>

A Level Computing

"Everyone should learn how to code, it teaches you how to think!"
Steve Jobs

Computer Science: Transition Guide

A Level Computer Science

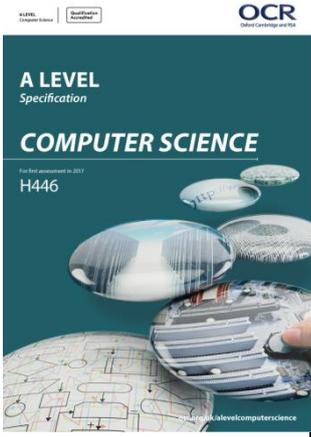
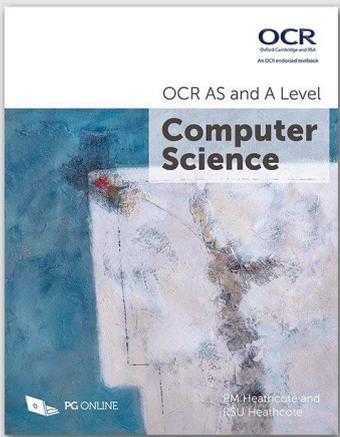
Examination Board: OCR

Within the course there are 3 components:

ASSESSMENT

Component	Assessment	Weighting	Marks and duration
01 Computer systems	Externally marked question paper	40%	140 marks / 2 hr 30 mins
02 Algorithms and programming	Externally marked question paper	40%	140 marks / 2 hr 30 mins
03 Programming project	Internally assessed, externally moderated	20%	70 marks

Resources you will be using in this course:

Specification	Textbook	Lesson Materials
		

Year 12:

Here's a brief look at the course units and the content for our AS and A Level Computer Science qualifications.

AS COMPUTER SCIENCE

01 COMPUTING PRINCIPLES

This component will be a traditionally marked and structured question paper with a mix of question types: short-answer, longer-answer, and levels of response mark-scheme-type questions. It will cover the characteristics of contemporary systems architecture and other areas including the following:

- The characteristics of contemporary processors, input, output and storage devices
- Software and software development
- Programming
- Exchanging data
- Data types, data structures and algorithms
- Legal, moral, ethical and cultural issues.

02 ALGORITHMS AND PROBLEM SOLVING

This component will be a traditionally marked and structured question paper and will include a mix of question types: short-answer, longer-answer, and levels of response mark-scheme-type questions.

There'll be a short scenario/task contained in the paper, which could be an algorithm or a text page-based task, which will involve problem solving.

Other areas covered include the following:

- Elements of computational thinking
- Problem solving and programming
- Algorithms.

Year 13:

A LEVEL COMPUTER SCIENCE ASSESSMENT OVERVIEW – FIRST EXAM JUNE 2017

Component		
01 Computer systems	Mix of question types: including short-answer, longer-answer, and banded mark-scheme-type questions.	<p>The characteristics of contemporary processors, input, output and storage devices Components of a computer and their uses</p> <p>Software and software development: Types of software and the methodologies used to develop them</p> <p>Exchanging data: How data is exchanged between different systems</p> <p>Data types, data structures and algorithms How data is represented and stored in different structures and the use of different algorithms</p> <p>Legal, moral, cultural and ethical issues Laws surrounding the use and ethical issues that can arise from the use of computers</p>
02 Algorithms and Programming	<p>Two sections:</p> <p>A – Traditional questions concerning computational thinking.</p> <p>Mix of question types: including short-answer, longer-answer, and levels of response mark-scheme-type questions.</p> <p>B – Scenario/task contained in the paper, which could be an algorithm but will involve problem solving.</p> <p>Short-answer, longer-answer questions, and levels of response mark-scheme-type questions.</p>	<p>Sections A and B</p> <p>Elements of computational thinking What is meant by computational thinking</p> <p>Problem solving and programming How computers are used to solve problems and programs can be written to solve them</p> <p>Algorithms The use of algorithms to describe problems and standard algorithms</p>
03 Programming project	Candidates and/or centres select their own user-driven problem of an appropriate size and complexity to solve. This will enable them to demonstrate the skills and knowledge necessary to meet the Assessment Objectives.	<p>Analysis of the problem</p> <p>Design of the solution</p> <p>Implementation of the solution</p> <p>Evaluation</p>

Transition Activities: To be completed before September

The following Tasks will need to be attempted before September. Your knowledge in these topics will be assessed in a classroom test on the first week.

Task 1: Programming

Programming Task 1 Activity 1:

Visit www.w3schools.com/python and work through Python Exercises.

You must cover the following topics:

- Python Syntax
- Python Variables
- Python Numbers
- Python Strings
- Python Operators
- Python Lists
- Python Sets
- Python Dictionaries
- Python If...Else
- Python While Loops



Programming Task 1 Activity 2:

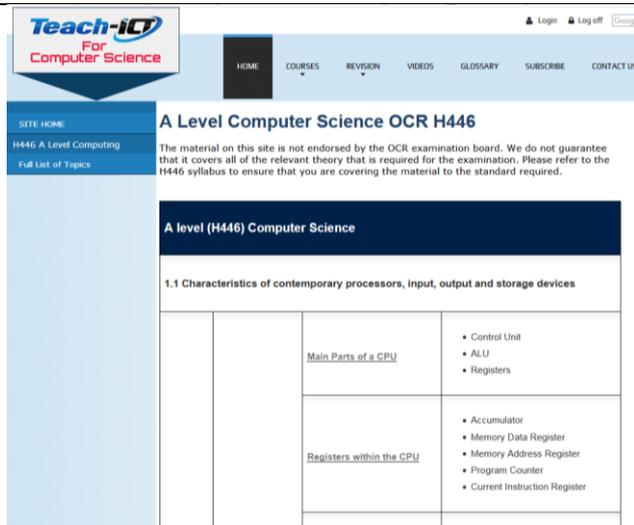
Register with www.codecademy.com and work through “Programming with Python” tutorial.

Task 2: Understand Computer Architecture

Read Teach ICT Theory

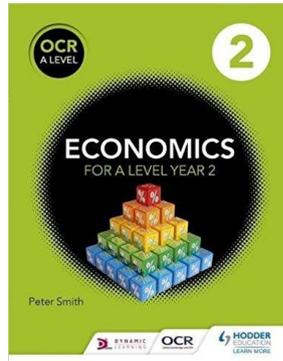
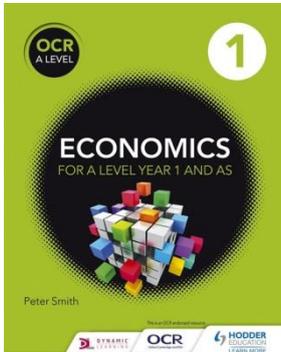
Read through topics on “1.1.1 Architecture”, starting with the CPU

http://www.teach-ict.com/2016/A_Level_Computing/OCR_H446/OCR_H446_home.html



A Level Economics

"It is not from the benevolence of the butcher, the brewer, or the baker that we expect our dinner, but from their regard to their own interest"
Adam Smith: "Founding Father of Modern Economics"



A Level Economics

At A Level, we study OCR.

Within this course, we pick the following units:

Year 12:

Microeconomics: How competitive markets work (50%)

Macroeconomics: Economic aims of the government (50%)

Year 13:

Microeconomics: How competitive markets work (33.33%)

Macroeconomics: Economic aims of the government (33.33%)

Themes in Economics: Looking at both micro and macroeconomics (33.33%)

Transition Activities: How can you prepare for A Level Economics?

Task 1

“Write down five headlines you think are related to economics”

Task 2:

1. Make a list of your daily needs
2. How do these differ from your yearly needs?
3. How do your needs differ from those in the poorest parts of the world?
4. How would you allocate 24 hours of your day?

Task 3:

In front of you there is a specific selection of resources available to you.

You have three minutes to make item/items that you can then sell on.

Transition preparation exercise

Can you justify if education should remain free, or should it only be provided by those who can afford it?

Think and write down the likely impact of either approach was adopted.

Key terms:

Opportunity Cost, Externalities, Taxation, Subsidies, Productivity, Scarcity, Government intervention, Employment, Skills, Poverty.

A Level English Literature

An ideal course for those who:

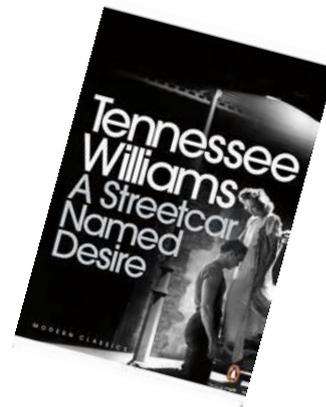
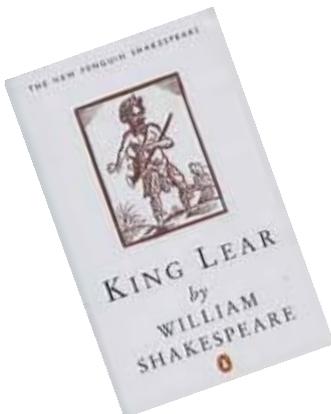
- ✓ **love reading** a wide range of **thought provoking** and **challenging** texts
- ✓ relish **exploring big ideas** on some of life's most **important issues**: from the role of science in society to relationships, romantic passion and individual identity
- ✓ enjoy **lively intellectual discussion**, **evaluating different interpretations** and forming new ideas, based on the **opinions of others**

There is a significant focus on **independent further reading**, so be prepared to take charge of your own research!

Assessment is comprised of **three examinations** (taken at the end of Year 13) and a **piece of coursework** (started at the end of Year 12).

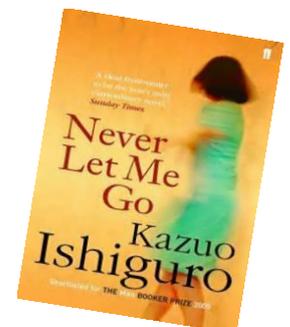
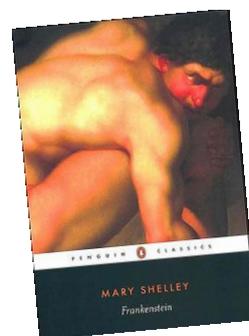
Component 1- Drama: Tragedy (30% of the total qualification)

For this **examination unit** you will study the Shakespearean tragedy *King Lear* and the play *A Streetcar Named Desire* by Tennessee Williams. You will explore tragedy as a genre, and evaluate the elements of a Shakespearean tragedy as well as the features of a modern tragedy.



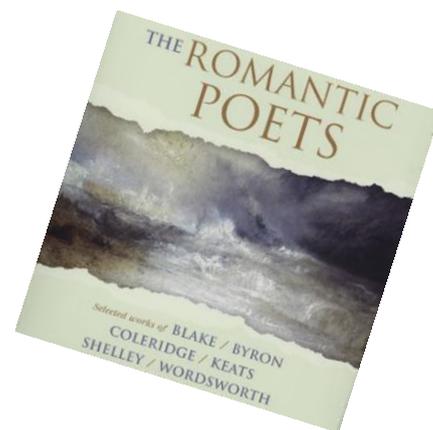
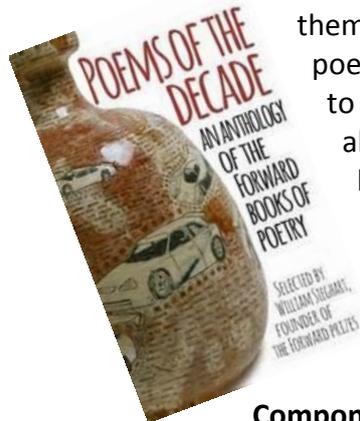
Component 2- Prose: Science and Society (20% of the total qualification)

For this **examination unit** you will read **two texts** related to the theme of Science and Society: *Frankenstein* by Mary Shelly and *Never Let Me Go* by Kazuo Ishiguro. You will compare and contrast the methods the writers use to shape meaning in each text, and evaluate themes such as social responsibility, morality and Man vs Nature.



Component 3- Poetry (30% of the total qualification)

For this **examination unit** you will study two anthologies of poetry: a selection of contemporary poetry exploring a range of themes from family relationships to mortality, and poetry from The Romantic Period. You will be required to analyse a wide variety of poetic techniques and also consider the connections between a text and its historical and cultural context.



Component 4- Coursework (20% of the total qualification)

In this **coursework unit** (started at the end of Year 12), the choice is yours! You will **decide on texts** and issues which **you** are particularly interested in. You will write **one comparative essay** (2500-3000 words) exploring how an idea or theme is presented in two different texts, drawing on critical interpretations to inform your argument. We will give you a wide range of suggestions for suitable texts, but the final choice for what you study on this unit is up to you!

Transition Activities – to be completed before September

Read: *Brave New World*, Aldous Huxley; 1984,

George Orwell; *Hamlet*, William Shakespeare;

The Kite Runner, Khaled Hosseini;

Beloved, Toni Morrison.

Watch: *The Handmaid's Tale*,

Any version of *Frankenstein*,

Black Mirror

Visit: The British Library, Shakespeare's Globe Theatre

See exam question overleaf and complete as part of your transition work

Sample Assessment Question English Literature

The following is an extract from the opening scene of Tennessee William's *A Streetcar Named Desire* which is set in the USA during the 1950s.

SCENE ONE

The exterior of a two-story corner building on a street in New Orleans which is named Elysian Fields and runs between the L & N tracks and the river. The section is poor but, unlike corresponding sections in other American cities, it has a raffish charm. The houses are mostly white frame, weathered gray, with rickety outside stairs and galleries and quaintly ornamented gables. This building contains two flats, upstairs and down. Faded white stairs ascend to the entrances of both.

It is first dark of an evening early in May. The sky that shows around the dim white building is a peculiarly tender blue, almost a turquoise, which invests the scene with a kind of lyricism and gracefully attenuates the atmosphere of decay. You can almost feel the warm breath of the brown river beyond the river warehouses with their faint redolences of bananas and coffee. A corresponding air is evoked by the music of Negro entertainers at a barroom around the corner. In this part of New Orleans you are practically always just around the corner, or a few doors down the street, from a tinny piano being played with the infatuated fluency of brown fingers. This "Blue Piano" expresses the spirit of the life which goes on here.

Two women, one white and one colored, are taking the air on the steps of the building. The white woman is Eunice, who occupies the upstairs flat; the colored woman a neighbor, for New Orleans is a cosmopolitan city where there is a relatively warm and easy intermingling of races in the old part of town.

Above the music of the "Blue Piano" the voices of people on the street can be heard overlapping.

[Two men come around the corner, Stanley Kowalski and Mitch. They are about twenty-eight or thirty years old, roughly dressed in blue denim work clothes. Stanley carries his bowling jacket and a red-stained package from a butcher's. They stop at the foot of the steps.]

STANLEY [bellowing]: Hey, there! Stella, Baby!

[Stella comes out on the first floor landing, a gentle young woman, about twenty-five, and of a background obviously quite different from her husband's.]

STELLA [mildly]: Don't holler at me like that. Hi, Mitch.

STANLEY: Catch!

STELLA: What?

STANLEY: Meat!

[He heaves the package at her. She cries out in protest but manages to catch it; then she laughs breathlessly. Her husband and his companion have already started back around the corner.]

STELLA [calling after him]: Stanley! Where are you going?

STANLEY: Bowling!

STELLA: Can I come watch?

STANLEY: Come on.

[He goes out.]

STELLA: Be over soon. [To the white woman]

Hello, Eunice. How are you?

EUNICE: I'm all right. Tell Steve to get him a poor boy's sandwich 'cause nothing's left here.

[They all laugh; the colored woman does not stop. Stella goes out.]

COLORED WOMAN: What was that package he th'ew at 'er?

[She rises from steps, laughing louder.]

EUNICE: You hush, now!

NEGRO WOMAN: Catch what!

[She continues to laugh. Blanche comes around the corner, currying a valise. She looks at a slip of paper, then at the building, then again at the slip and again at the building. Her expression is one of shocked disbelief. Her appearance is incongruous to this setting. She is daintily dressed in a white suit with a fluffy bodice, necklace and earrings of pearl, white gloves and hat, looking as if she were arriving at a summer tea or cocktail party in the garden district. She is about five years older than Stella. Her delicate beauty must avoid a strong light. There is something about her uncertain manner, as well as her white clothes, that suggests a moth.]

Task: 'A *Streetcar Named Desire* is a play of conflict and contrasts' to what extent is this highlighted in the opening scene of the play?

Complete your answer on the following page.

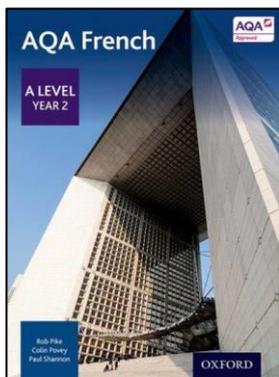
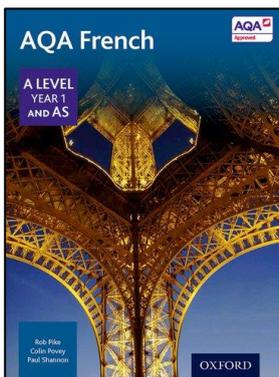
You should consider:

- Annotating the extract in detail
- What conflicts are presented in this extract
- What those contrasts and conflicts might reflect or represent
- Imagery, stage craft and language used which highlights these conflicts
- How these conflicts might reflect modern America
- Your own personal response
- You should attempt your answer in an academic style of writing

A Level French

“If you talk to a man in a language he understands, that goes to his head. If you talk to him in his own language, that goes to his heart.”

–Nelson Mandela



A Level French

At A Level, we follow the AQA course.

Course structure

The AQA A level in French comprises three units:

Exam	Skills	Length	Percentage of A-Level
Paper 1	Listening, reading and writing	2 hours 30 mins	50%
Paper 2	Writing on film and literary texts	2 hours	20%
Paper 3	Speaking	16-18 mins (plus 5 mins prep time)	30%

Within this course, we study the following topics:

Year 12	Year 13
<p>Aspects of French-speaking society – current trends</p> <ul style="list-style-type: none"> • Changes to family life • Cyber society • Voluntary work <p>Artistic culture in the French-speaking world</p> <ul style="list-style-type: none"> • Cultural heritage • Contemporary French music • Cinema 	<p>Aspects of French-speaking society – current issues</p> <ul style="list-style-type: none"> • Diverse society • Marginalisation • Criminality and sanctions <p>Aspects of political life in the French-speaking world</p> <ul style="list-style-type: none"> • Political engagement for young people • Demonstrations and strikes

La Haine (Matthieu Kassovitz)

- In depth study of a French film

- Politics and immigration

Boule de Suif et autres contes de la guerre (Guy de Maupassant)

- Detailed study of a literary text

Transition Activities: How can you prepare for A Level French?**Task 1: Writing**

Prepare a short presentation in French on a francophone music artist of your choosing.

Use the vocabulary below to help you.

Some artists that you could consider are: **MC Solaar, Stromae, Cœur de pirate, Zazie, Nolwenn Leroy, Zaz, Sniper, Shy'm, Manu Chao, Diams, La fouine** and many more...

Vocabulaire utile:

J'ai choisi de parler de... - **I have chosen to speak about...** |

Il /Elle est un chanteur/chanteuse ... - **He/She is a singer**

...de musique rock/pop/rap/classique – **ofmusic**

Auteur-compositeur-interprète – **singer-songwriter**

Il/Elle est né(e)... - **He/She was born...**

Il/Elle a grandi... - **He/She grew up...**

À huit ans... - **at the age of 8...**

Il/Elle s'est fait connaître avec la chanson... - **He/She made themselves known with the song...**

Qui est sortie en – **which came out in...**

Son style de musique est influencé par... - **His/Her style of music is influenced by...**

Dans ses chansons ... - **In his/her songs...**

Il/Elle fait référence à... - **He/She refers to...**

Il/Elle parle de... - **He she talks about...**

Dans son album il/elle aborde des thèmes tels que... - **In his/her album he/she tackles themes like...**

Il/Elle a réalisé deux tournées – **He/She has completed two tours.**

Task 2: Grammar

Complete the verb table for the regular –er verb jouer (to play)

Present tense	Past tense	Imperfect
Je joue	Je	Je
Tu	Tu	Tu jouais
Il/Elle/On	Il/Elle/On	Il/Elle/On
Nous	Nous avons joué	Nous
Vous	Vous	Vous
Ils/Elles	Ils/Elles	Ils/Elles
Future tense with aller	Simple future tense	Conditional
Je	Je	Je
Tu	Tu	Tu
Il/Elle/On va jouer	Il/Elle/On	Il/Elle/On
Nous	Nous	Nous
Vous	Vous	Vous joueriez
Ils/Elles	Ils/Elles joueront	Ils/Elles

Now complete the verb table for the irregular verb aller (to go)

Je	Je suis allé(e)	Je
Tu	Tu	Tu allais
Il/Elle/On va	Il/Elle/On	Il/Elle/On
Nous	Nous	Nous
Vous	Vous	Vous
Ils/Elles	Ils/Elles	Ils/Elles
Future tense with aller	Simple future tense	Conditional
Je	Je	Je
Tu	Tu	Tu
Il/Elle/On	Il/Elle/On	Il/Elle/On
Nous	Nous	Nous irions
Vous allez aller	Vous	Vous
Ils/Elles	Ils/Elles iront	Ils/Elles

Task 3: Reading skills

Read this article about the Belgian singer Stromae and select the four true statements.

Le chanteur belge, Stromae

Lisez cet extrait d'un article sur le chanteur belge, Stromae, qui vient d'un site web sur la musique francophone contemporaine.

Stromae s'est imposé comme l'un des artistes les plus créatifs de sa génération dans l'industrie musicale francophone et il est considéré actuellement comme un des musiciens les plus innovateurs et les plus intelligents. Mais en quoi consiste son innovation ? Stromae n'est pas un musicien conventionnel : il ne se contente pas de proposer des disques et peut-être une tournée de concerts. Il a compris qu'aujourd'hui un artiste doit offrir davantage. Il a diffusé sur le net des leçons de « beatmaking », c'est-à-dire de la musique assistée par ordinateur, qui sont visionnées par des millions d'internautes sur YouTube. Grâce à ces leçons il était déjà bien connu même avant la sortie commerciale de son premier album en 2010. Mais son style de musique offre, lui aussi, de l'innovation. Il traite des sujets de fond sur des rythmes dansants comme l'électro ou le hip-hop. Il mélange son identité vocale plutôt unique avec des lignes mélodiques composées dans la grande tradition de la chanson française. Stromae se définit par une identité plurielle : il peut être à la fois rwandais, belge, chanteur, rappeur, musicien mélancolique et festif. Sa musique est tirée des influences de tous les styles d'une culture mondialisée.

Ecrivez les lettres des **quatre phrases vraies** dans les cases

A	Le succès de Stromae est dû largement à sa créativité conventionnelle.
B	Stromae s'est servi du net pour mener une campagne de marketing.
C	Des millions d'internautes téléchargent sa musique.
D	Il a eu de la peine à promouvoir son premier album.
E	Son style de musique est plein de diversité et d'originalité.
F	Ses chansons respectent une tradition très connue dans la musique francophone.
G	Ses compositions sont toujours tristes.
H	La musique de Stromae ne reflète que son identité belge.
I	Stromae se laisse influencer par la musique de tous genres.

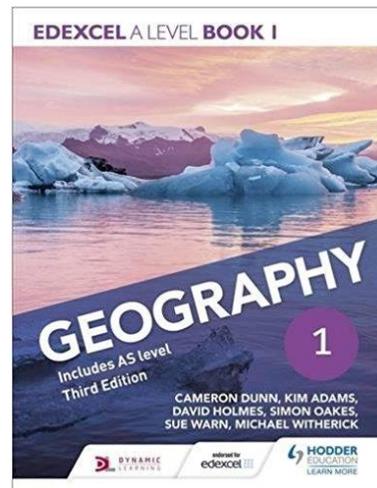
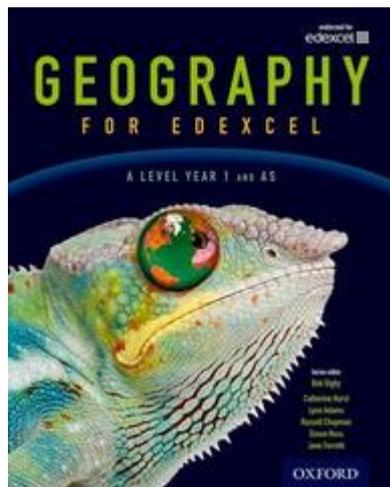
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... ..

A Level Geography

“The study of geography is about more than just memorizing places on a map. It’s about understanding the complexity of our world, appreciating the diversity of cultures that exists across continents. And in the end, it’s about using all that knowledge to help bridge divides and bring people together.”

–Former US President Barack Obama



A Level Geography

At A Level, we study Edexcel.

Within this course, we pick the following units:

Year 12:

Tectonic Hazards and their management Coasts

Regeneration Globalisation

Year 13:

Superpowers, Health, Human Rights and Intervention

The Carbon Cycle The Hydrological Cycle

Transition Activities: How can you prepare for A Level Geography?

Task 1

Choose at least one of the following.

Write a book review / film review, one page long.

Watch:

Before the Flood (2016), An inconvenient Truth (2006), The Impossible (2012), Under the Dome (YouTube), Planet Earth (David Attenborough documentaries)

Read

Novels:

Prisoners of Geography: Ten Maps That Tell You Everything You Need To Know About Global Politics by Tim Marshal, *The Glass Palace*

The Carbon Diaries 2015 by Saci Lloyd

The Bone Clocks by David Mitchell

Task 2: Visit one of the following places

Write a one page summary of what you learnt from your visit.

Visit:

London Maritime Museum, Greenwich

Natural History Museum

London Transport Museum

Task 3:

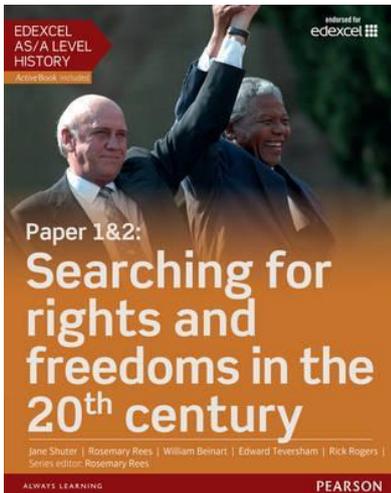
Read the article provided in your taster lesson and complete the activities to go with it.

A Level History

"History is who we are and why we are the way we are"

David McCullough, Historian

History: Transition Guide



A Level History

At A Level, we study Edexcel.

Within this course, we pick the following units:

Year 12:

Depth Study: The British Empire in India (20%)

Breadth Study: The USA in the 20th Century (30%)

Year 13:

Breadth and Depth Study: The rise and fall of the British Empire 1763-1914 (30%)

Coursework: The Cold War (20%)

Transition Activities: How can you prepare for A Level History?

Task 1

Choose at least one of the following films or novels.

Write a book review / film review, one page long.

Watch:

Indian Summer (Channel 4, 2015) BBC

The Great Gatsby

Hyde Park on Hudson

I love Lucy (TV show)

The 60s (NBC)

The Post (2018)

Read

Novels:

White Tiger by Aravind Adiga

The Glass Palace by Amitav Ghosh

A Passage to India by E M Forster

Heart of Darkness by Conrad

To Kill a Mockingbird by Harper Lee

The Feminine Mystique by Betty Friedan

The Grapes of Wrath by John Steinbeck

Task 2: Visit one of the following places

Write a one page summary of what you learnt from your visit.

Visit:

London Maritime Museum, Greenwich

Francis Drake's Golden Hind, London Bridge

HMS Belfast, Tower Bridge

Science Museum (space race), Kensington

American Museum, Bath

Task 3:

Read the article provided in your taster lesson and complete the activities to go with it.

A Level Law

At A Level, we study WJEC Eduqas

The specification has three components:

- **Component 1: The Nature of Law and the English Legal System**
- **Component 2: Substantive Law in Practice**
- **Component 3: Perspectives of Substantive Law**

A level Component One The nature of law and the English Legal System

Section A
Law making and the nature of law

Section B
The English legal system and the nature of law

A level Component 2 Substantive Law in practice

Section A – Law of contract (Private law)

Section B – Law of tort (Private law)

Section C – Criminal law (Public law)

Section D – Human rights law (Public law)

A level Component 3 Perspectives of Substantive Law

Section A – Law of contract (Private law)

Section B – Law of tort (Private law)

Section C – Criminal law (Public law)

Section D – Human rights law (Public law)

The Eduqas specification is designed to enable learners to develop an understanding of public and private law in England and Wales. Learners will study the dynamics of legal decision making that will equip them with the skills necessary to study law at higher education. It has a broad focus for learners to experience a range of legal disciplines.

Learners will be encouraged to think in a reflective manner in order to develop the higher level skills of analysis and evaluation. They will be given opportunities to analyse legal rules and procedure and factual issues. Learners will develop the ability to construct persuasive legal arguments and evaluate the strength of such arguments.

Learners will develop a critical understanding of the English legal system and the legal method and reasoning as used by lawyers and the judiciary. In addition, they will develop critical awareness of the influence of and operation the law in contemporary society.



Key skills required in A-level Law:

ASSESSMENT OBJECTIVES

AO1	Demonstrate knowledge and understanding of the English legal system and legal rules and principles
AO2	Apply legal rules and principles to given scenarios in order to present a legal argument using appropriate legal terminology
AO3	Analyse and evaluate legal rules and principles, concepts and issues

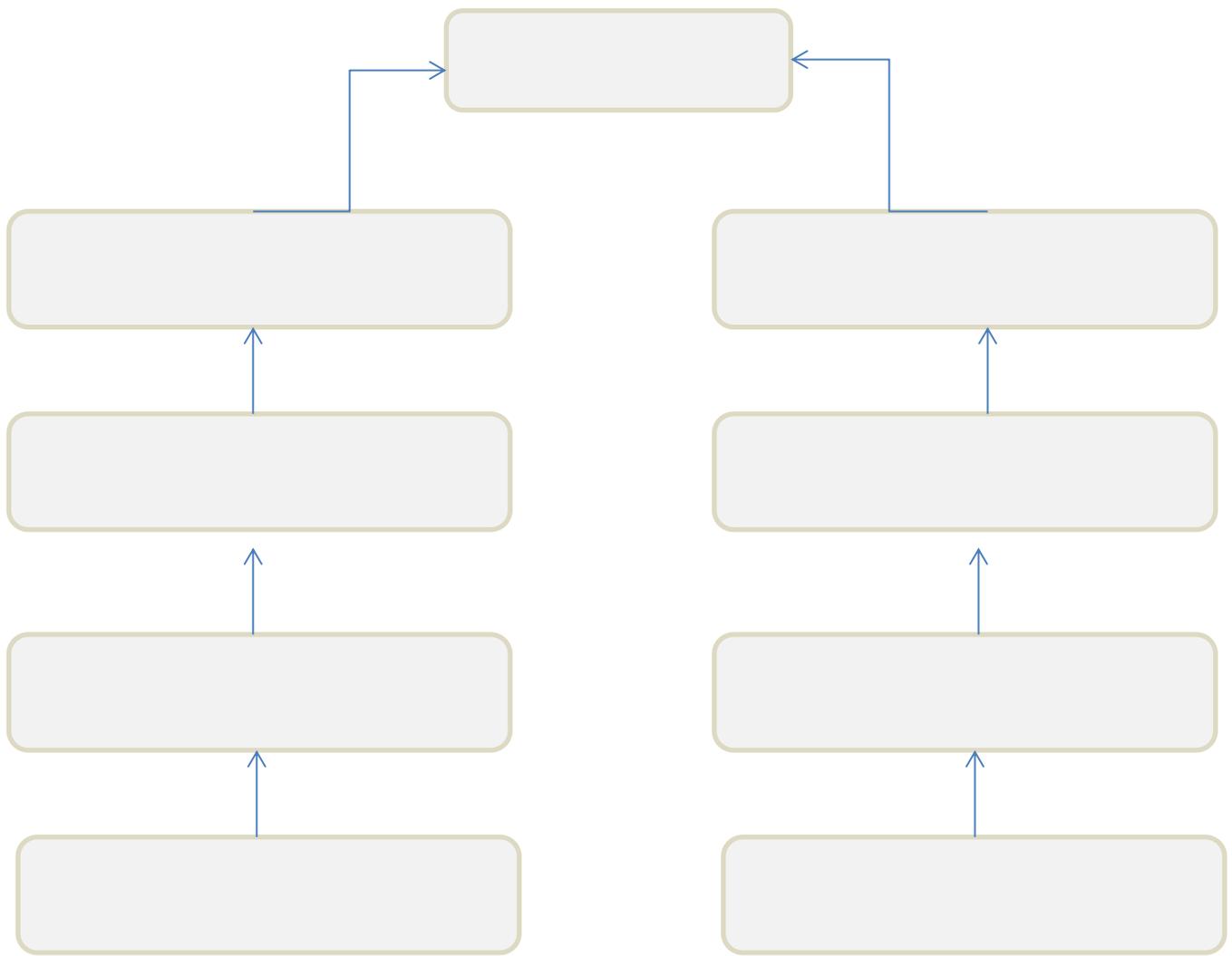
Transition Activities

1. Research how a **bill** is passed as **legislation**.
Sort the statements below; decide on the correct order to complete a flow chart that describes the how an Act of Parliament is made.

• Second Reading – proposals fully debated – MPs vote whether to proceed
• Committee Stage – detailed examination – amendments can be made.
• House of Lords – Bill then goes to the Lords – goes through similar process as the Commons, any amendments must go back to Commons for consideration
• First Reading – title is read to the House of Commons
• Report Stage – Committee reports back to the House, vote is taken.
• Third Reading – Bill re-presented to the House - vote taken
• Royal Assent

2. Carry out research on the court structure in the UK. Complete the flowchart below to outline the court **hierarchy** in the UK for civil and criminal law.

Court of Appeal which has both a criminal division and a civil division
Criminal
County Court – majority of civil litigation
Supreme Court
Crown Court – deal with triable either way and indictable offences
Civil
Magistrates Court – deal with summary offences
High Court – Chancery division; Family division; Queens Bench division



Mathematics

Students study a variety of topics across the two years of A Level Mathematics and A Level Further Mathematics.

The Pearson Edexcel Level 3 Advanced GCE in Mathematics consists of three externally examined papers and four papers for Further Mathematics.

Students must complete all assessment in May/June in any single year.

Paper 1: Pure Mathematics 1

Written examination: 2 hours (calculator)

33.33% of the qualification - 100 marks

Content:

Proof; algebra and functions; coordinate geometry in the (x, y) plane; sequences and series; trigonometry; exponentials and logarithms; differentiation; integration and vectors.

Paper 2: Pure Mathematics 2

Written examination: 2 hours (calculator)

33.33% of the qualification- 100 marks

Content:

Proof; algebra and functions; coordinate geometry in the (x, y) plane; sequences and series; trigonometry; differentiation; integration and numerical methods.

Paper 3: Statistics and Mechanics

Written examination: 2 hours (calculator)

33.33% of the qualification- 100 marks

The paper comprises of two sections: section A (statistics) and section B (mechanics).

Content:

Section A - Statistical sampling; data presentation and interpretation; probability; statistical distributions and statistical hypothesis testing.

Section B – Quantities and units in mechanics, kinematics, forces and newton's laws and moments.

A Level Further Mathematics

Students study a variety of topics across the two years of A Level Further Mathematics.

The Pearson Edexcel Level 3 Advanced GCE in Further Mathematics consists of four externally examined papers.

Students must complete all assessment in May/June in any single year.

Paper 1: Further Pure Mathematics 1

Written Examination: 1 hour and 30 minutes (calculator)

25% of the qualification

75 marks

Content:

Proof; complex numbers; matrices; further algebra and functions; further calculus and further vectors.

Paper 2: Further Pure Mathematics 2

Written Examination: 1 hour and 30 minutes (calculator)

25% of the qualification

75 marks

Content:

Complex numbers; further algebra and functions; further calculus, polar coordinates, hyperbolic functions and differential equations.

Paper 3: Further Mathematics Option 1

Written Examination: 1 hour and 30 minutes (calculator)

25% of the qualification

75 marks

Students take **one** of the following options:

3A: Further Pure Mathematics 3

3B: Further Statistics 1

3C: Further Mechanics 1

3D: Decision Mathematics 1

Paper 4: Further Mathematics Option 2

Written Examination: 1 hour and 30 minutes (calculator)

25% of the qualification

75 marks

Students take **one** of the following options:

4A: Further Pure Mathematics 4

4B: Further Statistics 1

4C: Further Statistics 2

4D: Further Mechanics 1

4E: Further Mechanics 2

4F: Decision Mathematics 1

4G: Decision Mathematics 2

Entry Requirements

Mathematics: GCSE grade 7 and above. Further Mathematics: GCSE grade 8/9.

Rules of indices

A LEVEL LINKS

Scheme of work: 1a. Algebraic expressions – basic algebraic manipulation, indices and surds

Key points

- $a^m \times a^n = a^{m+n}$
- $\frac{a^m}{a^n} = a^{m-n}$
- $(a^m)^n = a^{mn}$
- $a^0 = 1$
- $a^{\frac{1}{n}} = \sqrt[n]{a}$ i.e. the n th root of a
- $a^{\frac{m}{n}} = \sqrt[n]{a^m} = (\sqrt[n]{a})^m$
- $a^{-m} = \frac{1}{a^m}$
- The square root of a number produces two solutions, e.g. $\sqrt{16} = \pm 4$.

Examples

Example 1 Evaluate 10^0

$10^0 = 1$	Any value raised to the power of zero is equal to 1
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Example 2 Evaluate $9^{\frac{1}{2}}$

$\begin{aligned} 9^{\frac{1}{2}} &= \sqrt{9} \\ &= 3 \end{aligned}$	Use the rule $a^{\frac{1}{n}} = \sqrt[n]{a}$
---	--

Example 3 Evaluate $27^{\frac{2}{3}}$

$\begin{aligned} 27^{\frac{2}{3}} &= (\sqrt[3]{27})^2 \\ &= 3^2 \\ &= 9 \end{aligned}$	<ol style="list-style-type: none">1 Use the rule $a^{\frac{m}{n}} = (\sqrt[n]{a})^m$2 Use $\sqrt[3]{27} = 3$
--	---

Example 4 Evaluate 4^{-2}

$4^{-2} = \frac{1}{4^2}$ $= \frac{1}{16}$	<ol style="list-style-type: none">1 Use the rule $a^{-m} = \frac{1}{a^m}$2 Use $4^2 = 16$
---	--

Example 5 Simplify $\frac{6x^5}{2x^2}$

$\frac{6x^5}{2x^2} = 3x^3$	<p>$6 \div 2 = 3$ and use the rule $\frac{a^m}{a^n} = a^{m-n}$ to give $\frac{x^5}{x^2} = x^{5-2} = x^3$</p>
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Example 6 Simplify $\frac{x^3 \times x^5}{x^4}$

$\frac{x^3 \times x^5}{x^4} = \frac{x^{3+5}}{x^4} = \frac{x^8}{x^4}$ $= x^{8-4} = x^4$	<ol style="list-style-type: none">1 Use the rule $a^m \times a^n = a^{m+n}$2 Use the rule $\frac{a^m}{a^n} = a^{m-n}$
--	--

Example 7 Write $\frac{1}{3x}$ as a single power of x

$\frac{1}{3x} = \frac{1}{3} x^{-1}$	<p>Use the rule $\frac{1}{a^m} = a^{-m}$, note that the fraction $\frac{1}{3}$ remains unchanged</p>
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Example 8 Write $\frac{4}{\sqrt{x}}$ as a single power of x

$\frac{4}{\sqrt{x}} = \frac{4}{x^{\frac{1}{2}}}$ $= 4x^{-\frac{1}{2}}$	<ol style="list-style-type: none">1 Use the rule $a^{\frac{1}{n}} = \sqrt[n]{a}$2 Use the rule $\frac{1}{a^m} = a^{-m}$
--	--

Practice

1 Evaluate.

a 14^0

b 3^0

c 5^0

d x^0

2 Evaluate.

a $49^{\frac{1}{2}}$

b $64^{\frac{1}{3}}$

c $125^{\frac{1}{3}}$

d $16^{\frac{1}{4}}$

3 Evaluate.

a $25^{\frac{3}{2}}$

b $8^{\frac{5}{3}}$

c $49^{\frac{3}{2}}$

d $16^{\frac{3}{4}}$

4 Evaluate.

a 5^{-2}

b 4^{-3}

c 2^{-5}

d 6^{-2}

5 Simplify.

a $\frac{3x^2 \times x^3}{2x^2}$

b $\frac{10x^5}{2x^2 \times x}$

c $\frac{3x \times 2x^3}{2x^3}$

d $\frac{7x^3 y^2}{14x^5 y}$

e $\frac{y^2}{y^{\frac{1}{2}} \times y}$

f $\frac{c^{\frac{1}{2}}}{c^2 \times c^{\frac{3}{2}}}$

g $\frac{(2x^2)^3}{4x^0}$

h $\frac{x^{\frac{1}{2}} \times x^{\frac{3}{2}}}{x^{-2} \times x^3}$

Watch out!

Remember that any value raised to the power of zero is 1. This is the rule $a^0 = 1$

6 Evaluate.

a $4^{-\frac{1}{2}}$

b $27^{-\frac{2}{3}}$

c $9^{-\frac{1}{2}} \times 2^3$

d $16^{\frac{1}{4}} \times 2^{-3}$

e $\left(\frac{9}{16}\right)^{-\frac{1}{2}}$

f $\left(\frac{27}{64}\right)^{-\frac{2}{3}}$

7 Write the following as a single power of x .

a $\frac{1}{x}$

b $\frac{1}{x^7}$

c $\sqrt[4]{x}$

d $\sqrt[5]{x^2}$

e $\frac{1}{\sqrt[3]{x}}$

f $\frac{1}{\sqrt[3]{x^2}}$

8 Write the following without negative or fractional powers.

a x^{-3}

b x^0

c $x^{\frac{1}{5}}$

d $x^{\frac{2}{5}}$

e $x^{-\frac{1}{2}}$

f $x^{-\frac{3}{4}}$

9 Write the following in the form ax^n .

a $5\sqrt{x}$

b $\frac{2}{x^3}$

c $\frac{1}{3x^4}$

d $\frac{2}{\sqrt{x}}$

e $\frac{4}{\sqrt[3]{x}}$

f 3

Extend

10 Write as sums of powers of x .

a $\frac{x^5+1}{x^2}$

b $x^2\left(x+\frac{1}{x}\right)$

c $x^{-4}\left(x^2+\frac{1}{x^3}\right)$

Answers

1	a	1	b	1	c	1	d	1
2	a	7	b	4	c	5	d	2
3	a	125	b	32	c	343	d	8
4	a	$\frac{1}{25}$	b	$\frac{1}{64}$	c	$\frac{1}{32}$	d	$\frac{1}{36}$
5	a	$\frac{3x^3}{2}$	b	$5x^2$				
	c	$3x$	d	$\frac{y}{2x^2}$				
	e	$y^{\frac{1}{2}}$	f	c^{-3}				
	g	$2x^6$	h	x				
6	a	$\frac{1}{2}$	b	$\frac{1}{9}$	c	$\frac{8}{3}$		
	d	$\frac{1}{4}$	e	$\frac{4}{3}$	f	$\frac{16}{9}$		
7	a	x^{-1}	b	x^{-7}	c	$x^{\frac{1}{4}}$		
	d	$x^{\frac{2}{5}}$	e	$x^{\frac{1}{3}}$	f	$x^{\frac{2}{3}}$		
8	a	$\frac{1}{x^3}$	b	1	c	$\sqrt[5]{x}$		
	d	$\sqrt[5]{x^2}$	e	$\frac{1}{\sqrt{x}}$	f	$\frac{1}{\sqrt[4]{x^3}}$		
9	a	$5x^{\frac{1}{2}}$	b	$2x^{-3}$	c	$\frac{1}{3}x^{-4}$		
	d	$2x^{\frac{1}{2}}$	e	$4x^{\frac{1}{3}}$	f	$3x^0$		
10	a	$x^3 + x^{-2}$	b	$x^3 + x$	c	$x^{-2} + x^{-7}$		

Expanding brackets and simplifying expressions

A LEVEL LINKS

Scheme of work: 1a. Algebraic expressions – basic algebraic manipulation, indices and surds

Key points

- When you expand one set of brackets you must multiply everything inside the bracket by what is outside.
- When you expand two linear expressions, each with two terms of the form $ax + b$, where $a \neq 0$ and $b \neq 0$, you create four terms. Two of these can usually be simplified by collecting like terms.

Examples

Example 1 Expand $4(3x - 2)$

$$4(3x - 2) = 12x - 8$$

Multiply everything inside the bracket by the 4 outside the bracket

Example 2 Expand and simplify $3(x + 5) - 4(2x + 3)$

$$\begin{aligned} 3(x + 5) - 4(2x + 3) \\ = 3x + 15 - 8x - 12 \\ = 3 - 5x \end{aligned}$$

1 Expand each set of brackets separately by multiplying $(x + 5)$ by 3 and $(2x + 3)$ by -4

2 Simplify by collecting like terms:
 $3x - 8x = -5x$ and $15 - 12 = 3$

Example 3 Expand and simplify $(x + 3)(x + 2)$

$$\begin{aligned} (x + 3)(x + 2) \\ = x(x + 2) + 3(x + 2) \\ = x^2 + 2x + 3x + 6 \\ = x^2 + 5x + 6 \end{aligned}$$

1 Expand the brackets by multiplying $(x + 2)$ by x and $(x + 2)$ by 3

2 Simplify by collecting like terms:
 $2x + 3x = 5x$

Example 4 Expand and simplify $(x - 5)(2x + 3)$

$$\begin{aligned} (x - 5)(2x + 3) \\ = x(2x + 3) - 5(2x + 3) \\ = 2x^2 + 3x - 10x - 15 \\ = 2x^2 - 7x - 15 \end{aligned}$$

1 Expand the brackets by multiplying $(2x + 3)$ by x and $(2x + 3)$ by -5

2 Simplify by collecting like terms:
 $3x - 10x = -7x$

Practice

1 Expand.

a $3(2x - 1)$

c $-(3xy - 2y^2)$

b $-2(5pq + 4q^2)$

2 Expand and simplify.

a $7(3x + 5) + 6(2x - 8)$

c $9(3s + 1) - 5(6s - 10)$

b $8(5p - 2) - 3(4p + 9)$

d $2(4x - 3) - (3x + 5)$

3 Expand.

a $3x(4x + 8)$

c $-2h(6h^2 + 11h - 5)$

b $4k(5k^2 - 12)$

d $-3s(4s^2 - 7s + 2)$

4 Expand and simplify.

a $3(y^2 - 8) - 4(y^2 - 5)$

c $4p(2p - 1) - 3p(5p - 2)$

b $2x(x + 5) + 3x(x - 7)$

d $3b(4b - 3) - b(6b - 9)$

5 Expand $\frac{1}{2}(2y - 8)$

6 Expand and simplify.

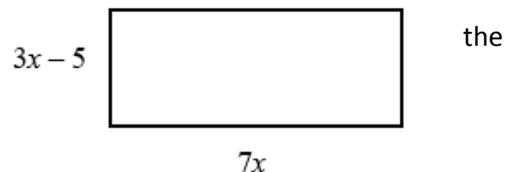
a $13 - 2(m + 7)$

b $5p(p^2 + 6p) - 9p(2p - 3)$

7 The diagram shows a rectangle.

Write down an expression, in terms of x , for the area of rectangle.

Show that the area of the rectangle can be written as $21x^2 - 35x$



8 Expand and simplify.

a $(x + 4)(x + 5)$

c $(x + 7)(x - 2)$

e $(2x + 3)(x - 1)$

g $(5x - 3)(2x - 5)$

i $(3x + 4y)(5y + 6x)$

k $(2x - 7)^2$

b $(x + 7)(x + 3)$

d $(x + 5)(x - 5)$

f $(3x - 2)(2x + 1)$

h $(3x - 2)(7 + 4x)$

j $(x + 5)^2$

l $(4x - 3y)^2$

Extend

9 Expand and simplify $(x + 3)^2 + (x - 4)^2$

10 Expand and simplify.

a $\left(x + \frac{1}{x}\right)\left(x - \frac{2}{x}\right)$

b $\left(x + \frac{1}{x}\right)^2$

Watch out!

When multiplying (or dividing) positive and negative numbers, if the signs are the same the answer is '+'; if the signs are

Factorising expressions

A LEVEL LINKS

Scheme of work: 1b. Quadratic functions – factorising, solving, graphs and the discriminants

Key points

- Factorising an expression is the opposite of expanding the brackets.
- A quadratic expression is in the form $ax^2 + bx + c$, where $a \neq 0$.
- To factorise a quadratic equation find two numbers whose sum is b and whose product is ac .
- An expression in the form $x^2 - y^2$ is called the difference of two squares. It factorises to $(x - y)(x + y)$.

Examples

Example 1 Factorise $15x^2y^3 + 9x^4y$

$$15x^2y^3 + 9x^4y = 3x^2y(5y^2 + 3x^2)$$

The highest common factor is $3x^2y$.
So take $3x^2y$ outside the brackets and then divide each term by $3x^2y$ to find the terms in the brackets

Example 2 Factorise $4x^2 - 25y^2$

$$4x^2 - 25y^2 = (2x + 5y)(2x - 5y)$$

This is the difference of two squares as the two terms can be written as $(2x)^2$ and $(5y)^2$

Example 3 Factorise $x^2 + 3x - 10$

$$b = 3, ac = -10$$

$$\text{So } x^2 + 3x - 10 = x^2 + 5x - 2x - 10$$

$$= x(x + 5) - 2(x + 5)$$

$$= (x + 5)(x - 2)$$

- 1** Work out the two factors of $ac = -10$ which add to give $b = 3$ (5 and -2)
- 2** Rewrite the b term ($3x$) using these two factors
- 3** Factorise the first two terms and the last two terms
- 4** $(x + 5)$ is a factor of both terms

Example 4 Factorise $6x^2 - 11x - 10$

<p>$b = -11, ac = -60$</p> <p>So</p> $6x^2 - 11x - 10 = 6x^2 - 15x + 4x - 10$ $= 3x(2x - 5) + 2(2x - 5)$ $= (2x - 5)(3x + 2)$	<ol style="list-style-type: none"> 1 Work out the two factors of $ac = -60$ which add to give $b = -11$ (-15 and 4) 2 Rewrite the b term ($-11x$) using these two factors 3 Factorise the first two terms and the last two terms 4 $(2x - 5)$ is a factor of both terms
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Example 5 Simplify $\frac{x^2 - 4x - 21}{2x^2 + 9x + 9}$

$\frac{x^2 - 4x - 21}{2x^2 + 9x + 9}$ <p>For the numerator: $b = -4, ac = -21$</p> <p>So</p> $x^2 - 4x - 21 = x^2 - 7x + 3x - 21$ $= x(x - 7) + 3(x - 7)$ $= (x - 7)(x + 3)$ <p>For the denominator: $b = 9, ac = 18$</p> <p>So</p> $2x^2 + 9x + 9 = 2x^2 + 6x + 3x + 9$ $= 2x(x + 3) + 3(x + 3)$ $= (x + 3)(2x + 3)$ <p>So</p> $\frac{x^2 - 4x - 21}{2x^2 + 9x + 9} = \frac{(x - 7)(x + 3)}{(x + 3)(2x + 3)}$ $= \frac{x - 7}{2x + 3}$	<ol style="list-style-type: none"> 1 Factorise the numerator and the denominator 2 Work out the two factors of $ac = -21$ which add to give $b = -4$ (-7 and 3) 3 Rewrite the b term ($-4x$) using these two factors 4 Factorise the first two terms and the last two terms 5 $(x - 7)$ is a factor of both terms 6 Work out the two factors of $ac = 18$ which add to give $b = 9$ (6 and 3) 7 Rewrite the b term ($9x$) using these two factors 8 Factorise the first two terms and the last two terms 9 $(x + 3)$ is a factor of both terms 10 $(x + 3)$ is a factor of both the numerator and denominator so cancels out as a value divided by itself is 1
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Practice

1 Factorise.

a $6x^4y^3 - 10x^3y^4$

c $25x^2y^2 - 10x^3y^2 + 15x^2y^3$

b $21a^3b^5 + 35a^5b^2$

2 Factorise

a $x^2 + 7x + 12$

c $x^2 - 11x + 30$

e $x^2 - 7x - 18$

g $x^2 - 3x - 40$

b $x^2 + 5x - 14$

d $x^2 - 5x - 24$

f $x^2 + x - 20$

h $x^2 + 3x - 28$

3 Factorise

a $36x^2 - 49y^2$

c $18a^2 - 200b^2c^2$

b $4x^2 - 81y^2$

4 Factorise

a $2x^2 + x - 3$

c $2x^2 + 7x + 3$

e $10x^2 + 21x + 9$

b $6x^2 + 17x + 5$

d $9x^2 - 15x + 4$

f $12x^2 - 38x + 20$

5 Simplify the algebraic fractions.

a $\frac{2x^2 + 4x}{x^2 - x}$

c $\frac{x^2 - 2x - 8}{x^2 - 4x}$

e $\frac{x^2 - x - 12}{x^2 - 4x}$

b $\frac{x^2 + 3x}{x^2 + 2x - 3}$

d $\frac{x^2 - 5x}{x^2 - 25}$

f $\frac{2x^2 + 14x}{2x^2 + 4x - 70}$

6 Simplify

a $\frac{9x^2 - 16}{3x^2 + 17x - 28}$

c $\frac{4 - 25x^2}{10x^2 - 11x - 6}$

b $\frac{2x^2 - 7x - 15}{3x^2 - 17x + 10}$

d $\frac{6x^2 - x - 1}{2x^2 + 7x - 4}$

Hint

Take the highest common factor outside the

Extend

7 Simplify $\sqrt{x^2 + 10x + 25}$

8 Simplify $\frac{(x+2)^2 + 3(x+2)^2}{x^2 - 4}$

Answers

1 a $2x^3y^3(3x - 5y)$ b $7a^3b^2(3b^3 + 5a^2)$
c $5x^2y^2(5 - 2x + 3y)$

2 a $(x + 3)(x + 4)$ b $(x + 7)(x - 2)$
c $(x - 5)(x - 6)$ d $(x - 8)(x + 3)$
e $(x - 9)(x + 2)$ f $(x + 5)(x - 4)$
g $(x - 8)(x + 5)$ h $(x + 7)(x - 4)$

3 a $(6x - 7y)(6x + 7y)$ b $(2x - 9y)(2x + 9y)$
c $2(3a - 10bc)(3a + 10bc)$

4 a $(x - 1)(2x + 3)$ b $(3x + 1)(2x + 5)$
c $(2x + 1)(x + 3)$ d $(3x - 1)(3x - 4)$
e $(5x + 3)(2x + 3)$ f $2(3x - 2)(2x - 5)$

5 a $\frac{2(x+2)}{x-1}$ b $\frac{x}{x-1}$
c $\frac{x+2}{x}$ d $\frac{x}{x+5}$
e $\frac{x+3}{x}$ f $\frac{x}{x-5}$

6 a $\frac{3x+4}{x+7}$ b $\frac{2x+3}{3x-2}$
c $\frac{2-5x}{2x-3}$ d $\frac{3x+1}{x+4}$

7 $(x + 5)$

8 $\frac{4(x+2)}{x-2}$

Surds and rationalising the denominator

A LEVEL LINKS

Scheme of work: 1a. Algebraic expressions – basic algebraic manipulation, indices and surds

Key points

- A surd is the square root of a number that is not a square number, for example $\sqrt{2}, \sqrt{3}, \sqrt{5}$, etc.
- Surds can be used to give the exact value for an answer.
- $\sqrt{ab} = \sqrt{a} \times \sqrt{b}$
- $\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}$
- To rationalise the denominator means to remove the surd from the denominator of a fraction.
- To rationalise $\frac{a}{\sqrt{b}}$ you multiply the numerator and denominator by the surd \sqrt{b}
- To rationalise $\frac{a}{b+\sqrt{c}}$ you multiply the numerator and denominator by $b-\sqrt{c}$

Examples

Example 1 Simplify $\sqrt{50}$

$\begin{aligned}\sqrt{50} &= \sqrt{25 \times 2} \\ &= \sqrt{25} \times \sqrt{2} \\ &= 5 \times \sqrt{2} \\ &= 5\sqrt{2}\end{aligned}$	<ol style="list-style-type: none">1 Choose two numbers that are factors of 50. One of the factors must be a square number2 Use the rule $\sqrt{ab} = \sqrt{a} \times \sqrt{b}$3 Use $\sqrt{25} = 5$
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Example 2 Simplify $\sqrt{147} - 2\sqrt{12}$

$\begin{aligned}\sqrt{147} - 2\sqrt{12} \\ &= \sqrt{49 \times 3} - 2\sqrt{4 \times 3} \\ &= \sqrt{49} \times \sqrt{3} - 2\sqrt{4} \times \sqrt{3} \\ &= 7 \times \sqrt{3} - 2 \times 2 \times \sqrt{3} \\ &= 7\sqrt{3} - 4\sqrt{3} \\ &= 3\sqrt{3}\end{aligned}$	<ol style="list-style-type: none">1 Simplify $\sqrt{147}$ and $2\sqrt{12}$. Choose two numbers that are factors of 147 and two numbers that are factors of 12. One of each pair of factors must be a square number2 Use the rule $\sqrt{ab} = \sqrt{a} \times \sqrt{b}$3 Use $\sqrt{49} = 7$ and $\sqrt{4} = 2$4 Collect like terms
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Example 3 Simplify $(\sqrt{7} + \sqrt{2})(\sqrt{7} - \sqrt{2})$

$ \begin{aligned} &(\sqrt{7} + \sqrt{2})(\sqrt{7} - \sqrt{2}) \\ &= \sqrt{49} - \sqrt{7}\sqrt{2} + \sqrt{2}\sqrt{7} - \sqrt{4} \\ &= 7 - 2 \\ &= 5 \end{aligned} $	<ol style="list-style-type: none"> 1 Expand the brackets. A common mistake here is to write $(\sqrt{7})^2 = 49$ 2 Collect like terms: $\begin{aligned} &-\sqrt{7}\sqrt{2} + \sqrt{2}\sqrt{7} \\ &= -\sqrt{7}\sqrt{2} + \sqrt{7}\sqrt{2} = 0 \end{aligned}$
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Example 4 Rationalise $\frac{1}{\sqrt{3}}$

$ \begin{aligned} \frac{1}{\sqrt{3}} &= \frac{1}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} \\ &= \frac{1 \times \sqrt{3}}{\sqrt{9}} \\ &= \frac{\sqrt{3}}{3} \end{aligned} $	<ol style="list-style-type: none"> 1 Multiply the numerator and denominator by $\sqrt{3}$ 2 Use $\sqrt{9} = 3$
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Example 5 Rationalise and simplify $\frac{\sqrt{2}}{\sqrt{12}}$

$ \begin{aligned} \frac{\sqrt{2}}{\sqrt{12}} &= \frac{\sqrt{2}}{\sqrt{12}} \times \frac{\sqrt{12}}{\sqrt{12}} \\ &= \frac{\sqrt{2} \times \sqrt{4 \times 3}}{12} \\ &= \frac{2\sqrt{2}\sqrt{3}}{12} \\ &= \frac{\sqrt{2}\sqrt{3}}{6} \end{aligned} $	<ol style="list-style-type: none"> 1 Multiply the numerator and denominator by $\sqrt{12}$ 2 Simplify $\sqrt{12}$ in the numerator. Choose two numbers that are factors of 12. One of the factors must be a square number 3 Use the rule $\sqrt{ab} = \sqrt{a} \times \sqrt{b}$ 4 Use $\sqrt{4} = 2$ 5 Simplify the fraction: $\frac{2}{12}$ simplifies to $\frac{1}{6}$
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Example 6 Rationalise and simplify $\frac{3}{2+\sqrt{5}}$

$\frac{3}{2+\sqrt{5}} = \frac{3}{2+\sqrt{5}} \times \frac{2-\sqrt{5}}{2-\sqrt{5}}$ $= \frac{3(2-\sqrt{5})}{(2+\sqrt{5})(2-\sqrt{5})}$ $= \frac{6-3\sqrt{5}}{4+2\sqrt{5}-2\sqrt{5}-5}$ $= \frac{6-3\sqrt{5}}{-1}$ $= 3\sqrt{5}-6$	<p>1 Multiply the numerator and denominator by $2-\sqrt{5}$</p> <p>2 Expand the brackets</p> <p>3 Simplify the fraction</p> <p>4 Divide the numerator by -1 Remember to change the sign of all terms when dividing by -1</p>
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Practice

1 Simplify.

- a $\sqrt{45}$
 c $\sqrt{48}$
 e $\sqrt{300}$
 g $\sqrt{72}$

- b $\sqrt{125}$
 d $\sqrt{175}$
 f $\sqrt{28}$
 h $\sqrt{162}$

Hint

One of the two numbers you choose at the start must be a square number

2 Simplify.

- a $\sqrt{72} + \sqrt{162}$
 c $\sqrt{50} - \sqrt{8}$
 e $2\sqrt{28} + \sqrt{28}$

- b $\sqrt{45} - 2\sqrt{5}$
 d $\sqrt{75} - \sqrt{48}$
 f $2\sqrt{12} - \sqrt{12} + \sqrt{27}$

Watch out!

Check you have chosen the highest square number at the

3 Expand and simplify.

- a $(\sqrt{2} + \sqrt{3})(\sqrt{2} - \sqrt{3})$
 c $(4 - \sqrt{5})(\sqrt{45} + 2)$

- b $(3 + \sqrt{3})(5 - \sqrt{12})$
 d $(5 + \sqrt{2})(6 - \sqrt{8})$

4 Rationalise and simplify, if possible.

a $\frac{1}{\sqrt{5}}$

b $\frac{1}{\sqrt{11}}$

c $\frac{2}{\sqrt{7}}$

d $\frac{2}{\sqrt{8}}$

e $\frac{2}{\sqrt{2}}$

f $\frac{5}{\sqrt{5}}$

g $\frac{\sqrt{8}}{\sqrt{24}}$

h $\frac{\sqrt{5}}{\sqrt{45}}$

5 Rationalise and simplify.

a $\frac{1}{3-\sqrt{5}}$

b $\frac{2}{4+\sqrt{3}}$

c $\frac{6}{5-\sqrt{2}}$

Extend

6 Expand and simplify $(\sqrt{x} + \sqrt{y})(\sqrt{x} - \sqrt{y})$

7 Rationalise and simplify, if possible.

a $\frac{1}{\sqrt{9}-\sqrt{8}}$

b $\frac{1}{\sqrt{x}-\sqrt{y}}$

Answers

1 a $3\sqrt{5}$
c $4\sqrt{3}$
e $10\sqrt{3}$
g $6\sqrt{2}$

b $5\sqrt{5}$
d $5\sqrt{7}$
f $2\sqrt{7}$
h $9\sqrt{2}$

2 a $15\sqrt{2}$
c $3\sqrt{2}$
e $6\sqrt{7}$

b $\sqrt{5}$
d $\sqrt{3}$
f $5\sqrt{3}$

3 a -1
c $10\sqrt{5}-7$

b $9-\sqrt{3}$
d $26-4\sqrt{2}$

4 a $\frac{\sqrt{5}}{5}$
c $\frac{2\sqrt{7}}{7}$
e $\sqrt{2}$
g $\frac{\sqrt{3}}{3}$

b $\frac{\sqrt{11}}{11}$
d $\frac{\sqrt{2}}{2}$
f $\sqrt{5}$
h $\frac{1}{3}$

5 a $\frac{3+\sqrt{5}}{4}$

b $\frac{2(4-\sqrt{3})}{13}$

c $\frac{6(5+\sqrt{2})}{23}$

6 $x-y$

7 a $3+2\sqrt{2}$

b $\frac{\sqrt{x}+\sqrt{y}}{x-y}$

Solving quadratic equations by factorisation

A LEVEL LINKS

Scheme of work: 1b. Quadratic functions – factorising, solving, graphs and the discriminants

Key points

- A quadratic equation is an equation in the form $ax^2 + bx + c = 0$ where $a \neq 0$.
- To factorise a quadratic equation find two numbers whose sum is b and whose products is ac .
- When the product of two numbers is 0, then at least one of the numbers must be 0.
- If a quadratic can be solved it will have two solutions (these may be equal).

Examples

Example 1 Solve $5x^2 = 15x$

$5x^2 = 15x$ $5x^2 - 15x = 0$ $5x(x - 3) = 0$ So $5x = 0$ or $(x - 3) = 0$ Therefore $x = 0$ or $x = 3$	<ol style="list-style-type: none">1 Rearrange the equation so that all of the terms are on one side of the equation and it is equal to zero. Do not divide both sides by x as this would lose the solution $x = 0$.2 Factorise the quadratic equation. $5x$ is a common factor.3 When two values multiply to make zero, at least one of the values must be zero.4 Solve these two equations.
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Example 2 Solve $x^2 + 7x + 12 = 0$

$x^2 + 7x + 12 = 0$ $b = 7, ac = 12$ $x^2 + 4x + 3x + 12 = 0$ $x(x + 4) + 3(x + 4) = 0$ $(x + 4)(x + 3) = 0$ So $(x + 4) = 0$ or $(x + 3) = 0$ Therefore $x = -4$ or $x = -3$	<ol style="list-style-type: none">1 Factorise the quadratic equation. Work out the two factors of $ac = 12$ which add to give you $b = 7$. (4 and 3)2 Rewrite the b term ($7x$) using these two factors.3 Factorise the first two terms and the last two terms.4 $(x + 4)$ is a factor of both terms.5 When two values multiply to make zero, at least one of the values must be zero.6 Solve these two equations.
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Example 3 Solve $9x^2 - 16 = 0$

$9x^2 - 16 = 0$ $(3x + 4)(3x - 4) = 0$ So $(3x + 4) = 0$ or $(3x - 4) = 0$ $x = -\frac{4}{3}$ or $x = \frac{4}{3}$	<ol style="list-style-type: none">1 Factorise the quadratic equation. This is the difference of two squares as the two terms are $(3x)^2$ and $(4)^2$.2 When two values multiply to make zero, at least one of the values must be zero.3 Solve these two equations.
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Example 4 Solve $2x^2 - 5x - 12 = 0$

$b = -5, ac = -24$ So $2x^2 - 8x + 3x - 12 = 0$ $2x(x - 4) + 3(x - 4) = 0$ $(x - 4)(2x + 3) = 0$ So $(x - 4) = 0$ or $(2x + 3) = 0$ $x = 4$ or $x = -\frac{3}{2}$	<ol style="list-style-type: none">1 Factorise the quadratic equation. Work out the two factors of $ac = -24$ which add to give you $b = -5$. (-8 and 3)2 Rewrite the b term ($-5x$) using these two factors.3 Factorise the first two terms and the last two terms.4 $(x - 4)$ is a factor of both terms.5 When two values multiply to make zero, at least one of the values must be zero.6 Solve these two equations.
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Practice

1 Solve

a $6x^2 + 4x = 0$

c $x^2 + 7x + 10 = 0$

e $x^2 - 3x - 4 = 0$

g $x^2 - 10x + 24 = 0$

i $x^2 + 3x - 28 = 0$

k $2x^2 - 7x - 4 = 0$

b $28x^2 - 21x = 0$

d $x^2 - 5x + 6 = 0$

f $x^2 + 3x - 10 = 0$

h $x^2 - 36 = 0$

j $x^2 - 6x + 9 = 0$

l $3x^2 - 13x - 10 = 0$

2 Solve

a $x^2 - 3x = 10$

c $x^2 + 5x = 24$

e $x(x + 2) = 2x + 25$

g $x(3x + 1) = x^2 + 15$

b $x^2 - 3 = 2x$

d $x^2 - 42 = x$

f $x^2 - 30 = 3x - 2$

h $3x(x - 1) = 2(x + 1)$

Hint

Get all terms onto one side of the

Solving quadratic equations by completing the square

A LEVEL LINKS

Scheme of work: 1b. Quadratic functions – factorising, solving, graphs and the discriminants

Key points

- Completing the square lets you write a quadratic equation in the form $p(x + q)^2 + r = 0$.

Examples

Example 5 Solve $x^2 + 6x + 4 = 0$. Give your solutions in surd form.

$x^2 + 6x + 4 = 0$ $(x + 3)^2 - 9 + 4 = 0$ $(x + 3)^2 - 5 = 0$ $(x + 3)^2 = 5$ $x + 3 = \pm\sqrt{5}$ $x = \pm\sqrt{5} - 3$ <p>So $x = -\sqrt{5} - 3$ or $x = \sqrt{5} - 3$</p>	<ol style="list-style-type: none"> Write $x^2 + bx + c = 0$ in the form $\left(x + \frac{b}{2}\right)^2 - \left(\frac{b}{2}\right)^2 + c = 0$ Simplify. Rearrange the equation to work out x. First, add 5 to both sides. Square root both sides. Remember that the square root of a value gives two answers. Subtract 3 from both sides to solve the equation. Write down both solutions.
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Example 6 Solve $2x^2 - 7x + 4 = 0$. Give your solutions in surd form.

$2x^2 - 7x + 4 = 0$ $2\left(x^2 - \frac{7}{2}x\right) + 4 = 0$ $2\left[\left(x - \frac{7}{4}\right)^2 - \left(\frac{7}{4}\right)^2\right] + 4 = 0$ $2\left(x - \frac{7}{4}\right)^2 - \frac{49}{8} + 4 = 0$ $2\left(x - \frac{7}{4}\right)^2 - \frac{17}{8} = 0$	<ol style="list-style-type: none"> Before completing the square write $ax^2 + bx + c$ in the form $a\left(x^2 + \frac{b}{a}x\right) + c$ Now complete the square by writing $x^2 - \frac{7}{2}x$ in the form $\left(x + \frac{b}{2a}\right)^2 - \left(\frac{b}{2a}\right)^2$ Expand the square brackets. Simplify. <p style="text-align: right;"><i>(continued on next page)</i></p>
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$2\left(x - \frac{7}{4}\right)^2 = \frac{17}{8}$ $\left(x - \frac{7}{4}\right)^2 = \frac{17}{16}$ $x - \frac{7}{4} = \pm \frac{\sqrt{17}}{4}$ $x = \pm \frac{\sqrt{17}}{4} + \frac{7}{4}$ <p>So $x = \frac{7}{4} - \frac{\sqrt{17}}{4}$ or $x = \frac{7}{4} + \frac{\sqrt{17}}{4}$</p>	<p>5 Rearrange the equation to work out x. First, add $\frac{17}{8}$ to both sides.</p> <p>6 Divide both sides by 2.</p> <p>7 Square root both sides. Remember that the square root of a value gives two answers.</p> <p>8 Add $\frac{7}{4}$ to both sides.</p> <p>9 Write down both the solutions.</p>
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Practice

3 Solve by completing the square.

a $x^2 - 4x - 3 = 0$

c $x^2 + 8x - 5 = 0$

e $2x^2 + 8x - 5 = 0$

b $x^2 - 10x + 4 = 0$

d $x^2 - 2x - 6 = 0$

f $5x^2 + 3x - 4 = 0$

4 Solve by completing the square.

a $(x - 4)(x + 2) = 5$

b $2x^2 + 6x - 7 = 0$

c $x^2 - 5x + 3 = 0$

Hint

Get all terms onto one side of the

Solving quadratic equations by using the formula

A LEVEL LINKS

Scheme of work: 1b. Quadratic functions – factorising, solving, graphs and the discriminants

Key points

- Any quadratic equation of the form $ax^2 + bx + c = 0$ can be solved using the formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

- If $b^2 - 4ac$ is negative then the quadratic equation does not have any real solutions.
- It is useful to write down the formula before substituting the values for a , b and c .

Examples

Example 7 Solve $x^2 + 6x + 4 = 0$. Give your solutions in surd form.

$$a = 1, b = 6, c = 4$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-6 \pm \sqrt{6^2 - 4(1)(4)}}{2(1)}$$

$$x = \frac{-6 \pm \sqrt{20}}{2}$$

$$x = \frac{-6 \pm 2\sqrt{5}}{2}$$

$$x = -3 \pm \sqrt{5}$$

$$\text{So } x = -3 - \sqrt{5} \text{ or } x = \sqrt{5} - 3$$

- 1 Identify a , b and c and write down the formula.

Remember that $-b \pm \sqrt{b^2 - 4ac}$ is all over $2a$, not just part of it.

- 2 Substitute $a = 1$, $b = 6$, $c = 4$ into the formula.

- 3 Simplify. The denominator is 2, but this is only because $a = 1$. The denominator will not always be 2.

- 4 Simplify $\sqrt{20}$.

$$\sqrt{20} = \sqrt{4 \times 5} = \sqrt{4} \times \sqrt{5} = 2\sqrt{5}$$

- 5 Simplify by dividing numerator and denominator by 2.

- 6 Write down both the solutions.

Example 8 Solve $3x^2 - 7x - 2 = 0$. Give your solutions in surd form.

$a = 3, b = -7, c = -2$ $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $x = \frac{-(-7) \pm \sqrt{(-7)^2 - 4(3)(-2)}}{2(3)}$ $x = \frac{7 \pm \sqrt{73}}{6}$ <p>So $x = \frac{7 - \sqrt{73}}{6}$ or $x = \frac{7 + \sqrt{73}}{6}$</p>	<p>1 Identify a, b and c, making sure you get the signs right and write down the formula.</p> <p>Remember that $-b \pm \sqrt{b^2 - 4ac}$ is all over $2a$, not just part of it.</p> <p>2 Substitute $a = 3$, $b = -7$, $c = -2$ into the formula.</p> <p>3 Simplify. The denominator is 6 when $a = 3$. A common mistake is to always write a denominator of 2.</p> <p>4 Write down both the solutions.</p>
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Practice

5 Solve, giving your solutions in surd form.

a $3x^2 + 6x + 2 = 0$

b $2x^2 - 4x - 7 = 0$

6 Solve the equation $x^2 - 7x + 2 = 0$

Give your solutions in the form $\frac{a \pm \sqrt{b}}{c}$, where a , b and c are integers.

7 Solve $10x^2 + 3x + 3 = 5$

Give your solution in surd form.

Hint

Get all terms onto one side of the equation.

Extend

8 Choose an appropriate method to solve each quadratic equation, giving your answer in surd form when necessary.

a $4x(x - 1) = 3x - 2$

b $10 = (x + 1)^2$

c $x(3x - 1) = 10$

Answers

- 1** **a** $x = 0$ or $x = -\frac{2}{3}$ **b** $x = 0$ or $x = \frac{3}{4}$
 c $x = -5$ or $x = -2$ **d** $x = 2$ or $x = 3$
 e $x = -1$ or $x = 4$ **f** $x = -5$ or $x = 2$
 g $x = 4$ or $x = 6$ **h** $x = -6$ or $x = 6$
 i $x = -7$ or $x = 4$ **j** $x = 3$
 k $x = -\frac{1}{2}$ or $x = 4$ **l** $x = -\frac{2}{3}$ or $x = 5$
- 2** **a** $x = -2$ or $x = 5$ **b** $x = -1$ or $x = 3$
 c $x = -8$ or $x = 3$ **d** $x = -6$ or $x = 7$
 e $x = -5$ or $x = 5$ **f** $x = -4$ or $x = 7$
 g $x = -3$ or $x = 2\frac{1}{2}$ **h** $x = -\frac{1}{3}$ or $x = 2$
- 3** **a** $x = 2 + \sqrt{7}$ or $x = 2 - \sqrt{7}$ **b** $x = 5 + \sqrt{21}$ or $x = 5 - \sqrt{21}$
 c $x = -4 + \sqrt{21}$ or $x = -4 - \sqrt{21}$ **d** $x = 1 + \sqrt{7}$ or $x = 1 - \sqrt{7}$
 e $x = -2 + \sqrt{6.5}$ or $x = -2 - \sqrt{6.5}$ **f** $x = \frac{-3 + \sqrt{89}}{10}$ or $x = \frac{-3 - \sqrt{89}}{10}$
- 4** **a** $x = 1 + \sqrt{14}$ or $x = 1 - \sqrt{14}$ **b** $x = \frac{-3 + \sqrt{23}}{2}$ or $x = \frac{-3 - \sqrt{23}}{2}$
 c $x = \frac{5 + \sqrt{13}}{2}$ or $x = \frac{5 - \sqrt{13}}{2}$
- 5** **a** $x = -1 + \frac{\sqrt{3}}{3}$ or $x = -1 - \frac{\sqrt{3}}{3}$ **b** $x = 1 + \frac{3\sqrt{2}}{2}$ or $x = 1 - \frac{3\sqrt{2}}{2}$
- 6** $x = \frac{7 + \sqrt{41}}{2}$ or $x = \frac{7 - \sqrt{41}}{2}$
- 7** $x = \frac{-3 + \sqrt{89}}{20}$ or $x = \frac{-3 - \sqrt{89}}{20}$
- 8** **a** $x = \frac{7 + \sqrt{17}}{8}$ or $x = \frac{7 - \sqrt{17}}{8}$
 b $x = -1 + \sqrt{10}$ or $x = -1 - \sqrt{10}$
 c $x = -1\frac{2}{3}$ or $x = 2$

A Level Media Studies

Welcome to the SJCR Media Department. Follow us on on Twitter **@SJCRMedia** for all the latest Media news and resources relevant to your studies. We look forward to meeting you!

What are we studying?

Eduqas GCE in A Level Media Studies

The Eduqas Media Studies course is designed to allow media students to draw on their existing experience of the media and to develop their abilities to respond critically to the media. It enables students to explore a wide variety of media (including: newspapers, advertising, music video, radio, video games, film marketing, television, magazines, blogs and websites).

The course also encourages creative work, through a cross-media production, to enable students to gain a greater appreciation of the media through their own production work and to develop their own production skills. Coursework tasks are set by the exam board and completed individually by students.

The course is made up of 30% coursework and 70% exam. The exam is taken in the summer term at the end of the second year of the course

More details: <http://www.eduqas.co.uk/qualifications/media-studies/as-a-level/>

The theoretical framework:

Representation – how different social groups are presented by the media

Media Language – the way in which meaning of a media text is conveyed to the audience

Industry – how and why media products are made

Audience – how media products influence and are influenced by consumers; the appeals of a media product

Watch:

A crime drama of your choice

A YouTube Vlogger of your choice

A range of music videos

Listen:

BBC Five Live Kermode and Mayo Film Review podcast

BBC Unpopped podcast

Read:

Newspapers – in print and online.

Media Summer Project:

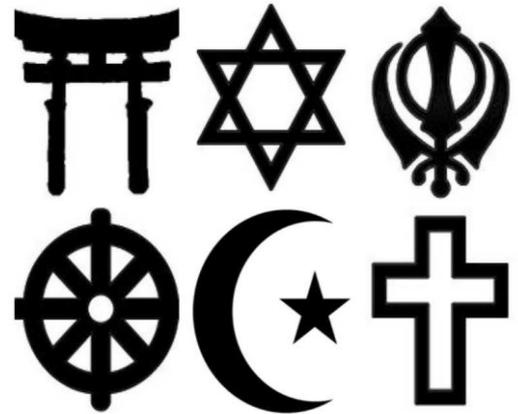
Task 1: Use the website: www.mediaknowall.com to research and make brief bullet point notes on each area of the theoretical framework.

Task 2: Evaluate the Representation of Gender in Music Videos or Advertising: Analyse one music video OR one print advert of your choice. Write a report explaining how gender (women and men) has been represented in these texts. Arrive with it at your first lesson to discuss with the class.

A Level Religious Studies

At A Level we study the EDUQAS Exam Board Syllabus

A level RE is a fascinating and enlightening subject choice. It is one which affords the opportunity to develop your understanding of arguably the most important elements of humanity: what we believe, how we think and the way we behave. The A level syllabus combines the in-depth study of Islam, Philosophy of Religion and Ethics



With the Philosophy of Religion and Ethics syllabus you will engage with classic academic theory such as the Ontological Argument and Virtue Ethics, combined with contemporary ideology such as New Atheism and Situation Ethics.

In Islam you will explore the history of Islam and its integral features such as the Quran, Shariah Law, the Five Pillars and Jihad.

You will develop the ability to express your personal beliefs and values in both written and oral manner. You will be able to grapple with some of the most ancient academic thought on the most fundamental questions about life.

Component 1: A Study of Religion

Written examination: 2 hours

33⅓% of qualification

For this part of the course, we study:

Option B: Islam

There will be four themes within each option: religious figures and sacred texts; for example, the Life of Muhammad; The Qur'an

Religious concepts and religious life; significant social and historical developments in religious thought; religious practices and religious identity. For example, Islam and science, Islam and Crime and punishment. The importance of Family life in Islam.

Learners will be expected to answer one question from Section A out of a choice of two and one question from Section B out of a choice of three in this component.

Questions can be taken from any area of the specification.

Component 2: Philosophy of Religion

Written examination: 2 hours

33⅓% of qualification

There will be four themes within this component: arguments for the existence of God; challenges to religious belief; religious experience; religious language.

Learners will be expected to answer one question from Section A out of a choice of two and one question from Section B out of a choice of three in this component.

Questions can be taken from any area of the specification.

Course structure

The RE A Level course is structured as follows

	Islam	Philosophy	Ethics
Year 12 Term 1	Religious figures /Sacred Texts (1)	Inductive / Deductive arguments	Ethical Thought / Natural Law
Year 12 Term 2	Religious Concepts / Religious Life (1)	The problem of Evil	Situation Ethics
Year 12 Term 3	Social and historical developments /Identity (1)	Religious Experience	Utilitarianism
Year 13 Term 1	Religious figures /Sacred Texts (2)	Challenges to Religious belief	Natural Law (2)
Year 13 Term 2	Religious Concepts / Religious Life (2)	Religious Experience	Free will and Determinism
Year 13 Term 3	Social and historical developments /Identity (2)	Religious Language	Free will and Determinism

Specification

Component 1: A Study of Religion Islam

Written examination: 2 hours

33⅓% of qualification

100 marks

This component includes the study of the following content:

- religious beliefs, values and teachings, in their interconnections and as they vary historically and in the contemporary world, including those linked to the nature and existence of God, gods or ultimate reality, the role of the community of believers, key moral principles, beliefs about the self, death and afterlife, beliefs about the meaning and purpose of life
- sources of wisdom and authority including, where appropriate, scripture and/or sacred texts and how they are used and treated, key religious figures and/or teachers and their teachings practices that shape and express religious identity, including the diversity of practice within a tradition
- significant social and historical developments in theology or religious thought including the challenges of secularisation, science, responses to pluralism and diversity within traditions, migration, the changing roles of men and women, feminist and liberationist approaches
- a comparison of the significant ideas presented in works of at least two key scholars selected from the field of religion and belief
- two themes related to the relationship between religion and society, for example: the relationship between religious and other forms of identity; religion, equality and discrimination; religious freedom; the political and social influence of religious institutions; religious tolerance, respect and recognition and the ways that religious traditions view other religions and non-religious worldviews and their truth claims
- how developments in beliefs and practices have, over time, influenced and been influenced by developments in philosophical, ethical, studies of religion and/or by textual interpretation.

Component 2: Philosophy of Religion

Written examination: 2 hours

33⅓% of qualification

100 marks

This component includes the study of the following content:

- philosophical issues and questions raised by religion and belief including at least three contrasting arguments about the existence or non-existence of God, gods or ultimate reality
- the nature and influence of religious experience
- challenges to religious belief such as the problems of evil and suffering
- philosophical language and thought through significant concepts and the works of key thinkers, illustrated in issues or debates in the philosophy of religion

- how views of religious language have changed over time; the challenges posed by the verification/falsification debate and language games theory over whether religious language should be viewed cognitively or non-cognitively; and a consideration of at least two different views about religious teachings being understood symbolically and analogically
- a comparison of the significant ideas presented in works of at least two key scholars selected from the field of the philosophy of religion, and developments in the way these ideas are applied to issues in religion and belief how the philosophy of religion has, over time, influenced and been influenced by developments in religious beliefs and practices, ethics or textual interpretation.

Component 3: Religion and Ethics

Written examination: 2 hours

33⅓% of qualification

100 marks

This component includes the study of the following content:

- ethical language and thought through significant concepts and the works of key thinkers, illustrated in issues or debates in religion and ethics
- three normative ethical theories such as deontological, teleological or character based ethics (at least two of which must be religious approaches)
- the application of ethical theory to two personal, societal or global issues of importance, including religious ethical perspectives
- how ethical language in the modern era has changed over time; including a study of meta-ethical theories and significant ideas in religious and moral thought such as free will, conscience or authority
- a comparison of the significant ideas presented in the works of at least two key scholars selected from the field of religion and ethics, and developments in the way these ideas are applied to significant issues in religion and belief how the study of ethics has, over time, influenced and been influenced by developments in religious beliefs and practices, the philosophy of religion and/or textual interpretation.

Assessment and marking

You will be assessed by three exam papers, all at the end of Year 13.

Islam - 2 hours

Philosophy - 2 hours

Ethics – 2 hours

Key essay skills for RE

Introduction: What is the question asking? Identify / briefly explain the topic, identify important issues and key words. Finish with a **THESIS**, a clear statement of what your argument (answer) will be, ideally not using the personal pronoun “I” or the hackneyed “this essay will argue...”

Paragraph 1: Your first / strongest reason in support of your argument. State it in your first sentence (**POINT**), then explain it using plenty of examples and references to scholars (**EVIDENCE**) and finally relate it back to the Thesis, showing how it relates to your **ARGUMENT** and **LINKS** to your reasoning.

Paragraph 2: Your second / next strongest reason in support of your argument. State it in your first sentence (**POINT**), then explain it using plenty of examples and references to scholars (**EVIDENCE**) and finally relate it back to the Thesis, showing how it relates to your **ARGUMENT** and **LINKS** to your reasoning.

Paragraph 3: Another reason in support of your argument. State it in your first sentence (**POINT**), then explain it using plenty of examples and references to scholars (**EVIDENCE**) and finally relate it back to the Thesis, showing how it relates to your **ARGUMENT** and **LINKS** to your reasoning.

COUNTERCLAIM: Who would disagree with your argument? Why? Explain their objection using examples and references to scholars etc. **EVALUATE** their objection, concluding that you do not accept it because... **LINK** back to your Thesis.

COUNTERCLAIM 2: Who else would disagree with your argument? Why? Explain their objection using examples and references to scholars etc. **EVALUATE** their objection, concluding that you do not accept it because... **LINK** back to your Thesis.

Conclusion: Repeat your Thesis and list your main points in support. Acknowledge any limitations or weaknesses that your argument has and/or what might force you to change this conclusion.

USING PARAGRAPHS

Note how each paragraph shares a similar **STRUCTURE** – it contains a **POINT**, some **EXPLANATION**, **EVIDENCE** and a **LINK** to the argument. Think **PEEL**.

A paragraph is not just aesthetic and does not just break-up a block of text making it look better, it is a unit of your argument which helps to make sense of it. Think of each paragraph as a separate slide in a PowerPoint or a separate bullet-point in a plan. A paragraph must be self-contained and make sense in its own terms as well as fitting neatly into your essay structure.

TIP: It is worth practicing writing paragraphs separately, drafting and re-drafting them to improve your clarity and style. This can be a really good way of making notes, one which gets you evaluating and thinking about how you would use information to argue a case.

(<https://divinityphilosophy.net/a-level-model-essays/>)

Key texts and further reading

Our core textbooks are:

Islam:

Idris Morar, *Islam Studies for Year1 and Year2*

Philosophy and Ethics Year 1:

Richares Gray & Karl Lawson, *Philosophy of Religion and Ethics*

Philosophy Year 2

Peter Cole and Karl Lawson, *Philosophy of Religion and Ethics*

Further reading

Islam

- Islam: The Basics, Colin Turner (2005,2011)
- Islam - An Introduction: Teach Yourself, Ruqaiyyah Waris Maqsood, (2010)
- Islam: A Student's Approach to World Religion, Victor Watton (1993)
- Muslims: Their Religious Beliefs and Practices, Andrew Rippon (2011)
- A New Introduction to Islam, Daniel W. Brown (2009)
- Islam: The Straight Path, John L. Esposito, (2016 5th edition)
- An Introduction to Islam (Introduction to Religion), David Waines (2003)

Philosophy

- Cole, P. (2008) - Access to religion and philosophy: Philosophy of Religion, Hodder, ISBN 9780340957783
- Cottingham, J. (2014) - Philosophy of Religion: Towards a More Humane Approach, Cambridge University Press, ISBN:110769518X
- Davies, B. (2004) - An Introduction to the Philosophy of Religion, Oxford University Press, ISBN0199263477
- Davies, B. (2000) - Philosophy of Religion: A Guide and Anthology, Oxford

University Press, ISBN:019875194X

- Ellerton-Harris, D. (2013) - WJEC A2 Religious Studies: Studies in
- Philosophy of Religion - Study and Revision Guide, Illuminate, ISBN:1908682108
- Gray, R. & Lawson, K. (2016) - WJEC/EDUQAS RS for Yr1/AS - Philosophy & Ethics Of Religion, Illuminate, ISBN:9781908682994

Ethics

- Lawson, K. and Pearce, A. (2012) - WJEC AS Religious Studies: An Introduction to
- Philosophy of Religion and an Introduction to Religion and Ethics: Study and Revision
- Guide, Illuminate, ISBN:9781908682079
- Lee, J. (1999) - Ethical Theory and Language, Abacus, ISBN:1898653143
- Lee, J. (1999) - Moral Rules, Abacus ISBN:1898653151
- Macquarrie, J. & Childress, J. (editor) (1990) - A New Dictionary of Christian Ethics, SCM Press, ISBN:9780334022046
- Thompson, M. (2010) - Understand Ethics : Teach Yourself, Teach Yourself Books, ISBN:9781444103519
- Thompson, M. (2005) - Ethical Theory – 2nd Edition, Hodder Murray, ISBN:9780340883440

example exam questions

Islam

1. (a) Explain why there was a need for revelation during the period known as jahiliyya in pre-Islamic Arabia. [20]

(b) 'The direct nature of Muhammad's message to the Makkans did nothing to encourage the development of Islam. 'Evaluate this view [30]

Or

(a) Examine the difficulties that arose during the compilation of the Qur'an. [20]

(b) 'The Qur'an contains eternal religious principles.' Evaluate this view. [30]

Philosophy

1. (a) Explain Aquinas' cosmological arguments for the existence of God.

[20]

(b) 'Science, not God, tells us all we need to know about the beginning of the universe.'

Evaluate this view with reference to cosmological arguments for the existence of God. [30]

Or

2. (a) Explain the teleological arguments for God's existence, with reference to Aquinas, Paley and Tennant. [20]
- (b) 'Scientific evidence proves beyond doubt, that there is no designer God.' Evaluate this view.

Ethics

1. (a) Explain John Finnis' development of Aquinas' Natural Law. [20]
- (b) 'The strengths of Finnis' Natural Law outweigh its weaknesses.' Evaluate this view. [30]
- Or
2. (a) Explain how Natural Law is different from the other laws identified within Aquinas' four levels of law. [20]
- (b) 'Aquinas' Natural Law provides a practical basis for judging moral issues.' Evaluate this view. [30]

TRANSITION ACTIVITIES:

How can you prepare for A level RE?

Choose one of the following topics, research it, and answer the question attached to each topic as an extended piece of writing.

1. ISLAM

Topic: Sunni and Shi'a Muslims.

Question: What are the main differences in belief and practice of Sunnis and Shi'as, and do you think both Sunni and Shi'a can be Muslims.

2. PHILOSOPHY

Topic: Teleological and Cosmological arguments for the existence of God

Question: Having done some research on these two Philosophical arguments for the existence of God, which do you think is a better argument and why?

Finally, visit the EDUQAS website, which is the EXAM BOARD that we follow.

Go to the Religious Studies section, and check out the specification for yourselves and the SAM's (or Sample Assessment materials) and look at some of the sample exam papers.

Read through the Specification and start doing some research on some of the topics you discover there.

A Level Sociology

SOCIOLOGY SUMMER TRANSITION PROJECT



<p>AO1: Knowledge and Understanding</p>	<p>Demonstrate Knowledge and understanding of:</p> <ul style="list-style-type: none"> • Sociological theories e.g. Marxism, concepts e.g. norms, evidence e.g. statistics. • Sociological research methods e.g. interviews. • Any language taught and is specific to SOCIOLOGY is AO1.
<p>AO2: Application</p>	<p>Apply sociological theories, concepts, evidence and research methods to a range of issues and question asked.</p> <ul style="list-style-type: none"> • Applying the relevant AO1 to a question shows application of sociological knowledge.
<p>AO3: Analyse and Evaluation</p>	<p>Analyse and evaluate sociological theories, concepts, evidence and research methods in order to:</p> <ul style="list-style-type: none"> • Present arguments • Make judgements • Draw conclusions <p>Use of key command words is vital to show you have presented this skill e.g. however, although, on the other hand, in support.</p>

Task 1a: Read through and highlight AO1, AO2 and AO3 in Kim and Tim's responses.

Task 1b: Whose response is better and why use the mark scheme to assess and grade their responses. Compare both responses and provide feedback.

Question 5 Describe **TWO** ways in which males are disadvantaged. [10]

Mary's response

Males are disadvantaged in family life. This is because they receive far less time off work for paternity leave: many men only take two weeks. In addition, there is evidence that many men felt they can't take the paternity leave that is due to them as they fear their boss will look badly on this. This can mean that men lack a quality relationship with the early years of their children. Also, there used to be a protest group called "Fathers for Justice" that argued men are disadvantaged after divorce: their ex-wives control access time to their children in an unfair manner.

Males are disadvantaged at school as they do less well. There is a big GCSE gap. When they are interviewed in studies, boys don't like coursework work at school and have an anti-learning subculture (Willis).

feedback

Harry's response

Males are disadvantaged in terms of educational performance. In 2013, 56% of boys obtained five or more A*-C grades at GCSE including English and Maths which was 10% less than girls in the same year. This gender gap has been consistent since the late 1980s/early 1990s. Boys do worse than girls in literacy based subjects the most: English GCSE for example. Mitsos and Brown argue that boys are disadvantaged by teacher discrimination in that teachers tend to be less strict with boys and have lower expectations for their academic standard. Boys are also disadvantaged by a far higher permanent exclusion rate from school than girls: the ratio of boys excluded compared to girls is around 4:1 (2012, Source: School Census data). Connell might link this to a "live fast, die young" value system for some boys that do not see the value in education for their long term benefit, similar to Willis and Mac and Ghail's research on boys at school.

Males are also disadvantaged in terms of health. Men have a significantly lower life expectancy than women. ONS data from 2013 states that on average, boys can expect to live to 79 years of age, 4 years less than girls who can expect to live to 83 years of age. Connected to this fact is the significantly higher suicide rate for men than women. ONS data (2013) shows that the suicide rate for men compared to women is over three times higher. This may be a reflection of how men are disadvantaged by a culture in our society that means they feel they cannot share their emotional problems with others or seek help from health care workers.

feedback

Question 5- 10 marks all AO1

Level 2: 3–4 marks

Candidates display basic knowledge and understanding of two ways in which males are disadvantaged. Responses will be lacking range and depth. Typically responses will be undeveloped/unsubstantiated/partial, confused. There may be an over-reliance on contemporary examples rather than concepts and studies. The information has some relevance and is presented with limited structure. The information is supported by limited evidence.

Level 1: 1–2 marks

Candidates display a limited knowledge and understanding. At the top of the level, knowledge will be very narrow, but will have some coherence. Responses may be very generalised. At the bottom of the level, there may be limited, and these may be confused in places. The information is basic and communicated in an unstructured way. The information is supported by limited evidence and the relationship to the evidence may not be clear.

0 marks

No relevant sociological knowledge or understanding.

AO1 Knowledge and understanding

Level 4: 8–10 marks

Candidates display a wide-ranging and excellent knowledge and understanding of two ways in which males are disadvantaged. There will be explicit and frequent use of sociological concepts and evidence. At the top of this level the candidate will use a wide range of relevant concepts and evidence in a detailed, accurate and explicit manner for both ways. At the bottom of the level the use of concepts will still be wide-ranging and detailed but will be underdeveloped for one way. There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated.

Level 3: 5–7 marks

Candidates will display good knowledge and understanding of two ways in which males are disadvantaged. Responses will be wide-ranging or detailed. There will be some use of sociological concepts/evidence for each way. At the top of the level candidates will use relevant concepts in an explicit way; but they may well be undeveloped. At the bottom of the level concepts may be underdeveloped and some may be implicit. One way with depth and detail can reach the bottom of this band. There is a line of reasoning presented with some structure. The information presented is in the most-part relevant and supported by some evidence.

Task 2a Research task: Define the following concepts and illustrate with examples;

Values

Norms

Status

Roles

Culture

Task 2b Research task:

- 1. Define the family type.**
- 2. Has the family type increased or decreased in contemporary society? Identify key trends (use the internet to find statistical data)**
- 3. Identify reasons for the increase or decrease.**

Lone parent families

Nuclear families

Extended families

A Level Spanish

At A Level, we study AQA.

What will I learn?

During this course you will develop your linguistic skills alongside your understanding of the culture and society of the countries where Spanish is spoken.

You will study:

- technological and social change, looking at the multicultural nature of Hispanic society.
- highlights of Hispanic artistic culture, including a focus on Spanish regional identity and the cultural heritage of past civilisations.
- aspects of the diverse political landscape of the Hispanic world.
- the influence of the past on present-day Hispanic communities.

Throughout your studies, you learn the language in the context of Hispanic countries and issues and influences which have shaped them. You will study texts and film and will have the opportunity to carry out independent research on an area of your choice.

Course structure

The AQA A level in Spanish comprises three units.

Paper 1: Listening, reading and writing

Paper 2: Writing (Essay on a novel + a film)

Paper 3: Speaking (involving discussion on a topic of your choice)

General Topic Areas for A level Spanish

The topics you will cover are as follows:

Year 1	Year 2
Aspects of Hispanic society <ul style="list-style-type: none">• Modern and traditional values• Cyberspace• Equal rights	Multiculturalism in Hispanic society <ul style="list-style-type: none">• Immigration• Racism• Integration
Artistic culture in the Hispanic world <ul style="list-style-type: none">• Modern day idols• Spanish regional identity• Cultural heritage	Aspects of political life in the Hispanic world <ul style="list-style-type: none">• Today's youth, tomorrow's citizens• Monarchies and dictatorships• Popular movements

Transition Activities: How can you prepare for A Level Spanish?

Task 1: Write a book review / film review, one page long.

Watch: <i>VOLVER – film by Pedro Almodóvar</i>	Read: <i>Like water for Chocolate – book by Laura Esquivél</i>
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Task 2: Prepare a presentation

Find an article or articles on an element of Hispanic culture that interests you and write a one page summary of what you learnt.

Examples:	
Barcelona Football Club language	The region of Catalonia + the Catalan
Bullfighting	The Spanish artist Picasso

Task 3: Grammar

Complete the verb table for the regular –ar verb escuchar (to listen)

Present tense	Preterite	Imperfect
Yo escucho	Yo	Yo
Tú	Tú escuchaste	Tú
Él /Ella	Él /Ella	Él /Ella escuchaba
Nosotros	Nosotros	Nosotros
Vosotros	Vosotros	Vosotros
Ellos	Ellos	Ellos
Near future	Future	Conditional
Yo	Yo	Yo
Tú	Tú	Tú
Él /Ella	Él /Ella	Él /Ella
Nosotros vamos a escuchar	Nosotros	Nosotros
Vosotros	Vosotros escucharéis	Vosotros
Ellos	Ellos	Ellos escucharían

Now complete the verb table for the irregular verb hacer (to do / make)

Present tense	Preterite	Imperfect
Yo hago	Yo	Yo
Tú	Tú hice	Tú
Él /Ella	Él /Ella	Él /Ella hacía
Nosotros	Nosotros	Nosotros
Vosotros	Vosotros	Vosotros

Ellos	Ellos	Ellos
Near future	Future	Conditional
Yo	Yo	Yo
Tú	Tú	Tú
Él /Ella	Él /Ella	Él /Ella
Nosotros vamos a hacer	Nosotros	Nosotros
Vosotros	Vosotros haréis	Vosotros
Ellos	Ellos	Ellos harían

Task 4: Reading

Read the text, choose the correct word from the table and write the letter in the box

El matrimonio forzado

Completa el siguiente texto, escogiendo palabras de la lista (A – R).
Escribe la letra de la palabra en la casilla. ¡Atención! – las letras I, J y L no están utilizadas.

[10 marks]

Unas al	A	alcanzada
forzado	B	casaría
había si	C	centrales
supuest	D	consentimiento
	E	desempleo
Sunita t	F	detenia
de su pi	G	existe
una solt	H	falta
con el h	K	interveniera
	M	negara
Las alur	N	prometida
interrun	O	protestar
que no	P	rechazan
	Q	viola
	R	zonas

El caso de los n _____
 tienen una media de 11 años, pero pueden ser incluso más jóvenes.

Para las Naciones Unidas, el matrimonio forzado los derechos humanos básicos de las niñas, castigándolas a un destino de aislamiento, violencia sexual, de educación y problemas de salud.

Please note: Letters I, J and L do not appear in the above grid.

A Level Physical Education

At A Level, we study AQA

- Students should develop knowledge and understanding of the changes within the body systems prior to exercise, during exercise of differing intensities and during recovery.
- Students should be able to interpret data and graphs relating to changes within the musculo-skeletal, cardio-respiratory and neuro-muscular systems, and the use of energy systems during different types of physical activity and sport, and the recovery process.
- Section 2 focuses on how skill is acquired and the impact of psychological factors on performance. Students should develop knowledge and understanding of the principles required to optimise learning of new, and the development of existing, skills in a range of physical activities.
- Students should be able to understand and interpret graphical representations associated with skill acquisition theories.
- Students should develop knowledge and understanding of the interaction between, and the evolution of, sport and society.
- Students should be able to understand, interpret and analyse data and graphs relating to participation in physical activity and sport.
- Students should refine their ability to perform effectively in physical activity and sport by developing skills and techniques and selecting and using tactics, strategies and/or compositional ideas.
- Students should develop their ability to analyse and evaluate to improve performance.

Assessments:

Paper 1: Factors affecting participation in physical activity and sport

What's assessed

Section A: Applied physiology

Section B: Skill acquisition and sports psychology

Section C: Sport and society and technology in sport

How it's assessed

- Written exam: 2 hours
- 84 marks
- 70% of AS



Non-exam assessment: Practical performance in physical activity and sport

What's assessed

Students assessed as a performer or coach in the full sided version of one activity.

written/verbal analysis of performance.

How it's assessed

- Internal assessment, external moderation
- 90 marks
- 30% of AS

Transition Activities:

1. Practice your strongest activity area/sport at least once a week over the holidays i.e. the one that you would like to be assessed in for A level PE.
2. Ask someone to analyse your performance or analyse the performance of one of your friends/teammates in your chosen sport in one of the sessions:
 - (A) Break the performance down into at least six different skills e.g. for football it could be passing, dribbling, shooting etc.
 - (B) Keep a track of how many times you or your teammate completes each skill successful or unsuccessfully. Record this in a table.
 - (C) Note down beneath your table your main skill weakness and **five specific reasons why this is a weakness** e.g. one reason could be that always lean back too much when you shoot.
3. Research the impact of social factors on the development of football, tennis and athletics **before 1780** ('pre-industrial' years).

Look specifically at the following factors:

Two-tier class system.

Rural

Limited communication/technology/transport

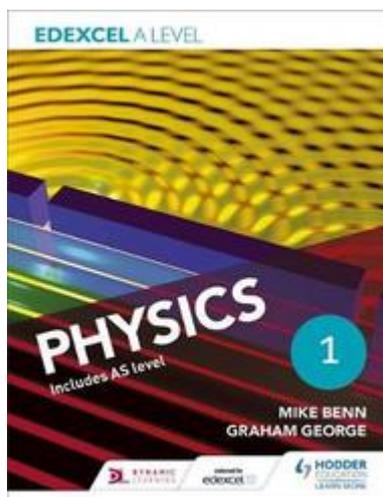
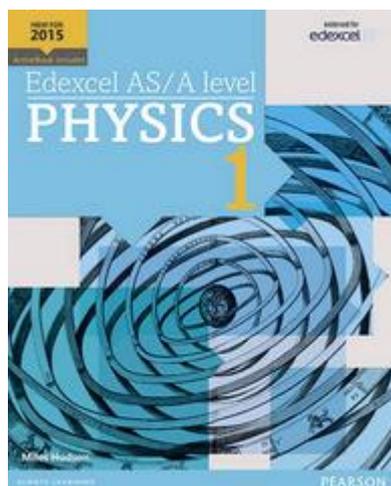
Widespread illiteracy

Harsh lifestyle

Design an informative leaflet which details the impact of the social factors above on football, tennis and athletics at that time.

A-Level Physics

A guide to help you get ready for A-level Physics, including everything from topic guides to online learning resources.



At A Level, we study Edexcel.

The course includes three exam papers on the following topics:

- Mechanics
- Electric Circuits
- Electric and Magnetic Fields
- Nuclear and Particle Physics
- Materials
- Wave and Particle Nature of Light
- Thermodynamics
- Space
- Nuclear Radiation
- Gravitational Fields
- Oscillations
- Working as a Physicist

There will be a minimum of 40% of questions across all three exams which require maths, including topics such as:

- Rearranging and substituting equations
- Differentiation (AS Maths)
- Logarithms and exponentials (AS Maths)
- Straight line graphs

- Trigonometry
- Proofs (AS Maths)

You will also complete numerous core experiments relating to topics you learn as part of the course and learn associated data analysis techniques.

Pre-Knowledge Topics

A level Physics will use your knowledge from GCSE and build on this to help you understand new and more demanding ideas. Complete the following tasks to make sure your knowledge is up to date and you are ready to start studying:

Research

To get the best grades in A Level Physics you will have to get good at completing independent research and making your own notes on difficult topics. Below are links to 5 websites that cover some interesting Physics topics.

Using the Cornell notes system: <http://coe.jmu.edu/learningtoolbox/cornellnotes.html> make 1 page of notes **from each site** covering a topic of your choice.

- a) <http://home.cern/about>

CERN encompasses the Large Hadron Collider (LHC) and is the largest collaborative science experiment ever undertaken. Find out about it here and make a page of suitable notes on the accelerator.

- b) http://joshworth.com/dev/pixelspace/pixelspace_solarsystem.html

The solar system is massive and its scale is hard to comprehend. Have a look at this award winning website and make a page of suitable notes.

- c) <https://phet.colorado.edu/en/simulations/category/html>

PhET create online Physics simulations when you can complete some simple experiments online. Open up the resistance of a wire html5 simulation. Conduct a simple experiment and make a one page summary of the experiment and your findings.

- d) <http://climate.nasa.gov/>

NASA's Jet Propulsion Laboratory has lots of information on Climate Change and Engineering Solutions to combat it. Have a look and make notes on an article of your choice.

Rearrange the following:

1. $E = m \times g \times h$ to find h
2. $Q = I \times t$ to find I
3. $E = \frac{1}{2} m v^2$ to find m
4. $E = \frac{1}{2} m v^2$ to find v
5. $v = u + at$ to find u
6. $v = u + at$ to find a
7. $v^2 = u^2 + 2as$ to find s
8. $v^2 = u^2 + 2as$ to find u

Rearrange the following:

1. Write 2530 in standard form.
2. Write 280 in standard form.
3. Write 0.77 in standard form.
4. Write 0.0091 in standard form.
5. Write 1 872 000 in standard form.
6. Write 12.2 in standard form.
7. Write 2.4×10^2 as a normal number.
8. Write 3.505×10^1 as a normal number.
9. Write 8.31×10^6 as a normal number.
10. Write 6.002×10^2 as a normal number.
11. Write 1.5×10^{-4} as a normal number.
12. Write 4.3×10^3 as a normal number.

Give to 3

significant figures:

1. 3.4527
2. 40.691
3. 0.838991
4. 1.0247
5. 59.972

Atomic Structure

You will study nuclear decay in more detail at A level covering the topics of radioactivity and particle physics. In order to explain what happens you need to have a good understanding of the model of the atom. You need to know what the atom is made up of, relative charges and masses and how sub atomic particles are arranged.

The following video explains how the current model was discovered

www.youtube.com/watch?v=wzALbzTdnc8

Describe the model used for the structure of an atom including details of the individual particles that make up an atom and the relative charges and masses of these particles. You may wish to include a diagram and explain how this model was discovered by Rutherford

Forces and Motion

At GCSE you studied forces and motion and at A level you will explore this topic in more detail so it is essential you have a good understanding of the content covered at GCSE. You will be expected to describe, explain and carry calculations concerning the motion of objects. The websites below cover Newton's laws of motion and have links to these in action.

<http://www.physicsclassroom.com/Physics-Tutorial/Newton-s-Laws>

<http://www.sciencechannel.com/games-and-interactives/newtons-laws-of-motion-interactive/>

Sketch a velocity-time graph showing the journey of a skydiver after leaving the plane to reaching the ground.

Mark on terminal velocity.

Waves

You have studied different types of waves and used the wave equation to calculate speed, frequency and wavelength. You will also have studied reflection and refraction.

Use the following links to review this topic.

<http://www.bbc.co.uk/education/clips/zb7gkqt>

<https://www.khanacademy.org/science/physics/mechanical-waves-and-sound/mechanical-waves/v/introduction-to-waves>

<https://www.khanacademy.org/science/physics/mechanical-waves-and-sound/mechanical-waves/v/introduction-to-waves>

- 1) Draw a diagram showing the refraction of a wave through a rectangular glass block. Explain why the ray of light takes this path.
- 2) Describe the difference between a longitudinal and transverse waves and give an example of each
- 3) Draw a wave and label the wavelength and amplitude

A Level Politics

A Level Politics Specification

Component 1: UK Politics (*Component code: 9PL0/01)
Written examination: 2 hours 33% of the qualification 84 marks
Content overview 1. Political Participation, students will study: <ul style="list-style-type: none">• democracy and participation, political parties, electoral systems, voting behaviour and the media. 2. Core Political Ideas, students will study: <ul style="list-style-type: none">• conservatism, liberalism, socialism.
Component 2: UK Government (*Component code: 9PL0/02)
Written examination: 2 hours 33% of the qualification 84 marks
Content overview 1. UK Government, students will study: <ul style="list-style-type: none">• the constitution, parliament, Prime Minister and executive, relationships between the branches. 2. Non-core political ideas, students will study: <ul style="list-style-type: none">• one idea from the following: anarchism, ecologism, feminism, multiculturalism, nationalism.
Component 3: Comparative Politics (*Component code: 9PL0/3A or 3B)
Written examination: 2 hours 33% of the qualification 84 marks Students study either USA (9PL0/3A) or Global (9PL0/3B)
Content overview For Global (3B) students will study: <ul style="list-style-type: none">• sovereignty and globalisation, global governance: political and economic, global governance: human rights and environmental, power and developments, regionalism and the European Union, comparative theories.

Transition Guide – Preparing for A-level Politics

Component 1

This component focuses upon people's participation to Politics and their day to day involvement with political issues. In order to prepare for the component complete the following tasks.

Task 1

Look at the website "Votes at 16" and write:

- a. 100 word statement why the voting age should be lowered
- b. 100 word statement why the voting age should stay the same

Task 2

Use the following website to answer the questions below:

<https://www.bbc.co.uk/news/election/2017/results>

Democracy and Participation

1. What was turnout in the election?
2. How did youth turnout compare to the last General Election?
3. Which areas had the highest turnout and why was this the case?
4. Despite the fact that turnout was better than in previous years, why was it still disappointing?
5. Give an example if an area where turnout was particularly low.

Research the following areas to help you formulate arguments for and against the claim that 'democracy is in crisis.'

1. Participation levels of pressure groups i.e. Green Peace, Age UK, Electoral Reform Society. Do people prefer to participate in politics through alternative means? If so why?
2. The turnout of general elections- has it increased or decreased and why?
3. The unelected House of Lords- how does this question principles of democracy? Have there been any measures taken to address this?
4. The voting system- first past the post- what are the strengths and weaknesses of this method? What are the alternatives? Should an alternative be adopted? If so, which one?

'Democracy is in crisis' Evaluate the arguments for and against

Arguments For

Arguments Against

A large, empty rectangular box with a black border, intended for collecting evidence.A large, empty rectangular box with a black border, intended for collecting evidence.

Conclusion: based on the evidence collected, is 'democracy in crisis?'

A large, empty rectangular box with a black border, intended for writing a conclusion.

Component 2

This component focuses on how the Government works and looks at the systems and institutions that control and run the UK.

Task 1

Research

Make profiles upon **two** of the following Prime Ministers.

Theresa May, David Cameron, Tony Blair, Margret Thatcher, John Major, James Callaghan

Be sure to include the information below for each.

- Political Party:
- Dates in office:
- Previous posts:
- Background:
- Key policies:
- Legacy/key achievements/controversies:

Task 2

Visit the UK Supreme Court or Houses of Parliament (both in central London). Write a 500 word summary about how one of these institutions work.

Component 3

This component focuses upon issues which effect nations across the world and impact their political policies.

Task 1

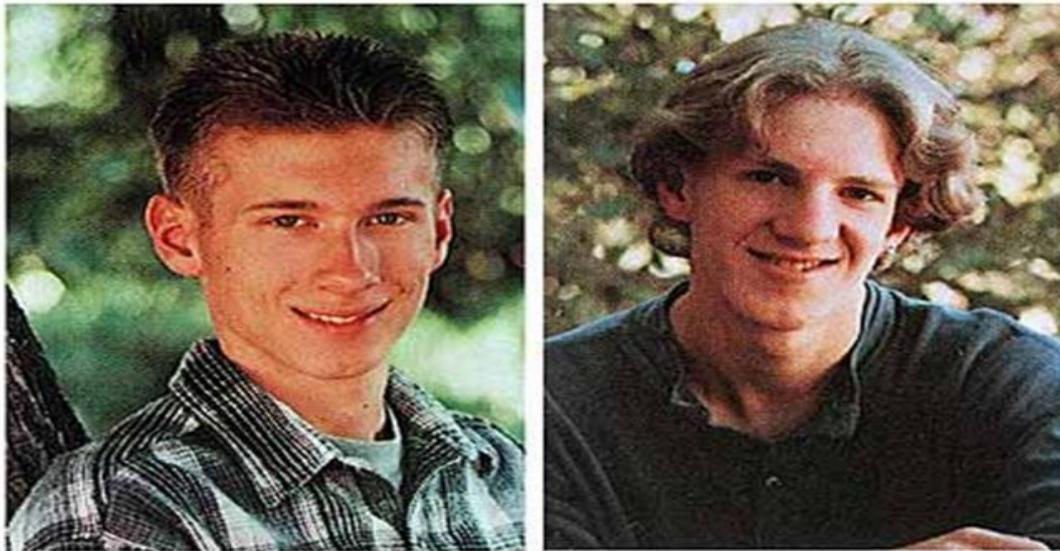
Watch the following episode of Turning Point:

<https://www.bbc.co.uk/iplayer/episode/b09g0214/turning-points-unscripted-reflections-by-steve-richards-series-1-5-brexit-referendum>

- Outline the arguments for and against BREXIT
- As you understand, what will be the implications for the UK?
- As you understand, how will BREXIT impact European policy?
- From your own knowledge, what may be the consequences upon Global politics and policies?

A Level Psychology

Welcome to Psychology Psychological Approaches



What do you think?

These pictures are of Eric Harris (left) and Dylan Klebold (right) who were aged 18 and 17 in 1999.

You are now a Psychologists think of the following two questions

- 1. What one word would you use to describe EACH of these men?**
- 2. What do you think they are doing now, aged 34 and 33?**

Were you right?

Task: While watching the video (<https://www.youtube.com/watch?v=AUSJ6rgEWUY>) , consider the different explanations for Eric & Dylan's behaviour.

Task: write down the different factors which *could* explain Eric & Dylan's behaviour.

- For example – brain damage

Can you think of AT LEAST 3 different examples?



Psychological Approaches

Each of our Psychologists below represent one of the main psychological approaches. On the posters, the Psychologists explain what they believe...use these psychologists to help you with the next task.

Psychodynamic Approach



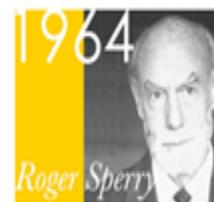
Behavioural Psychologists



Cognitive Psychologists



Biological Psychologists



Top 10 psychology films - for all you Netflix addicts!

- **A Beautiful Mind (2001):** Ron Howard's brilliant film not only educates the viewer about schizophrenia but ingeniously brings the viewer to empathize - and to a degree - experience the confusing pain of schizophrenia, as portrayed by Russell Crowe as mathematics genius, John Nash.
- **Memento (2000):** Another film that ingeniously brings the viewer a close-up experience of someone who is suffering, in this case a man struggling with retrograde amnesia.
- **One Flew over the Cuckoo's Nest (1975):** For a generation of students new to psychology, this film offers a slice of their profession's history, as seen in the barbaric and controlling treatment of patients at a psychiatric hospital.
- **To Kill a Mockingbird (1962):** Regarded by the American Film Institute as depicting the greatest hero in American cinema, Atticus Finch (Gregory Peck), an attorney who defends a Black man accused of rape. Heroes and exemplars portrayed in films can serve as powerful motivators in treatment.
- **Ordinary People (1980) and Good Will Hunting (1997):** while not perfect portrayals of psychologists (it is unethical to choke your client!), Judd Hirsch and Robin Williams play empathic and motivating therapists that educate and inspire their clients and the viewer.
- **Life is Beautiful (1998):** Italian film that shows us the extremes of what humans are capable of - the horrors of Nazism as well as tremendous creativity, humor, and sacrifice.
- **The Shawshank Redemption (1994):** one of the most popular films ever made, perhaps due to the ease an individual can relate to the story of a man wrongfully imprisoned but never giving up hope. Since most clients seeking psychology services are seeking hope, this is a great film to recommend as a treatment adjunct.
- **The Hours (2003):** interweaving story of three women, played by Meryl Streep, Julianne Moore, and Nicole Kidman, from different generations that serves as a useful teaching tool on mood disorders, suicide, and coping behaviors.
- **American Beauty (1999).** It's difficult to not be inspired by this Oscar-winning film. It is a rhapsody of mindfulness, finding beauty in each moment, and the possibility in every human being for change. If you do not enjoy this film the first time around, take another viewing and do as the alternate title for the film suggests - "look closer."

BTEC Health and Social Care

Level 3 Health and Social Care OCR Cambridge Technical Extended Diploma in Health and Social Care



You will complete this course over two years, it is equivalent to 3 A-levels.

This will involve completing both coursework units (which are **internally** assessed) and examination units (which are **externally** assessed).

Within the course you would complete the following units:

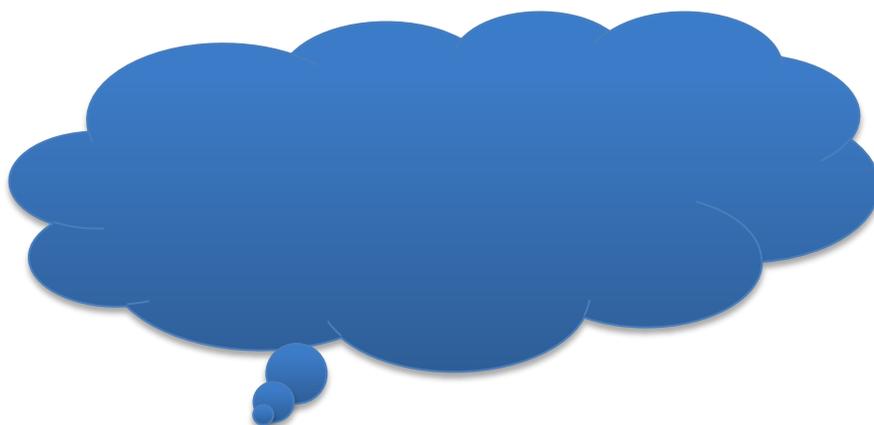
Year 12 units

- Unit 1: Building positive relationships
- Unit 3: Health, Safety and Security
- Unit 4: Anatomy and physiology
- Unit 7: Safeguarding
- Unit 9: Supporting people with learning difficulties
- Unit 10: Nutrition
- Unit 13: Sexual health and reproduction
- Unit 14: Impact of long term physiological conditions
- Unit 17: Supporting mental health

Year 13 units

- Unit 2 – Equality, diversity and rights
- Unit 5 – Infection control
- Unit 6 – Personalization and a person centred care approach to care
- Unit 12 – Promote positive behavior
- Unit 25 – Research Methods in Health, Social and Childcare
- Unit 16 – Supporting people with dementia
- Unit 18 – Caring for older people
- Unit 21 – Looked after children and young people

What is health and social care?



Unit 7 –
(exam unit)
In this unit

- The abuse
- The factors which lead to abusive situations
- The legislation that helps to protect individuals
- How to deal with cases of suspected abuse and disclosures of abuse
- Strategies and procedures for the safeguarding and protection of individuals
- Understand how workers in health, social and child care environments can minimise the risk of abuse.

Safeguarding

you will study:
types and signs of

Try to define each of the following types of abuse and their signs. How would we know if someone was suffering from each type of abuse. The first one has been done for you as an example.

Type of abuse	Definition	Signs of abuse
Physical abuse		e.g. bruises on the body, burns, broken bones, change to behaviour e.g. social withdrawal, fear of people or situations, low self esteem
Sexual abuse		
Emotional/ psychological abuse		
Neglect		
Financial abuse		
Institutional abuse		

Bullying		
Discrimination		
Exploitation/ mate crime		

Read the following articles and answer the question in the boxes below.

<https://www.telegraph.co.uk/news/2017/06/07/care-home-staff-guilty-oforganised-systematic-abuse-disabled/>

What type of abuse do you think this was? Why do you think the abuse took place?

<https://www.independent.co.uk/news/uk/home-news/care-homes-abuse-residents-funding-staff-uk-elderly-protection-a8266936.html>

Why do you think elderly people and people with Dementia are often victims of abuse?

<https://www.theguardian.com/society/2012/aug/29/care-home-worker-hidden-camera>

Abuse has been going on for a long time – why do you think it still takes place?

<https://www.bbc.co.uk/news/uk-scotland-edinburgh-east-fife-36333032>

<https://www.itv.com/news/border/2019-02-06/dangers-of-mate-crime-film-launched-by-carlisle-charity/>



For more information you can also look at the following websites.

<https://www.nhs.uk/conditions/social-care-and-support-guide/help-from-social-services-and-charities/abuse-and-neglect-vulnerable-adults/>

Unit 10 – Nutrition for health (coursework)

In this unit you will study:

- Nutritional and diet guidelines
- The functions of nutrients
- The factors that influence nutritional health
- Make recommendations to improve nutritional health

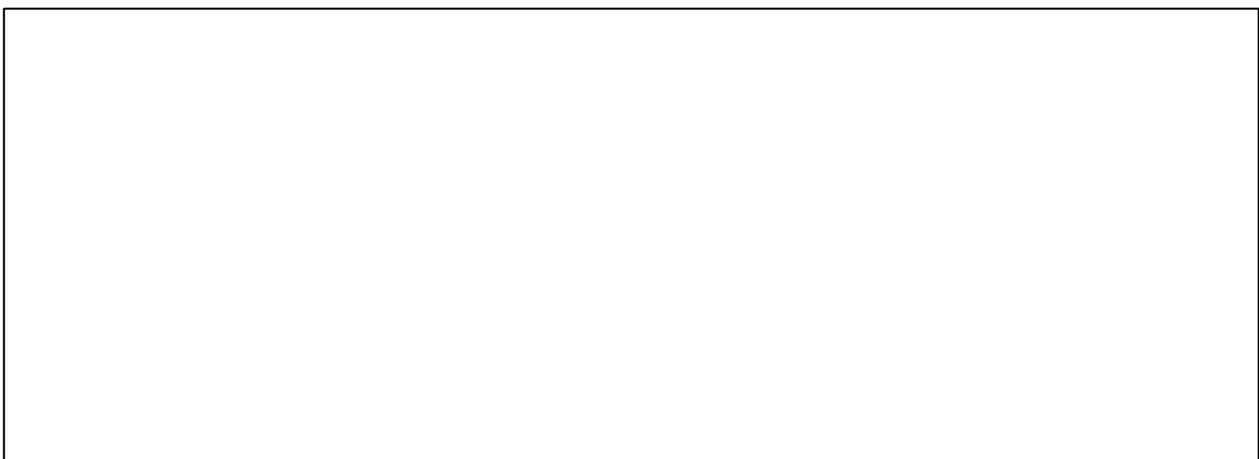


Using the following websites, summarise the daily nutritional guidelines for adults.

<https://www.gov.uk/government/publications/the-eatwell-guide> - click on The Eatwell Guide

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/742750/Eatwell_Guide_booklet_2018v4.pdf

<https://www.nhs.uk/live-well/eat-well/what-are-reference-intakes-on-food-labels/>



Read the following articles. Why is it important that we learn about nutrition and our intake of food? What are the implications for children of having too much sugar?

<https://www.independent.co.uk/life-style/health-and-families/british-calorie-intake-cut-per-day-1800-health-guidelines-a8129726.html>

<https://www.bbc.co.uk/news/health-46720303>

TASK TWO: Use the table below to record your food and drink intake for one day. Once you have done this find out what nutrients and how many are in the foods you have consumed.

	Foods/ drinks consumed	Nutritional values
Breakfast		

Lunch		
Dinner		
Snacks		

What are the daily recommended values of each nutrient for someone in your age group?

Are you consuming the right quantity of nutrients? Which nutrients are you lacking? Which are you consuming enough of? Which are you consuming more of (if so)?

Unit 4 – Anatomy and physiology (exam unit)

In this unit you will study:

- The cardiovascular system, malfunctions and their impact on individuals
- The respiratory system, malfunctions and their impact on individuals
- The digestive system, malfunctions and their impact on individuals
- The musculoskeletal system, malfunctions and their impact on individuals
- The control and regulatory systems, malfunctions and their impact on individuals
- The sensory systems and malfunctions

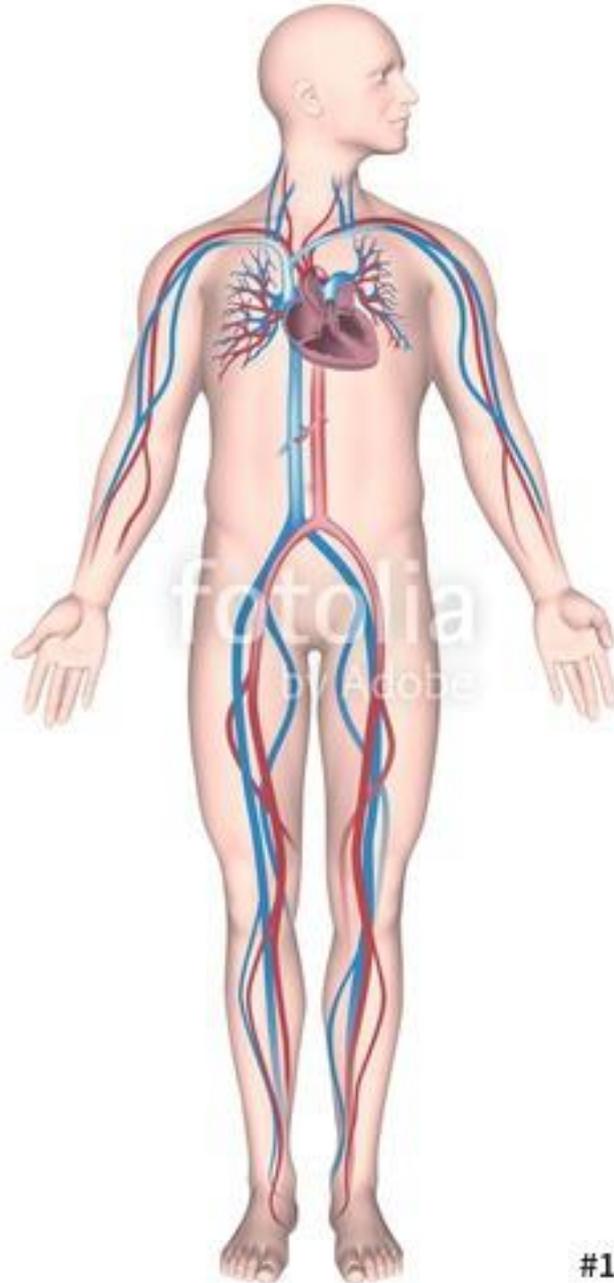
The Cardiovascular System

1. Watch the following video and label the following parts the cardiovascular system.

<https://www.youtube.com/watch?v=CWFyxn0gDEU>

- Right side
- Left side
- Aorta

- Deoxygenated blood (oxygen poor/blue blood)
- Oxygenated blood (oxygen rich/red blood)
- Right atrium
- Right ventricle
- Left atrium
- Left ventricle
- Pulmonary valves
- Pulmonary arteries and veins
- Aortic valve
- Tricuspid valve
- Mitral valve
- Vena cava
- Semi-lunar valves
- Coronary arteries

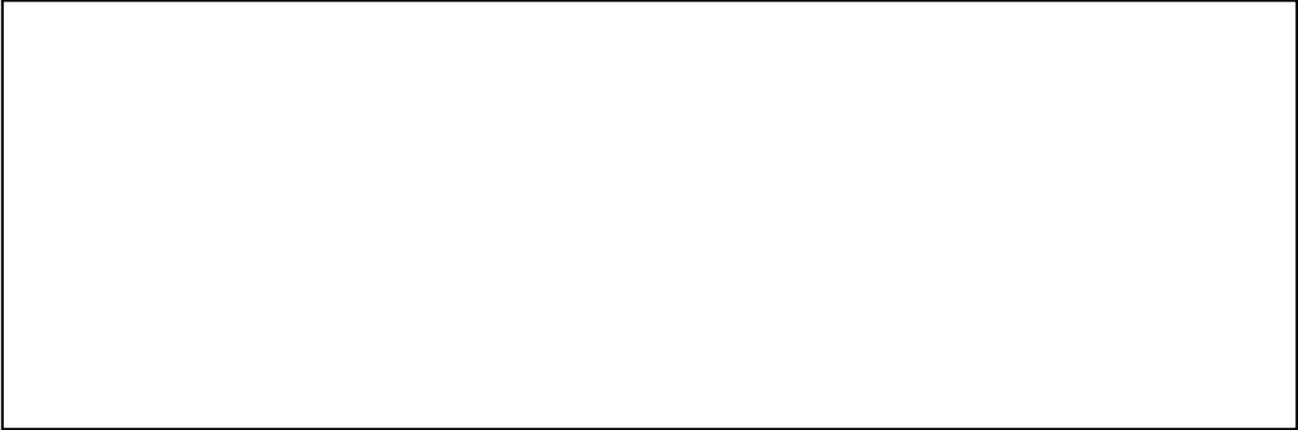


2. Your next task is to read through the information on the BHF website and summarise how the circulatory system works. Use the following video to help you.

<https://www.bhf.org.uk/information-support/how-a-healthy-heart-works>

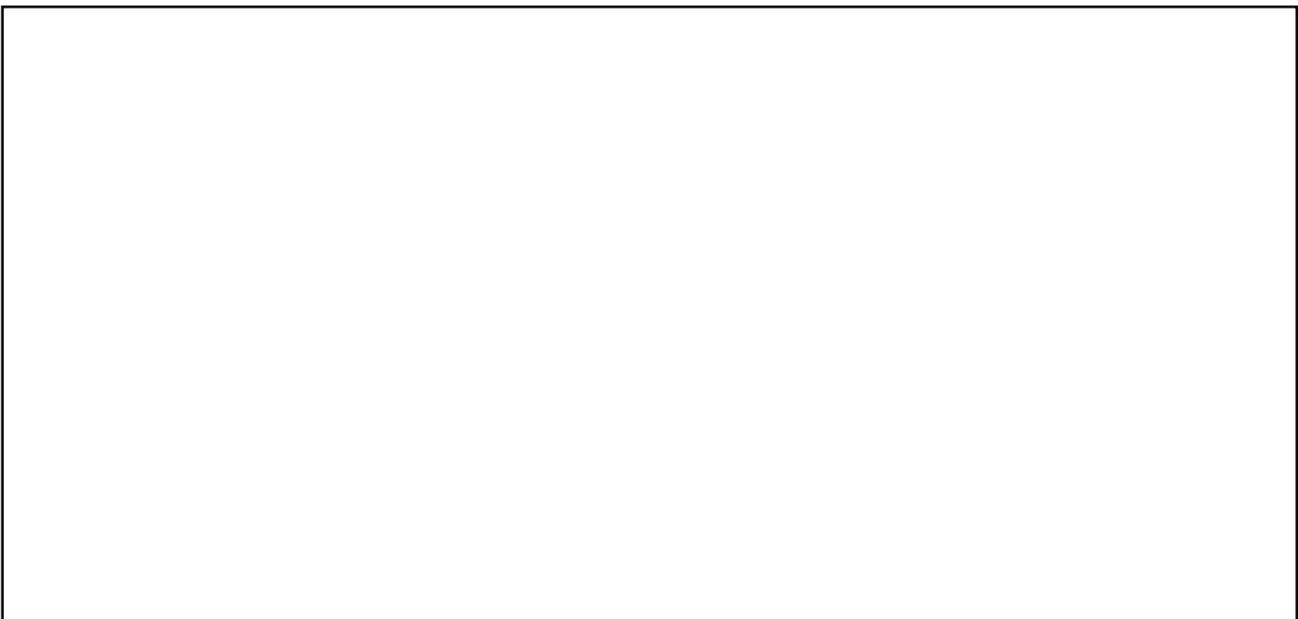
You can also use the following website to help you

<https://www.livescience.com/22486-circulatory-system.html>

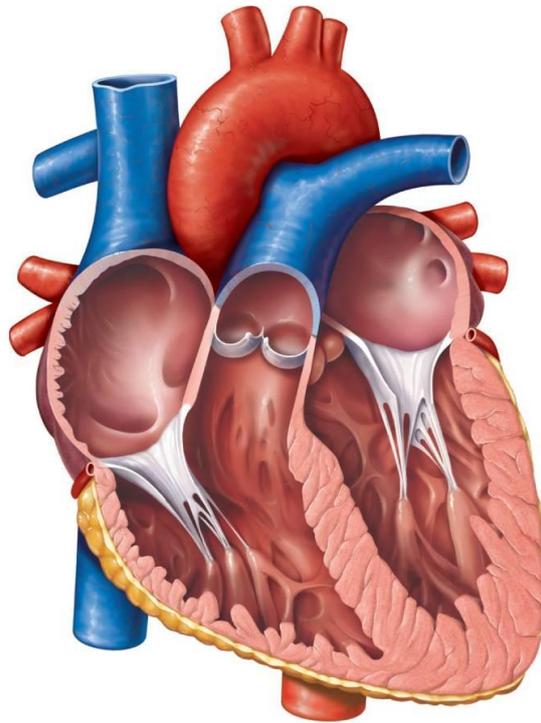


3. Try to explain the function of the heart *using the following key words* and label the diagram below. You will need to be able to recognize the parts of the circulatory system and label them in the exam.

Double pump - diastole - systole- cardiac cycle - role of component parts



You can use this video to help you. <https://www.news-medical.net/health/Structure-and-Function-of-the-Heart.aspx>



4. Function and composition of blood.

Watch the following video and make notes on the structure and composition of blood
<https://healthengine.com.au/info/blood-function-composition>

Try to include the following key terms for both.

Composition of blood

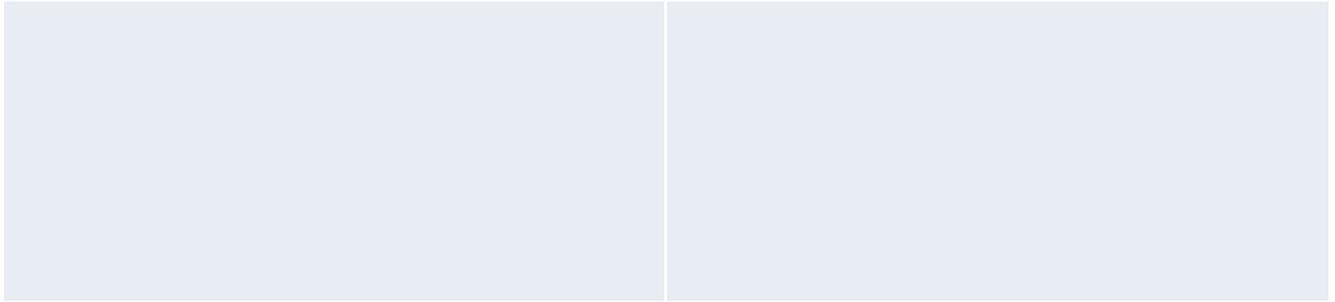
erythrocytes • lymphocytes • neutrophils • monocytes • platelets • plasma

Functions of blood

transport • temperature regulation • exchange of materials with body tissues • preventing infection
• blood clotting

Structure

Composition

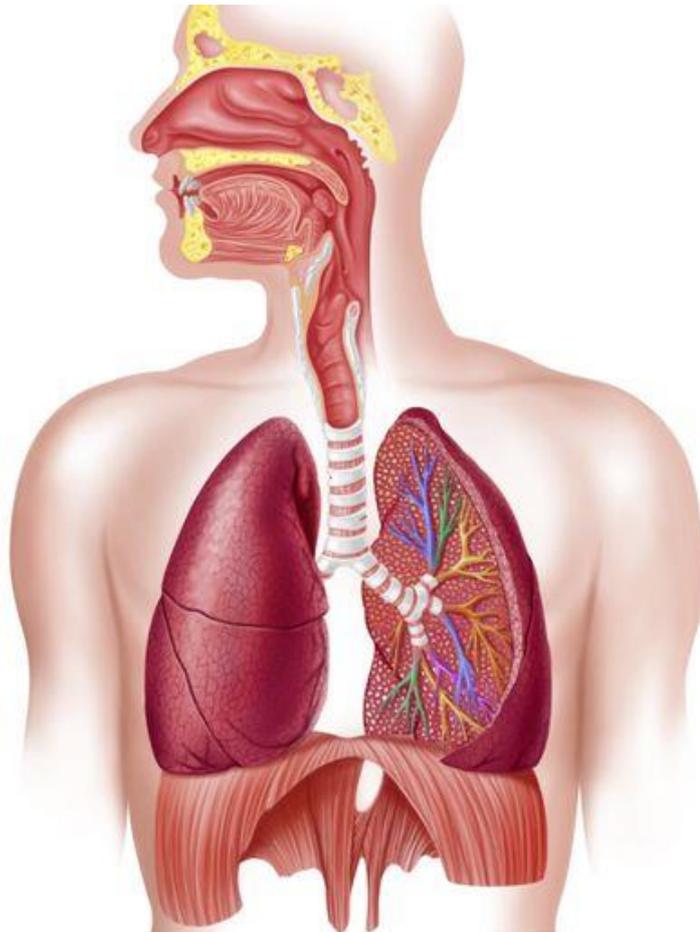


The respiratory system

1. Label the diagram below and try to explain how the respiratory system works. Try to include the following key words:

larynx • trachea • bronchi • bronchioles • alveoli • diaphragm • intercostal muscles • pleural membranes

Use the video to help you: <https://www.youtube.com/watch?v=kacMYexDgHg>

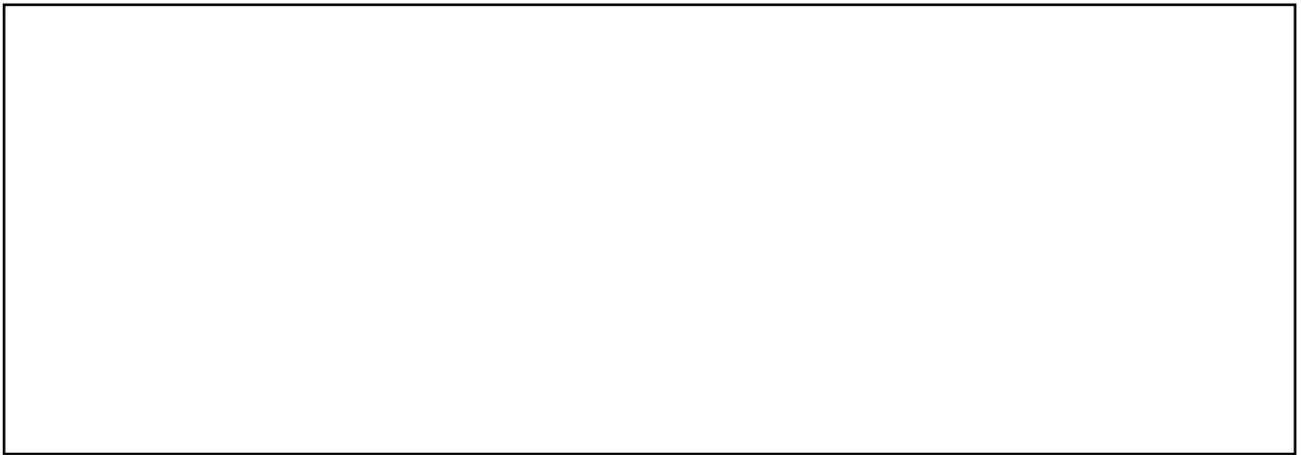


2. Your next task is to explain inspiration and expiration and include the following key words:=

Diaphragm

Muscles (intercostal)

Plural membranes



<https://medlineplus.gov/ency/anatomyvideos/000018.htm>

3. Gaseous exchange

Watch the following video and try to summarise in your own words what 'gaseous exchange' is.



<https://medlineplus.gov/ency/anatomyvideos/000059.htm>

4. Causes of Asthma and effects on the individual

<https://www.nhs.uk/conditions/asthma/causes/>

<https://www.asthma.org.uk/advice/understanding-asthma/causes/>

Using the information from both videos, try to summarise in your own words what can cause asthma and how it affects an individual.

BTEC Business

Level 3 Extended Diploma in Business

Edexcel BTEC

New specification written and endorsed by employers

Sainsbury's **John Lewis**

- Two year course
- Equivalent to 3 A levels
- 13 units of study in total
- 4 of the units are exam units
- Students get to learn about business and practise the skills set desired by current employers
- Chance to join the nationally recognised Career Ready Programme





Mandatory areas of study are:

Unit 1 Exploring Business

Unit 2 Developing a Marketing Campaign

Unit 3 Personal and Business Finance

Unit 4 Managing an Event

Unit 5 International Business

Unit 6 Principles of Management

Unit 7 Business Decision Making

Other units of study include:

- Customer Service
- Creative Promotion
- Market research
- Team building
- Pitching for a new Business
- Recruitment and Selection

Transition Activities

1. Produce a one page document in word, in business report format on “The importance of effective customer service in the fast food industry”
2. Create a basic business plan (using a suitable template that you find online) for a micro business idea (perhaps online) that you have in mind.

BTEC Computing

BTEC National Computing: Transition Guide

Examination Board: Pearson

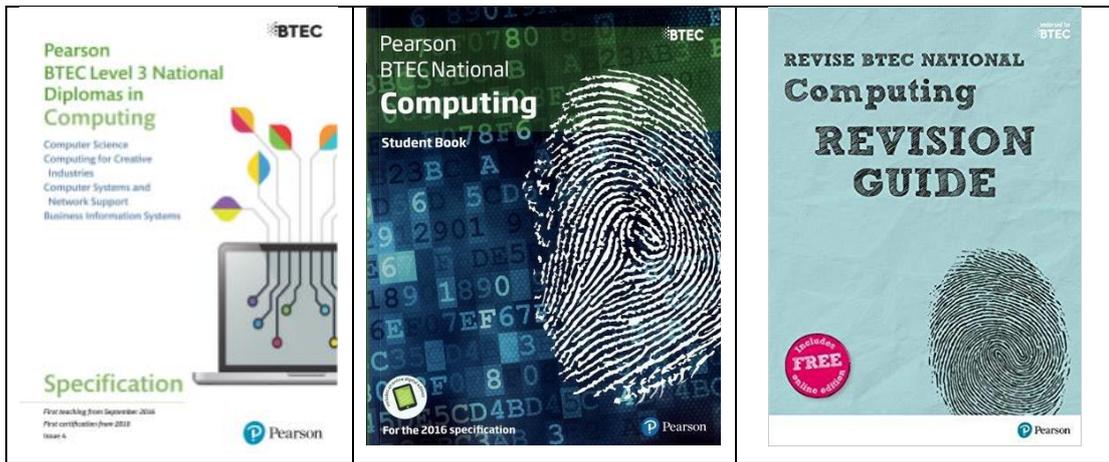
BTEC Level 3 National Extended Diploma in Computing is equivalent to 3 A Levels and comprises of 13 units (4 external and 7 internal).

BTEC Level 3 National Extended Diploma in Computing

Pearson BTEC Level 3 National Extended Diploma in Computing	1080 GLH (1435 TQT) Equivalent in size to three A Levels. 13 units of which 7 are mandatory and 4 are external. Mandatory content (67%). External assessment (42%).	This qualification is designed to support learners who are interested in a two-year, full-time course that meets entry requirements for a course in computer-related study at higher education. The qualification enables learners to explore a choice of sector areas, enabling progression to either higher education or employment in the computing sector.
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Resources you will be using in this course:

Specification	Textbook	Revision Books
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Year 12:

<u>Units Covered</u>	<u>Assessment</u>
Unit 1 Principles of Computer Science	External
Unit 2- Fundamentals of Computer Systems	External
Unit 3 - Planning and Management of Computer Systems	External
Unit 8 -Business Application of Social Media	Internal
Unit 10 -Human-computer Interaction	Internal
Unit 15 - Website Development	Internal
Unit 18 - Relational Database Development	Internal
Unit 14 - Computer Games Development	Internal

Year 13:

<u>Units Covered</u>	<u>Assessment</u>
Unit 4 - Software Design and Development Project	External
Unit 7 - IT System Security and Encryption	Internal
Unit 9 - The Impact of Computing	Internal
Unit 22 - Systems Analysis and Design	Internal
Unit 19 - Computer Networking	Internal
Unit 14 - Computer Games Development	Internal

Transition Activities: To be completed before September

The following Tasks will need to be attempted before September. Your knowledge in these topics will be assessed in a classroom test on the first week.

Task 1: Programming

Programming Task 1 Activity 1:

Visit www.w3schools.com/python and work through Python Exercises.

You must cover the following topics:

- Python Syntax
- Python Variables
- Python Numbers
- Python Strings
- Python Operators
- Python Lists
- Python Sets
- Python Dictionaries
- Python If...Else
- Python While Loops



The screenshot shows the w3schools.com website. The navigation menu includes HTML, CSS, JAVASCRIPT, SQL, PHP, and BOOTSTRAP. The Python Tutorial section is expanded, showing a list of topics: Python HOME, Python Intro, Python Get Started, Python Syntax, Python Variables, Python Numbers, Python Casting, Python Strings, Python Operators, Python Lists, Python Tuples, Python Sets, Python Dictionaries, Python If...Else, Python While Loops, and Python For Loops. The main content area features a blue banner for XML tools, a heading 'Python Tutorial', a '< Home' button, and a green box with the text 'Python is a programming language. Python can be used on a server to create w' and a 'Start learning Python now >' button.

Programming Task 1 Activity 2:

Register with www.codecademy.com and work through “Programming with Python” tutorial.

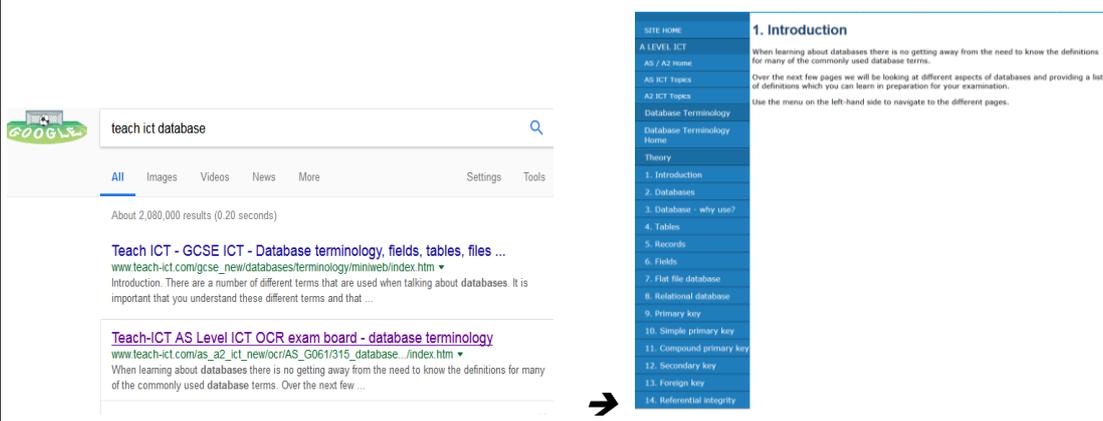
Task 2: Understand Relational Database

Read

Teach ICT Theory

Read through topics on “Database”,

Google the following terms “Teach ICT Database” and choose the 2nd result.



The screenshot shows a Google search for 'teach ict database'. The search results show two results. The second result is selected, and a table of contents is displayed on the right side of the page. The table of contents lists the following topics: 1. Introduction, 2. Databases, 3. Database - why use?, 4. Tables, 5. Records, 6. Fields, 7. Flat file database, 8. Relational database, 9. Primary key, 10. Simple primary key, 11. Compound primary key, 12. Secondary key, 13. Foreign key, and 14. Referential integrity.

SITE HOME	1. Introduction
A LEVEL ICT	When learning about databases there is no getting away from the need to know the definitions for many of the commonly used database terms.
AS / A2 Home	Over the next few pages we will be looking at different aspects of databases and providing a list of definitions which you can learn in preparation for your examination.
AS ICT Topics	Use the menu on the left hand side to navigate to the different pages.
A2 ICT Topics	
Database Terminology	
Database Terminology Home	
Theory	
1. Introduction	
2. Databases	
3. Database - why use?	
4. Tables	
5. Records	
6. Fields	
7. Flat file database	
8. Relational database	
9. Primary key	
10. Simple primary key	
11. Compound primary key	
12. Secondary key	
13. Foreign key	
14. Referential integrity	

Sixth Form Dress Code Expectations

- Professional suit with tie / bow tie (a tie must be worn with the suit). The suit can be black, brown, grey or blue
- Smart chino trousers are acceptable as long as they are worn with a shirt and tie
- Smart shirt with collar or blouse. Shirts with collars and a top button must be accompanied by a tie.
- Sensible shoes
- Smart trousers or smart skirt below the knee, on the knee and not more than one inch above the knee

Items that are not allowed:

- Hats
- T-shirts and polo shirts, vest tops or crop tops, t shirt style tops
- Jeans, leggings, jeggings or tracksuit bottoms (even if the jeans are black)
- Denim jackets
- Hoodies or sweatshirts
- Shoes should not have a stiletto heel, be trainers or canvas pumps, flip-flops, sandals without a strap around the back and boots with trousers tucked in are not permitted
- Black trainers
- Mandarin collar style shirts that don't allow for a tie
- Large logos are not permitted
- Jackets and coats **must not be worn inside the school buildings (not beyond reception point)**
-

This list is not exhaustive and the Sixth Form Team may add other items to this list. The final decision about whether an item of clothing is acceptable will be made by the Sixth Form Team.

How you wear the uniform

- Student ID Pass: security and identification purposes, to keep us all safe
- School bag (A4 sized to fit books and reports in plus a bottle of water)
- Shirts must be tucked in
- Shoes should be clean and maintained
- A suit jacket does not need to be worn at all times
- A thoub (prayer gown) is welcome but must only be worn during prayer and not before or after that time
- No bomber jackets over the suit, inside the building