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Aim High Progress Study Programme _ (Year 13) -January _2021

Subject	Focus	Activities	Useful Websites/Apps
Accounting	<ul style="list-style-type: none"> • To interpret the meaning and features of consignment accounts. • To analyse why consignment is not a sale and explain the important terms used in consignment accounts. • To interpret the use and importance of financial appraisal techniques in the investment decision making process • To make recommendations as to how the performance of a business, as revealed by a business could be improved. 	<ul style="list-style-type: none"> • Prepare a Prezi presentation comprising the following – <ul style="list-style-type: none"> ➢ Interpretation of the meaning and features of consignment accounts. ➢ Reasons explaining why consignment is not a sale. ➢ Explain the terms used in consignment accounts. • Present a report on the usefulness of financial appraisal techniques in investment decision. <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> • Prepare a Ted Ed Flipped Lesson on the topic. 	www.myaccountinglab.com , www.bized.co.uk www.cie.org.uk , http://www.accounting-world.com/ https://www.investopedia.com/ https://study.com/search/text/academy.html?q=accounting#/topresults/accounting
Economics	<ul style="list-style-type: none"> • To develop independent researching skills and student led lessons on Growth vs Development. 	<ul style="list-style-type: none"> • Prepare a Presentation for a student-led Lesson on any of the following topics: <ol style="list-style-type: none"> 1. Growth vs Development 2. Characteristics: Developed, developing and emerging economies. Use the Human Development Report to substantiate with facts and figures. 3. Factors Contributing to growth and development. 	www.tutor2u.net www.s-cool www.bized.ac.uk www.xtremepapers.com



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Business Studies	<ul style="list-style-type: none"> To analyze the role of strategic management for the success of a business. To research different sales forecasting methods for marketing planning. 	<ul style="list-style-type: none"> Research on the methods of strategic management and how a business would make its strategic choices? Research on different sales forecasting methods and their application for different businesses. 	www.bized.co.uk www.s-cool.co.uk www.businesscasestudies.co.uk
Travel & Tourism	<ul style="list-style-type: none"> Review the concept of branding destinations with marketing strategies. 	<ul style="list-style-type: none"> Choose any destination one in island and one in winter resort. For each of them try and work out what the USP is. How might this affect the target markets for such destination? Past paper questions pertaining to all topics covered so far 	https://www.researchgate.net/publication/241701652_Strategic_Branding_of_Destinations_A_Framework
Physics	<u>Op- Amp</u> <ul style="list-style-type: none"> To recall the main properties of the ideal operational amplifier (op-amp) To deduce, from the properties of an ideal operational amplifier, the use of an operational amplifier as a comparator To understand the effects of negative feedback on the gain of an operational amplifier 	<ul style="list-style-type: none"> Learners research the main properties of operational amplifiers, understand the symbol and its connections and how it can be used in practical situations. Possible experiment: op-amp in open loop mode as a comparator. Use with thermistor to monitor temperatures. The output may be 	<ul style="list-style-type: none"> https://www.youtube.com/watch?v=7beZocF34AU http://www.electronicstutorials.ws/opamp/opamp_1.html



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	<ul style="list-style-type: none"> • To recall the circuit diagrams for both the inverting and the noninverting amplifier for single signal input • To understand the virtual earth approximation and derive an expression for the gain of inverting amplifiers • To recall and use expressions for the voltage gain of inverting and of non-inverting amplifiers • To understand that an output device may be required to monitor the output of an op-amp circuit <p><u>Laws of electromagnetic induction</u></p>	<p>monitored with a voltmeter or use of LEDs may be considered.</p> <ul style="list-style-type: none"> • Learners read and make notes from textbooks and/or the internet. • Learners involve in discussion and interaction with teacher, drawing the circuit diagrams for both types of amplifier, gaining an understanding of how each one works and in what context. They must understand the concept of <i>saturation</i>. Learners compare their circuit diagrams with those on the suggested webpages. • Experiments to find the gain of both inverting and non-inverting amplifiers. • Infer from appropriate experiments on electromagnetic induction: that a changing magnetic flux can induce an e.m.f. in a circuit that the direction of the induced e.m.f. opposes the change producing it the factors affecting the magnitude of the induced e.m.f. 	<ul style="list-style-type: none"> • https://www.savemyexams.co.uk/notes/a-level-physics/cie-until-2021/24-electronics-pre/24-1-1-ideal-op-amp-pre/ • https://byjus.com/physics/magnetic-flux/#:~:text=Magnetic%20flux%20is%20defined%20as,the%20rough%20a%20given%20surface%20area • https://www.khanacademy.org/science/physics/magnetic-forces-and-magnetic-fields/magnetic-flux-faradays-law/a/what-is-magnetic-flux
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Chemistry	<p><u>Electrochemistry:</u></p> <ul style="list-style-type: none">• To explain the mathematical relationship $F = Le$• To outline the working of Standard Hydrogen Electrode• To determine the EMF of the electrochemical cell (one half cell being metal/metal ion cell, non-metal/non-metal ion cell, ion/ion cell and the other half cell as SHE)• To outline the direction of redox reaction using the electrochemical cell value• To apply the Nernst equation to predict quantitatively how the value of an electrode potential varies with the concentration of the aqueous ion.• To outline the use of fuel cells and batteries in daily life. <p><u>Polymerisation:</u></p> <ul style="list-style-type: none">• Describe the formation and characteristics of condensation polymers.• Deduce and identify the repeat unit of a condensation polymer obtained from a given monomer or pair of monomers	<ul style="list-style-type: none">• Solve at least five questions making use of $F = Le$ to predict the identity of a product during electrolysis• Construct electrochemical cell using Standard Hydrogen Electrode as one of the half cell• Research and prepare a write-up on determining the feasibility of a reaction based upon the electrochemical cell value• Plan an investigation to be conducted in a school laboratory to determine the cell potential under non-standard conditions (use Nernst equation)• Prepare a Power-Point presentation on 'fuel cell - the need of future'	<ul style="list-style-type: none">• https://www.chemguide.co.uk/inorganic/electrolysis/basic_calcs.html• https://byjus.com/chemistry/standard-hydrogen-electrode/• http://www.dynamicscience.com.au/tester/solutions1/chemistry/redox/electrochemicalcellfromequan.htm• https://chem.libretexts.org/Bookshelves/Introductory_Chemistry/Book%3A_Introductory_Chemistry_(CK-12)/23%3A_Electrochemistry/23.06%3A_Calculating_Standard_Cell_Potentials• https://www.chem.tamu.edu/class/fyp/stone/tutorialnote_files/electro/nernst.htm• http://www.docbrown.info/page01/ExIndChem/electrochemistry11.htm
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	<ul style="list-style-type: none">• Predict the type of polymerisation reaction for a given monomer or pair of monomers• Discuss the properties and structure of polymers based on their methods of formation, presence of side-chains and intermolecular forces affect the properties of polymeric materials• explain the significance of hydrogen-bonding in the pairing of bases in DNA in relation to the replication of genetic information• Recognise that polyalkenes are chemically inert and can therefore be difficult to biodegrade• Recognise that a number of polymers polyesters and polyamides can be degraded by the action of light and are biodegradable by hydrolysis <p>Transition elements:</p> <ul style="list-style-type: none">• Explain the properties of transition metals. Also, compare properties with s block elements.• describe and explain the reactions of transition elements with ligands to form complexes, including the complexes of copper(II) and cobalt(II) ions with water	<ul style="list-style-type: none">• Write a report - how the today's world is dependent on polymers. Sharing your view point if it's good or bad for environment.• Research about eco-friendly polymers. Prepare a presentation on the same.• Make an infographic poster comparing addition and condensation polymers.• Practice drawing polymers.	<ul style="list-style-type: none">• http://www.engineerstudent.co.uk/polymerisation.php• http://www.bbc.co.uk/bitesize/intermediate2/chemistry/carbon_compounds/plastics_synthetic_fibres/revision/5/• https://chem.libretexts.org/Textbook_Maps/Organic_Chemistry/Supplemental_Modules_(Organic_Chemistry)/Polymers/Condensation_Polymers
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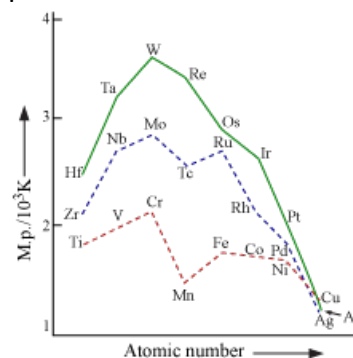
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- and ammonia molecules and hydroxide and chloride ions
- Describe the shapes of transition metal complexes.
 - explain qualitatively that ligand exchange may occur, including the complexes of copper(II) ions with water and ammonia molecules and hydroxide and chloride ions
 - explain the origin of colour in transition element complexes resulting from the absorption of light energy as an electron moves between two non-degenerate d orbitals using non degenerate concepts.
 - Describe, in qualitative terms, the effects of different ligands on absorption, and hence colour, using the complexes of copper(II) ions with water and ammonia molecules and hydroxide and chloride ions as ligands
 - Describe and explain ligand exchanges in terms of competing equilibria
 - Deduce expressions for the stability constant of a ligand substitution using K_{stab} and explain its importance.
 - Explain ligand exchange in terms of stability constants, K_{stab} , and

- Practice writing electronic configuration of transition elements and ions.
- Explore the shapes of d subshell.
- Analyse the graph and suggest possible reason for the trends.



Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn
	+2	+2	+2	+2	+2	+2	+2	+2	+2
+3	+3	+3	+3	+3	+3	+3	+3	+3	
	+4	+4	+4	+4	+4	+4	+4		
	+5	+5	+5	+5	+5	+5			
			+6	+6	+6				
				+7					

- <https://xtremepapers.xyz/revision/a-level/chemistry/inorganic/transition/features.php>
- [https://chem.libretexts.org/Textbook Maps/General Chemistry/Map%3A_General Chemistry \(Petrucci et al.\)/23%3A_The_Transition_Elements/23.1%3A_General_Properties_of_Transition_Metals](https://chem.libretexts.org/Textbook%2FMaps/General%20Chemistry/Map%3A_General_Chemistry_(Petrucci_et_al.)/23%3A_The_Transition_Elements/23.1%3A_General_Properties_of_Transition_Metals)
- <http://www.docbrown.info/page07/ASA2ptable2.htm>
- <https://www.memrise.com/course/161010/ocr-chemistry-a2-f325-definitions/3/>
- <https://revisionworld.com/a2-level-level-revision/chemistry/periodic-table/transition-metals>



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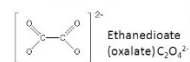
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understand that a large K_{stab} is due to the formation of a stable complex ion

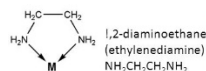
- Research about ligands, prepare a flow chart to show various types of ligands. Understand the differences between coordination number and valency.

Unidentate Ligand	Complex	Shape & Bond Angle	Coordination Number
Water	$[\text{Cu}(\text{H}_2\text{O})_6]^{2+}$	Octahedral 90	6
Ammonia	$[\text{Co}(\text{NH}_3)_6(\text{H}_2\text{O})_2]^{2+}$	Octahedral 90	6
Chloride ion	$[\text{Cu}(\text{Cl})_4]^{2-}$	Tetrahedral 109.5	4
Ammonia/Chloride	$[\text{Pt}(\text{NH}_3)_2(\text{Cl})_2]$	Square Planar 90	4
Cyanide	$[\text{Cu}(\text{CN})_4]^{2-}$	Tetrahedral 109.5	4
Cyanide, CN	$[\text{Ni}(\text{CN})_4]^{2-}$	Square Planar 90	4

Examples of Bidentate Ligands



Ethanedioate is able to form 2 coordinate bonds with the metal ion by donating 2 lone pairs of electrons (from oxygen atoms).



Ethylenediamine is able to form 2 coordinate bonds with the metal ion by donating 2 lone pairs of electrons (from nitrogen atoms).



- Practice writing the equations of transition metals complexes with various ligands and suggest observable changes. Write an expression for K_{stab} .

- <http://chemed.chem.purdue.edu/genchem/topicreview/bp/ch12/complex.php>



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<p>Biology</p>	<p>Inherited Changes</p> <ul style="list-style-type: none"> • Solve Problems using genetic diagrams involving test crosses, dihybrid cross, X linked inheritance. • Use the chi-squared test to test the significance of differences between observed and expected results (the formula for the chi-squared test will be provided) (see Mathematical requirements) • To Outline causes and effects of various types of Mutation • To explore gene control in Prokaryotes and prokaryotes <p>Selection and evolution:</p> <ul style="list-style-type: none"> ○ Discuss in groups how Darwin, using Darwin’s finches as an example, suggested that isolation of populations leads to speciation. ○ Use drawings / photographs of Darwin’s finches to annotate to explain speciation by isolation. 	<ul style="list-style-type: none"> • Draw annotated diagrams, using colors or shading, to show how two adjacent cells (haploid number 2) can produce 4 genetically different gametes by independent assortment. • Create Models using different recyclable material to consolidate learning of: (i) independent assortment and crossing. (ii) Types of mutation. (iii) Gene regulation in prokaryotes and eukaryotes. <ol style="list-style-type: none"> 1. Create a mind map on the factors influencing selection and variation. 2. Compare between natural selection and artificial selection. 3. Make a presentation on the selective breeding, focusing on it’s commercial aspect. 	<ul style="list-style-type: none"> • http://www.contexto.info/DNA_Basics/Meiosis.html • http://highered.mcgraw-hill.com/sites/0072495855/student_view0/chapter28/animation_how_meiosis_works.html • https://www.youtube.com/watch?v=LuOaEe89_HE • https://www.youtube.com/watch?v=N7_K0yIOEgk • https://www.youtube.com/watch?v=eDbK0cxK Ksk
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	<ul style="list-style-type: none"> ○ Research Darwin's mockingbirds, explaining how the observations made of these birds are believed to have had a major influence on Darwin in his development of the concept of natural selection. 		<ul style="list-style-type: none"> • https://www.youtube.com/watch?v=aTftyFboC_M • https://www.youtube.com/watch?v=fHS-OY9XDZc • https://www.huffingtonpost.com/james-a-shapiro/variation-and-selection-w_b_1522314.html
Art and Design	<ul style="list-style-type: none"> • To develop and present from the inception to the critically analysed works. 	<ul style="list-style-type: none"> • Communication: purposeful trials of art works to communicate, develop and present from the inception to the critically analysed works. The need to understand the relationship about the work which is developed, influenced by chosen media and methods. 	<ul style="list-style-type: none"> • www.studentartguide.com
English	<p>Revision Topics</p> <ul style="list-style-type: none"> • To revise topics • A: Spoken language and social groups • Topic B: English as a global language • Topic C: Language acquisition by children and teenagers. • Identify and analyses distinguishing features of written and spoken language in the text(s), such as vocabulary, word 	<ul style="list-style-type: none"> • Research on the topics and review the past papers. 	<ul style="list-style-type: none"> • https://gceguide.com/resources/example-candidate-responses-extra-resources/



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	<p>order and the structure of sentences/utterances, figurative language (e.g. use of metaphor and simile), formality/informality of tone, and the communication of attitudes, bias or prejudice</p> <ul style="list-style-type: none"> • Relate these features to the function and context of the text(s) 		
<p>Mathematics</p>	<p><u>Pure Mathematics</u> <u>INTEGRATION</u></p> <ul style="list-style-type: none"> • Extend the idea of ‘reverse differentiation’ to include the integration of e^{ax+b}, $1/ax$, $b \sin(ax + b)$, $\cos(ax + b)$, $\sec^2(ax + b)$ and $1/a^2 + b^2$. • Use trigonometrical relationships in carrying out integration • Integrate rational functions by means of decomposition into partial fractions • Recognise when an integrand can usefully be regarded as a product, and use integration by parts • Use a given substitution to simplify and evaluate either a definite or an indefinite integral. 	<p>Research on the application of integration</p> <ol style="list-style-type: none"> 1. An Architect Engineer uses integration in determining the amount of the necessary materials to construct curved shape constructions (e.g. dome over a sports arena) and also to measure the weight of that structure. 2. In Electrical Engineering, Integration is used to determine the exact length of power cable needed to connect two substations, which are miles away from each other. 3. In Physics, Integration is very much needed. For example, to calculate the Centre of Mass, Centre of Gravity and Mass Moment of Inertia of a sports utility vehicle. 	<p>https://tutorial.math.lamar.edu/classes/calci/integrationbyparts.aspx</p> <p>https://tutorial.math.lamar.edu/problems/calci/substitutionruleindefinite.aspx</p> <p>https://math.libretexts.org/Courses/Mount_Royal_University/MATH_1200%3A_Calculus_for_Scientists_I/4%3A_Integral_Calculus/4.1%3A_Integration_by_Substitution</p> <p>https://www.youtube.com/watch?v=PyLXFY3VkNE</p> <p>https://liavas.net/courses/calc1/files/Exp_log_trig_integration.pdf</p> <p>https://qedinsight.wordpress.com/2012/02/26/a-neat-trick-for-</p>



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		<p>4. A graphics artist uses calculus to determine how different three-dimensional models will behave when subjected to rapidly changing conditions. It can create a realistic environment for movies or video games.</p>	<p>determining-the-integrals-of-exp-cos-x-and-exp-sin-x/ https://www.mathsisfun.com/calculus/integration-by-parts.html</p>
	<p>Statistics 1</p> <p><u>Topic: Discrete random variables</u></p> <ul style="list-style-type: none"> • Construct a probability distribution table for a discrete random variable X. • Calculate the expectation, $E(X)$, and variance, $Var(X)$, of a discrete random variable. • Calculate binomial probabilities using the notation $X \sim B(n, p)$ • Calculate expectation and variance for a binomial distribution. • Calculate geometric probabilities using the notation $X \sim Geo(x)$ • Calculate expectation of a geometric distribution • Recognise practical situations where these distributions are suitable models. 	<p>Model a situation on discrete random variable from a real life situation.</p> <p>Summarise your learning and prepare notes on discrete random variables with examples.</p> <p>Summarise your learning and prepare mind map using an ICT tool using binomial distribution with examples.</p>	<p>https://revisionmaths.com/advanced-level-maths-revision/statistics/binomial-distribution</p> <p>https://revisionmaths.com/advanced-level-maths-revision/statistics/normal-distribution</p> <p>https://www.youtube.com/watch?v=HF9YCzoX8kU</p> <p>https://www.youtube.com/watch?v=y6wofZpuxfE</p>



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	<p><u>Statistics 2</u></p> <p><u>Sampling and Estimation</u></p> <ul style="list-style-type: none"> • Understand the distinction between a sample and a population, and appreciate the necessity for randomness in choosing samples. • Calculate expectation and variance of the mean of a random sample. • Solve problems using central limit theorem where appropriate • Calculate unbiased estimates of the population mean and variance <p>Determine and interpret a confidence interval for a population mean and proportion.</p>	<p>Research and summarise findings with examples on real life application on population and samples.</p> <p>Make notes to summarise learning that includes formulae and solved examples.</p>	<p>https://revisionmaths.com/advanced-level-maths-revision/statistics/sampling</p> <p>https://www.bmj.com/about-bmj/resources-readers/publications/statistics-square-one/3-populations-and-samples</p> <p>https://www.khanacademy.org/math/ap-statistics/gathering-data-ap/sampling-observational-studies/e/identifying-population-sample</p> <p>https://www.youtube.com/watch?v=EtP6km1JQi8</p> <p>https://www.youtube.com/watch?v=LhOYQFtdc6c</p>
	<p><u>Mechanics</u></p> <p><u>Momentum</u></p> <ul style="list-style-type: none"> • Apply conservation of linear momentum to solve problems involving direct impact of two bodies. 	<p>Find situations that can be modelled as impulse-momentum problems – for example a bat hitting a ball, a jerk in a string when the string suddenly goes tight, the recoil of a rifle when a shot is fired.</p>	<p>https://www.physicsclassroom.com/class/momentum/u4l2b.cfm</p> <p>https://www.britannica.com/science/conservation-of-momentum</p>



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	<ul style="list-style-type: none"> Apply conservation of momentum in coalescing bodies 	Use conservation of momentum principle in solving problems.	
Information Technology	<p>Declarative programming(Prolog):</p> <ul style="list-style-type: none"> Demonstrate an ability to solve a problem by writing appropriate facts and rules based on supplied information Demonstrate an ability to write code that can satisfy a goal using facts and rules 	<ul style="list-style-type: none"> Encourage your child to develop a software project to include the following: Create a software database which can handle the files using Prolog concept. 	<p>Prolog:</p> <p>www.learnprolognow.org/lpnpage.php?pageid=implementations</p> <p>Tutorial guide to prolog:</p> <p>www.learnprolognow.org/lpnpage.php?pageid=online</p>
Computer Science	<p>Project Management Describe disaster recovery management (including: risk analysis, perpetrator analysis, risk testing, quantifying the risk, securing the risk, software protection, password controls, recovery management)</p> <p>Prototyping</p> <ul style="list-style-type: none"> describe prototyping describe types of prototyping (including: evolutionary, incremental, throw-away, rapid) discuss the advantages and disadvantages of prototyping 	<ul style="list-style-type: none"> Discuss how the possibility of a disaster can be planned for and why this might be important. Explain the use of prototypes in development, the different types that can be created and how the use of the prototypes can change the development process. 	<p>The following could be used for information:</p> <p>http://whatis.techtarget.com/definition/disaster-recovery</p> <p>http://www.ready.gov/business/implementation/IT</p>



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	<ul style="list-style-type: none"> describe Rapid Application Development (RAD) and other methods of software development (including: <ul style="list-style-type: none"> the conventional 'waterfall' method) discuss the advantages and disadvantages of rapid application development (RAD) 		
Psychology	<p>Abnormal Psychology</p> <p>Anxiety Disorders</p> <p>Phobias</p>	<ul style="list-style-type: none"> Consider any one of these phobias (Anxiety disorders) to illustrate using a case study. Make a powerpoint presentation on agoraphobia, blood phobia or dog phobia. Practice Past Papers on related topics 	<p>www.psychexchange.co.uk;</p> <p>www.intute.com;</p> <p>www.hola.karoo.net</p> <p>www.psychologyabout.com</p>
Sociology	To assess the role of cults and sects in religion	<p>Research on the different cults and sects in different countries.</p> <p>Make a table to display the countries and the sects of religion in each of the countries.</p> <p>Practice the exam type of questions from the past papers</p>	<p>www.sociology.org.uk</p> <p>www.tes.co.uk</p>



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History	<ul style="list-style-type: none">To research on how important were the personalities of the leaders of the Great Powers in shaping the Cold War?	<ul style="list-style-type: none">Watch all parts of Isaacs' <i>Cold War</i>. These differences can be collated and classified: which are points of detail, which are points of argument (i.e. interpretative points, but not sufficient in themselves to identify the historian's overall interpretation), and finally the essential difference in the interpretation as a whole.<ul style="list-style-type: none">Practice writing essay type of questions from the topic given from the past papers	https://www.youtube.com/watch?v=GQbZSNS2mgY
Global perspectives	<ul style="list-style-type: none">Research Report	For your chosen topic for the Research Report: <ul style="list-style-type: none">Write an alternative research question. This should be linked to you're a-level subjects of whatever course you intend to pursue in university.Research the contrasting perspectives in the issue of focus.Identify the methods and methodologies you will employ and justify these. Analyse why you believe they are suitable and what shortcomings may be predicted.	Suitable research sources chosen by the learner.



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| | | <ul style="list-style-type: none">• Engage yourself in research as per the methods and methodologies decided upon.• Continue entries in the research log. Ensure that you enter the references as you will use them in your citation. Be more evaluative on the comments section of the log. | |
|--|--|---|--|