

Year 13, Term 2: How can I support at this point in the Sixth Form Journey?



What have we done to support this Journey?

- ▶ Strategies you may have heard you son/daughter using:
 - Thinking Pathway
 - Mentoring
 - Mnemonics
 - Note taking: Linear and Mind Mapping
 - QLA
 - Purple Pen response
 - Knowledge organisers
 - Flash cards
- ▶ Strategies have been taught and staff have been supporting the gradual process
- ▶ Mentoring are themed on academic rigour and how to balance.
- ▶ External providers have provided further thinking strategies.

How can you support you son or daughter?

- ▶ Understand the hours of study required per week, per subject
- ▶ It is estimated that students should contribute one hour of study per hour taught
- ▶ 16 hours of study per week.
- ▶ Effectively 11 hours should be done at home/twilight sessions. (2hours 15 minutes a night).

Allow for time out

- ▶ Encourage part-time jobs at weekends...but
- ▶ Encourage physical activity
- ▶ Please contact us if you have any issues or concerns
- ▶ Get your son/daughter to be SMART
(SPECIFIC; MEASURED; ACHIEVEABLE GOALS;
REALISTIC;TIMING)

What are Non-contacts and what are they used for?

- There has never been a mis-conception that this is a 'free'
- Non-Contacts are to study, complete or continue tasks set out of lessons
- This might be NEA
- A set task
- A presentation
- Essay response
- Organising a folder to support the above.

Intervention Process

- ▶ At subject level
- ▶ If students are not on Track after a Progress review, then they will receive intervention from their teacher
- ▶ Session 6
- ▶ Additional support after a PR

THE 6 HABITS OF HIGHLY SUCCESSFUL STUDENTS

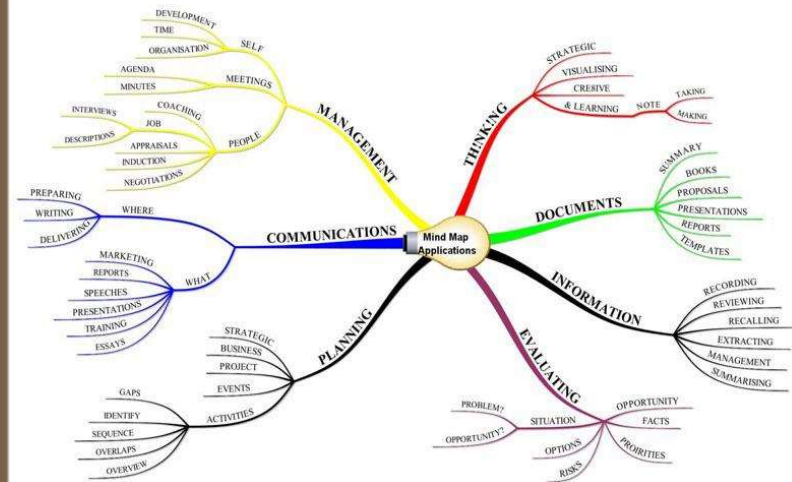
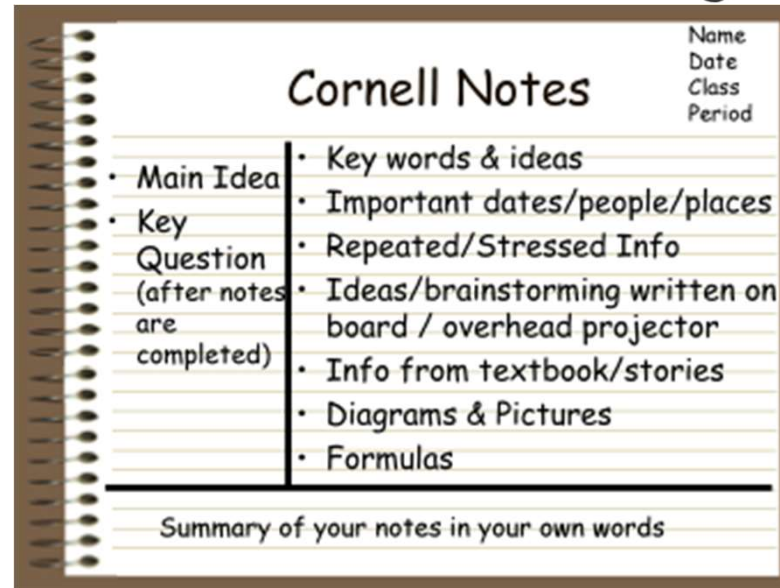
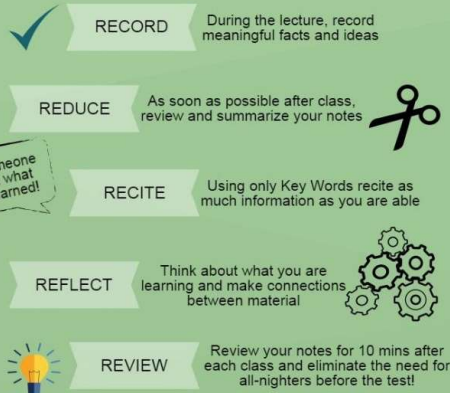


1. They get organised
2. Use their time effectively and prioritise their workload
3. Are motivated and know how to study independently
4. Take effective notes
5. Consolidate their knowledge
6. Understand how to revise

Revision to try in Social Science Subjects

5 R's of Notes

A+



How?	ADVANTAGES:	DISADVANTAGES	WHEN TO USE IT?
Set up your paper in columns and label appropriate headings.	Helps pull out most relevant information.	Can be a hard system to use during a lecture.	If you'll be tested on facts and relationships.
Headings could be categories covered in the lecture.	Reduces amount of writing.	Not a lot of room to write.	If content is heavy & presented quickly.
Insert information (words phrases, main ideas, etc.) into appropriate category.	Provides easy review for memorizing facts and studying comparisons and relationships.	Need to know the content that will be covered beforehand.	If you want to get an overview of the whole lecture on one sheet of paper.

© THE CHARTING METHOD

Strategies to use revising STEM

- ▶ Get your specification out!
 - Students were given these at the beginning of Year 12
- ▶ RAG every section:
 - Red: I need to start from the beginning
 - Amber: I am missing the key points
 - Green: I am confident and I want to complete as many exam questions as possible

Strategies to use revising STEM

Read the Question

What does that word mean?

Explain

Write a detailed answer that covers how and why a thing happens. Talk about mechanisms and reasons. (Hint: don't confuse with "describe").

Describe

Write a detailed answer that covers what happens, when it happens, and where it happens. Talk about facts and characteristics. (Hint: don't confuse with "explain").

Evaluate

You will be given some facts, data, or other kind of information. Write about the data or facts and provide your own conclusion or opinion on them.

Justify

Give some evidence or write down an explanation to tell the examiner why you gave an answer.

Suggest

Think about what you've learnt and apply it to a new situation or context. Use what you have learnt to suggest sensible answers to the question.

► Calculate

► Work out a number. You can use your calculator to help you. You may need to use an equation.

Compare

Write about the similarities and differences between two things.

Predict

Look at some data and suggest a realistic value or outcome. You may use a calculator to help. Don't guess - look at trends in the data and use your knowledge of science. (Hint: don't confuse with "calculate" or "estimate").

Strategies to use revising STEM

▶ Use the Marks

Show Calculations

Question Wording

Strategies to use revising STEM

20:40 Rule

- ▶ 20 mins of revision on a specific topic
 - Making a quick mindmap
 - Reading someone else's notes and highlight what you're forgetting
- ▶ 40 mins of exam questions
 - Stage 1: Use the notes to answer question
 - Stage 2: Answer questions without your notes
 - Stage 3: Answer, without notes and time yourself!



- ▶ When reading, ask **WHAT, WHY, WHEN, HOW QUESTIONS** about the material
- ▶ What am I reading? Is it appropriate to the task I am completing?
- ▶ Why am I reading this? What am I looking to find out?
- ▶ When am I reading? Is this is the best time? Is my concentration good enough?
- ▶ How am I reading? Am I scanning, or reading in detail?
- ▶ Am I understanding what I am reading? Is the information going in?
- ▶ Be selective when you are reading around a topic: are there any new publications?

Rapid Reading

Professor John Dunlosky's research

Published in Psychological Science in the Public Interest, a journal of the Association for Psychological Science (2013)

Only two of the 10 techniques examined turned out to be really effective :

1. Testing yourself
2. Spreading out your revision over time.

"Students who can test themselves or try to retrieve material from their memory are going to learn that material better in the long run".

"Start by reading the text book then make flash cards of the critical concepts and test yourself".

"A century of research has shown that repeated testing works."

Helping you memorise 5 simple steps

Step 1 – Highlight the key points

Step 2 – Make a flash card/bullet point list/mind map

Step 3 – Copy out flash card/bullet point list/mind map over and over about x10

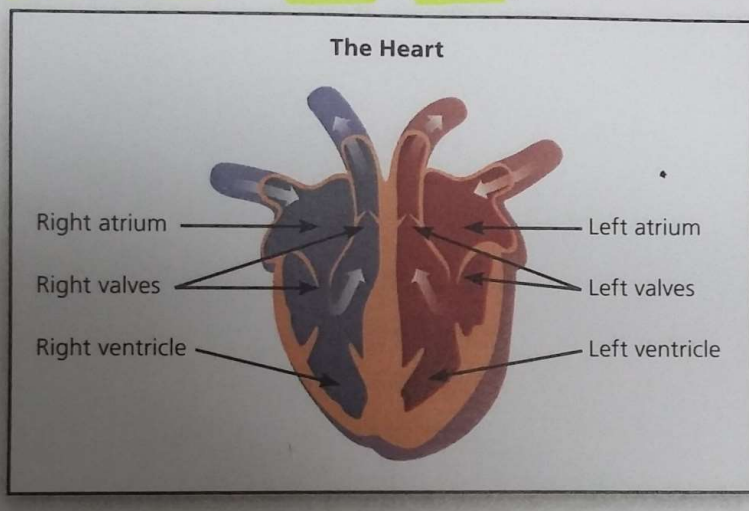
Step 4 – Test yourself– verbally or in writing– (if you cannot remember, go back to step 3 and repeat)

Step 5 – Practice exam question in timed conditions with no notes.

Step 1 – Highlight key points on the revision guide

The Heart

The heart is a muscular organ in the circulatory system. It beats automatically, pumping blood around the body to provide cells with oxygen and dissolved food for **respiration**. The blood removes carbon dioxide and water as waste products.



Blood from the rest of the body enters the right atrium of the heart. It then moves into the right ventricle before being pumped to the lungs. When the oxygenated blood returns to the heart, it enters the left atrium. It then moves into the left ventricle before being pumped to the rest of the body. The heart is called a **double pump** because blood returns to it twice.

The heart itself is mainly made up of muscle cells. These cells also require oxygen and dissolved food, so the heart needs its own blood supply.

Don't highlight everything– just keywords and points

You are trying to condense the content

Step 2– Make a flash card/bullet point list/mind map using the highlighted text

THE HEART

- Muscular organ in **Circulatory System**.
- Beats automatically
- Pumps blood → body → cells with Oxygen + dissolved food for **respiration**.
- Blood → removes CO₂ water as waste.
- **Blood from body** → enters **RIGHT ATRIUM** → moves to **RIGHT VENTRICLE** → then pumped to the **lungs**.

- **Oxygenated blood** returns to **LEFT ATRIUM** → moves into **LEFT VENTRICLE** → then pumped to **body** **TO LUNGS**.
- Heart = double pump → blood returns twice.

from body (Deoxygenated blood) → Right Atrium → Right Ventricle → TO LUNGS


FROM LUNGS → Left Atrium → Left Ventricle → To body (Oxygenated blood)

Right valves. Left valves

Use colours to help key concepts and points stand out

These are students' neat notes that they keep and use to revisit and test themselves

Step 3- Copy out flash card/bullet point list/mind map over and over- x5

The heart 

- Muscular organ in Circulatory system
- Beats automatically
- Pumps blood to body - provide cells with O_2 + dissolved food for RESPIRATION.
- Blood removes CO_2 + water as waste
- Blood - from body (deoxygenated) -
RIGHT ATRIUM → Moves RIGHT Ventricle → Lungs.
- Blood - from lungs (oxygenated) →
LEFT VENTRICLE → Moves LEFT Ventricle → body.

DOUBLE PUMP.

Writing is better
than simply
reading when it
comes to
memorising.

Step 4– Test yourself– verbally or in writing– (if you cannot remember, go back and repeat to step 3)



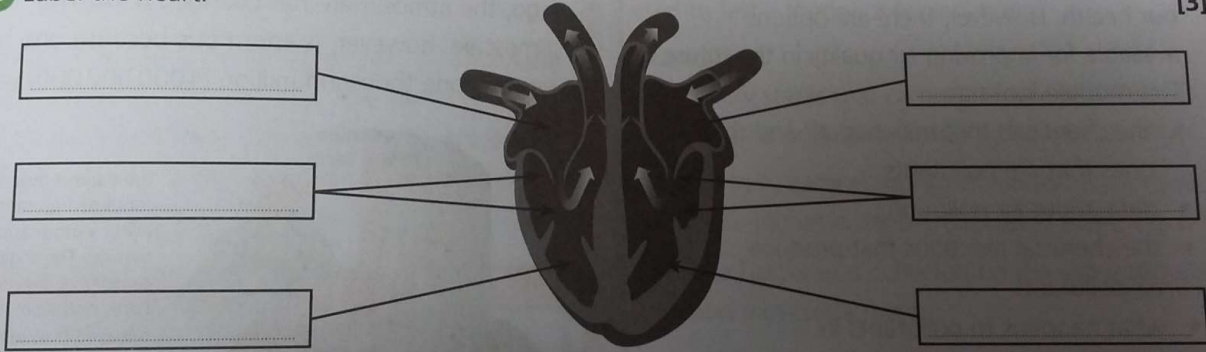
**REPETITION is very important– REPEAT REPEAT
REPEAT**

Step 5– Practice exam question in timed conditions with no notes

Exam Practice Questions

B1 5 Explain the disadvantages of making genetic testing compulsory. [6]
The quality of written communication will be assessed in your answer to this question.

B2 6 Label the heart. [3]



Revision and information learnt must be applied to the exam. Otherwise students will learn information but will no idea how this information actually helps them score marks in the examination.

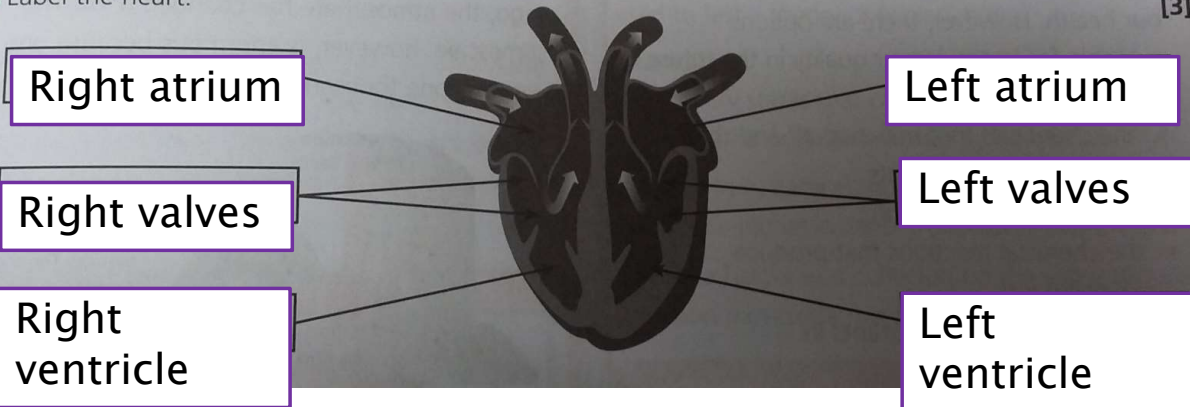
Examiners want students to answer the exact question being asked of them.

Step 5– Practice exam question in timed conditions with no notes.

Exam Practice Questions

B1 5 Explain the disadvantages of making genetic testing compulsory. [6]
The quality of written communication will be assessed in your answer to this question.

B2 6 Label the heart. [3]



The diagram shows a frontal view of a human heart. Six labels are connected to the heart by lines: 'Right atrium' (top left), 'Right valves' (middle left), 'Right ventricle' (bottom left), 'Left atrium' (top right), 'Left valves' (middle right), and 'Left ventricle' (bottom right).

Revision and information learnt must be applied to the exam. Otherwise students will learn information but will no idea how this information actually helps them score marks in the examination.

Examiners want students to answer the exact question being asked of them.

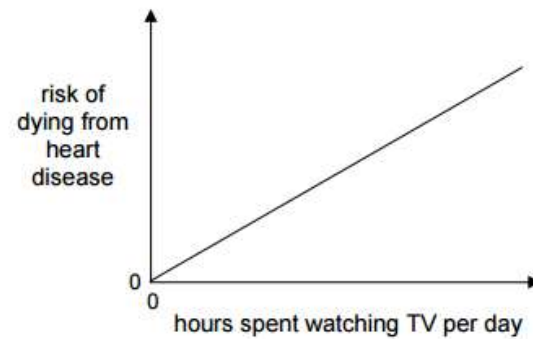
- 4 Toby sees this article in a newspaper.

Heart disease is one of the most common causes of death in the UK.

Some scientists claim that there is a correlation between the amount of time spent watching TV each day and the risk of dying from heart disease.

They concluded that watching TV increases the risk of dying from heart disease.

- (a) Toby draws a sketch graph to represent the correlation described in the article.



Discuss whether Toby's graph correctly represents the correlation described in the article.

.....

.....

.....

[2]

Question Number				Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Total Marks	Total %		Q1	Q2	Q3	Q4	Q5	Q6	Q7	Total Marks	Total %		Total Marks	Total %		
Topic				Food tests / numeracy	Microscopy, prokaryotes, cells	Amino acids, protein structure, haemoglobin	HIV	Heart, evaluate data	Aseptic technique	Enzymes / data handling	Extended answers, mRNA, translation, mutation				Photosynthesis	Respiration	Genetics/InheritanceHardy-Weinberg	SpeciationMark Release Recapture	EutrophicationNitrogen Cycle	Genetics/Inheritance	Control of Heart Rate/Natural Selection							
Total Marks Available				8	5	10	9	8	7	7	15	69			8	10	8	10	5	10	15	66			135			
Cohort Average - All Students				4.7	2.6	5.5	3.6	4.3	4.0	2.9	9.8	37.4	54.2%		3.3	5.3	6.2	7.2	2.6	4.8	7.2	36.7	55.6%		74.1	54.9%		
Cohort Average - Filtered	Hide this row before printing			4.7	2.6	5.5		4.3	4.0	2.9	9.8	33.8	49.0%		3.3	5.3	6.2	7.2	2.6	4.8	7.2	36.7	55.6%		70.5	52.3%		
Next Step																												
<div>Key: Green - Star Red - Next Step</div>																												
		Form	Class	Target	Mark	Mark	Mark	Mark	Mark	Mark	Mark	Total Marks	Total %		Mark	Mark	Mark	Mark	Mark	Mark	Mark	Total Marks	Total %		Total Marks	Total %	Grade	
			13D/Bi1	A	5	3	5	6	3	4	5	12	43	62.3%		4	8	8	7	4	7	10	48	72.7%		91	67.4%	A

2

Slow Fashion

Many clothing companies succeed by using a 'fast fashion' business model: selling seasonal, cheap, low-quality items that are often manufactured in low-cost countries such as Bangladesh. 1
 This practice is used by retailers promoting the latest designs.

As a senior buyer for a high street clothing retailer, Claudia Bryant had responsibility for sourcing clothing and negotiating contracts with suppliers from many countries. She was successful in her work by securing low-cost deals. 5

On 24 April 2013, over 1,130 people were killed when the Rana Plaza factory complex collapsed in Dhaka, Bangladesh. 2,500 more were injured. The people crushed under those eight floors were working for familiar fashion brands in unsafe conditions.

Rana Fashion

In 2013 Claudia was shocked by the Rana Plaza disaster. She believed that it was the fault of the 'fast fashion' business model – something she no longer wanted to be a part of. 10

She resigned from her job to set up her own online clothing retail business, centred on ethical objectives. The business (Rana Fashion) is a private limited company with Claudia owning 60% of the shares. The remaining shares are owned by a Bangladeshi charity, ensuring that at least 40% of the annual profits support charitable projects in Bangladesh. 15

The clothes are traditional designs that do not go out of fashion. All are made to last and fabrics are ethically sourced, eg fair-trade cotton. They are manufactured by suppliers in Bangladesh – many with personal links to the Rana Plaza disaster. Each supplier is a small independent family-run business. 20

Claudia is keen to trade ethically, in contrast with leading retailers, as shown below.

Rana Fashion's approach:	'Fast fashion' approach:
• pay promptly to help the suppliers' cash flow	• delay payments to help their own cash flow
• buy and store extra inventory – this allows better capacity utilisation for suppliers	• buy only enough to meet projected demand as old inventory goes 'out of fashion'
• have long term contracts with suppliers – allowing suppliers to plan for their future	• new contracts each season – in search of lower priced deals.

Rana Fashion garments are sold at a high price. If customers spend over £100 they can pay over 10 months without any interest. Last year 25% of sales were made this way. 25

Rana Fashion sells directly to consumers worldwide through e-commerce, removing the need for high street retailers. The UK is its biggest market. However, Claudia is pleased that sales in the USA and Europe have recently shown steady growth.

No budget is allocated to promotion. Claudia relies on media coverage to promote her brand. She has been interviewed by many newspapers, radio stations and online news providers when journalists have been reporting on ethical fashion. This has proved successful as the readers and audiences have views that are closely aligned with the business objectives.

Applying our answers

Ocado venture with M&S

Marks & Spencer (M&S) started to sell its popular food range online for the first time in September 2020, by forming a venture (also known as a joint venture) with Ocado. Ocado is a solely online supermarket that has well-established distribution networks and market-leading advanced technology.

M&S funded its part of the £1.5bn venture by selling £600m of shares to existing shareholders and by cutting shareholder dividends by 40%.

M&S stated that it had always believed M&S branded food should be available online and combining with Ocado was a 'win-win' situation that would drive long-term growth of both businesses.

Following the announcement of the venture, Ocado's share price rose by 3%.

The launch of the venture followed over a year of hard work and required senior managers from both businesses to work together to make it happen.

M Market
O Objectives
P Product
P Performance
S Stakeholders

Market

GROCERY INDUSTRY

Objectives

ORGANIC GROWTH – BEGIN SELLING ONLINE
CASE STUDY REFERENCES ‘LONG TERM
GROWTH’

Product

LUXURY GOODS (YED: ‘SUPERIOR’)
HOME DELIVERY (CONVENIENCE)
VENTURE COST £1.5BN – SIGNIFICANT RISK

Performance

M&S FOOD RANGE IS ‘POPULAR’
OCADO’S TECHNOLOGY IS ‘MARKET
LEADING’
OCADO’S SHARE PRICE ROSE BY 3%

Stakeholders

M&S SHAREHOLDERS HAD DIVIDENDS CUT BY
40%
MANAGERS FROM BOTH BUSINESSES
INVOLVED IN THE PLANNING

Ocado venture with M&S

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The launch of the venture followed over a year of hard work and required senior managers from both businesses to work together to make it happen.

SECTION C

Answer ONE question from this section.

Write your answer in the space provided.

You are advised to spend 30 minutes on this section.

EITHER

- 7** In 2015 a report by Public Health England recommended the imposition of a 20% tax on the sale of soft drinks that contain high levels of sugar.

Evaluate the likely microeconomic effects of such a tax.

(Total for Question 7 = 25 marks)

OR

- 8** 'Revenue maximisation is a more realistic business objective than profit maximisation for many businesses.'

To what extent do you agree with this statement? Refer to an industry of your choice in your answer.

(Total for Question 8 = 25 marks)

Write your name here	
Surname	Other names
Pearson Edexcel Level 3 GCE	
Centre Number	Candidate Number
Economics A Advanced Paper 1: Markets and Business Behaviour	
Tuesday 6 June 2017 – Afternoon	Paper Reference
Time: 2 hours	9EC0/01
You do not need any other materials.	
Total Marks	

Instructions

- Use **black** ink or ball-point pen.
- Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- There are three sections in this question paper. Answer **all** questions from Section A and Section B. Answer **one** question from Section C.
- Answer the questions in the spaces provided
– there may be more space than you need.

Information

- The total mark for this paper is 100.
- The marks for **each** question are shown in brackets
– use this as a guide as to how much time to spend on each question.
- Calculators may be used.

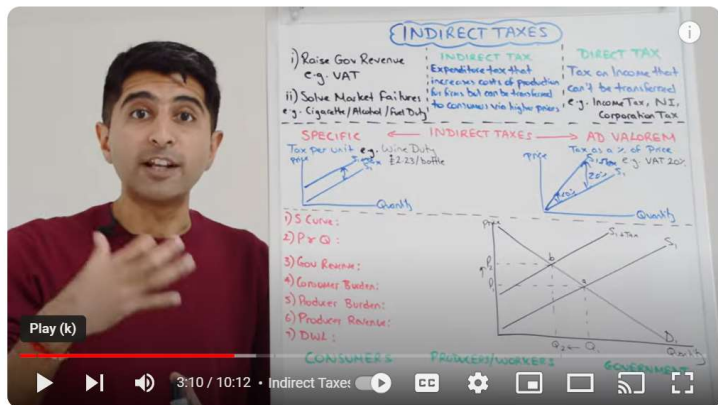
Advice

- Read each question carefully before you start to answer it.
- Check your answers if you have time at the end.

1.2.9

Indirect taxes and
subsidies

- a) Supply and demand analysis, elasticities, and:
- o the impact of indirect taxes on consumers, producers and government
 - o the incidence of indirect taxes on consumers and producers
 - o the impact of subsidies on consumers, producers and government
 - o the area that represents the producer subsidy and consumer subsidy



Y1 16) Indirect Tax - Full Market Impact



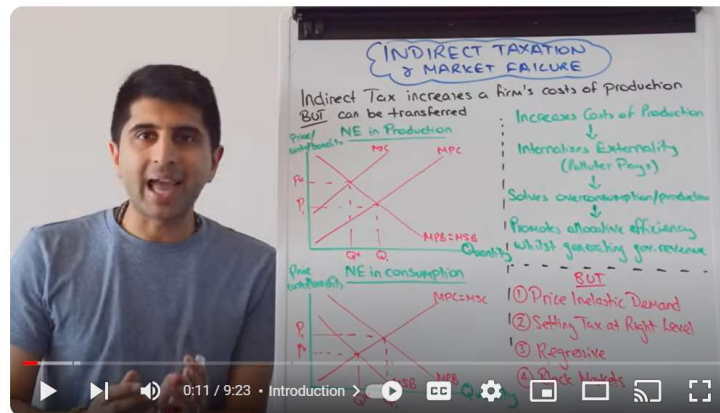
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Y1 29) Indirect Tax and Market Failure



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Indirect Taxes

Level: GCSE, AS, A-Level, IB, BTEC National, BTEC Tech Award

Board: AQA, Edexcel, OCR, IB, Eduqas, WJEC

Last updated 22 Oct 2019

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In this short revision video we cover the topic of indirect taxes.

The UK government raises over £785 billion a year in taxes – equivalent to around 37% of GDP. The majority of tax revenue comes from three main sources: income tax, National Insurance contributions (NICs) and value added tax (VAT). Overall, around 10 per cent of total tax revenues come from indirect taxes and this is worth looking at in detail when preparing answers to the exam questions.

Knowledge, application and analysis		
Level	Mark	Descriptor
	0	A completely inaccurate response.
Level 1	1–4	Displays isolated or imprecise knowledge and understanding of terms, concepts, theories and models. Use of generic or irrelevant information or examples. Descriptive approach which has no chains of reasoning or links between causes and consequences.
Level 2	5–8	Displays elements of knowledge and understanding of economic principles, concepts and theories. Applies economic ideas and relates them to economic problems in context, although does not focus on the broad elements of the question. A narrow response or superficial, two stage chains of reasoning only.
Level 3	9–12	Demonstrates accurate knowledge and understanding of the concepts, principles and models. Ability to apply economic concepts and relate them directly to the broad elements of the question with evidence integrated into the answer. Analysis is clear and coherent, although it may lack balance. Chains of reasoning are developed but the answer may lack balance.
Level 4	13–16	Demonstrates precise knowledge and understanding of the concepts, principles and models. Ability to link knowledge and understanding in context using appropriate examples. Analysis is relevant and focused with evidence fully and reliably integrated. Economic ideas are carefully selected and applied appropriately to economic issues and problems. The answer demonstrates logical and coherent chains of reasoning.

Evaluation		
Level	Mark	Descriptor
	0	No evaluative comments.
Level 1	1–3	Identification of generic evaluative comments without supporting evidence/reference to context. No evidence of a logical chain of reasoning.
Level 2	4–6	Evidence of evaluation of alternative approaches which is unbalanced leading to unsubstantiated judgements. Evaluative comments with supporting evidence/reference to context and a partially-developed chain of reasoning.
Level 3	7–9	Evaluative comments supported by relevant reasoning and appropriate reference to context. Evaluation recognises different viewpoints and is critical of the evidence provided and/or the assumptions underlying the analysis enabling informed judgements to be made.

7	Knowledge 4, Application 4, Analysis 8 <ul style="list-style-type: none"> Definition of a tax/ identification of an ad valorem tax. Economic effects include: <ul style="list-style-type: none"> Increase in price and a reduction in demand for soft drinks which contain sugar / increase in demand for healthy drinks. Reduction of consumer surplus and producer surplus/ profits (may be shown on diagram) Tax acts to increase costs and may reduce profits. Increased investment in healthier drinks. Increase in tax revenue for government and impact on healthcare services and other services, for example dental care. Improvements in quality of healthcare among population – fall in obesity, diabetes and heart disease. Reduced pressure on healthcare services. A diagram of an indirect tax may be awarded, depicting an increase in price, a decrease in quantity and the area of tax collected. A relevant externality diagram depicting a reduction in welfare loss. A relevant cost and revenue diagram depicting the impact of an expenditure tax on firms. Increase in life expectancy/ the quality of life/ productivity in the workforce. Impact on employment in the soft drinks industry/impact on employment in substitute product markets. Impact on income distribution / regressive tax 	
	Evaluation 9 <ul style="list-style-type: none"> Significance of price elasticity of demand in determining impact on price, quantity, employment and tax revenue. Consideration of the impact on substitutes/ application of cross elasticity of demand e.g. switch to healthier substitutes. Consideration of the incidence of tax on consumers and producers. Difficulty in imposing the tax – different soft drinks products with different sugar content. Extent of hidden/informal market. Time factor - long term implications for government funding of pensions and healthcare. Consideration of price elasticity of supply e.g. the ability of producers to switch to healthier drinks. 	(25)

LCCOR

Indicate which question you are answering by marking a cross in the box ☒. If you change your mind, put a line through the box ☒ and then indicate your new question with a cross ☒.

Chosen question number: **Question 7** ☒

Question 8 ☒

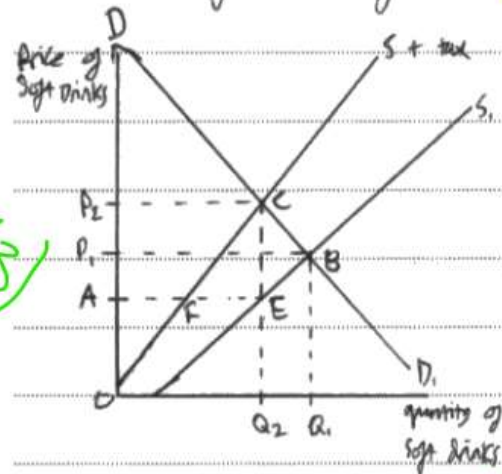
Write your answer here:

"concepts, principles models"

regressive
collabor
foreign
blank

Level 4 KAA
"Precision"
"Integrated"

An indirect tax is a tax on expenditure. The fact that the proposed tax is 20% on the sale of soft drinks shows that it is an ad valorem tax - a tax levied as a % of the value of the good. (Level 1) "The microeconomic effects precision"



(Level 3)

The imposition of an ad valorem tax per unit of soft drink of P2A will lead to an upward shift of the supply curve from S1 to S1 + tax. (1) Integrated The price paid by consumers will increase from P1 to P2 (2) and the quantity of soft drinks consumed will fall from Q1 to Q2 (3) Consumer Surplus, the difference between what consumers are willing to pay and what they actually pay (4) will fall from the area DP1B to DP2C (5) Producers will not receive a price

Q1 to Q2 (3) Consumer Surplus, the difference between what consumers are willing to pay and what they actually pay (4) will fall from the area DP1B to DP2C (5) Producers will not receive a price

larger proportion, causing their revenue to fall. Therefore if demand is price elastic, consumers won't be badly affected by the tax. To consolidate the level 3 evaluation; Inelastic demand curve showing "incidence" For the government, they will receive tax revenue as shown by the diagram. This tax revenue can be ringfenced and only used for socially beneficial products, which would increase

society's welfare. As well as this, the government will benefit from not having to spend as much on healthcare in the future. This is because soft drinks cause many illnesses so a reduction in the quantity consumed of them will reduce the amount of cases of illnesses like diabetes, which decreases the amount the government will have to spend on healthcare. Shows we are about to evaluate However, the imposition of an indirect tax could have unintended

Please check the examination details below before entering your candidate information

Candidate surname	Other names
Pearson Edexcel	Centre Number
Level 3 GCE	Candidate Number
Monday 18 May 2020	
Morning (Time: 2 hours)	Paper Reference 9EC0/01
Economics A	
Advanced	
Paper 1: Markets and Business Behaviour	
You do not need any other materials.	Total Marks

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in your answers.

- 1 Fuel duty is an excise tax imposed on the sale of petrol, included in the price paid by consumers, set at 58 pence per litre.

(Source: <https://www.gov.uk/tax-on-shopping/fuel-duty>)

- (a) Draw a supply and demand diagram to show the incidence of a specific petrol tax on consumers and producers.

(4)



- (b) The indirect tax on fuel is increased in a market in which the price elasticity of demand is -0.1 . Which **one** of the following is the most likely effect on consumer and producer surplus?

(1)

- ☐ A Consumer surplus and producer surplus both decrease
- ☐ B Consumer surplus and producer surplus both increase
- ☐ C Consumer surplus decreases and producer surplus increases
- ☐ D Consumer surplus increases and producer surplus decreases

(Total for Question 1 = 5 marks)

1 0 1

Explain five properties that make water important for organisms.

[5 marks]

- ° It has a high latent heat of vaporisation. This means a large amount of energy is required to evaporate water. Water can be used for sweating as a homeostatic control of body temperature. When water evaporates, it uses heat energy and cools the surface of the skin.
- ° Water has a high specific heat capacity. A large amount of energy is needed to change the temperature of water. This means it resists / acts as a buffer against changes in temperature which is useful for maintaining stable aquatic environments.
- ° Water is polar; has hydrogen bonds between molecules. This causes cohesion ^{between water} molecules so water can move as a continuous column during transpiration in plants.
- ° Water is a universal solvent which dissolves a large range of substances; water acts as a suitable transport medium e.g. in blood and tissue fluid. Substances dissolve in water and ~~water acts as a~~ can then be transported around the body.
- ° Water has surface tension due to hydrogen bonding so it resists external forces. This means small insects such as pond skaters can walk on and live on the surface of water.

7402/2, summer 2019

06.5

A population of fruit flies contained 64% grey-bodied flies. Use the Hardy-Weinberg equation to calculate the percentage of flies heterozygous for gene G.

[2 marks]

$$p + q = 1$$

$$p^2 + 2pq + q^2 = 1$$

$$p^2 + 2pq = 0.64$$

$$q^2 = 0.36$$

$$q = 0.6$$

$$p = 0.4$$

$$2pq = 0.48$$

Answer = 48 %

The student correctly identified that the value of 64% relates to $(p^2 + 2pq)$ in the Hardy-Weinberg equation. The student then converted this percentage to a frequency to find the value of q , and then of p . As a result, the student correctly found the value of $2pq$ from the Hardy-Weinberg formula and converted this frequency back to a percentage.

Student A

[5 marks]

before eq: $2A + B \rightleftharpoons 3C + D$
 $0.0095 \quad 0.0039 \quad 0.028$
 at eq: 0.0039

$40 = 0.0039 \times 0.04$
 $0.04 \times 0.16 = 0.0064 \text{ mol}$

$0.0095 - 2[0.0039] = 0.0017$

$3(0.028) - 2(0.0039)$

Amount of B 0.0017 mol
 Amount of C 0.0762 mol
 Amount of D 0.0017 mol

$K_c = \frac{[C]^3 [D]}{[A]^2 [B]}$

Units mol dm^{-3}

400
 Conc of $A = 1.05 \times 0.5$
 $C = 0.525 \text{ mol dm}^{-3}$
 $B = 0.21 \times 0.5 = 0.105 \text{ mol dm}^{-3}$
 $D = 0.076 \times 0.5 = 0.038$

$116 = \frac{[0.525]^3 [0.038]}{[A]^2 [0.105]}$
 $[A]^2 = 4.514547$
 $A = \sqrt{4.514547}$
 $A = 0.02124$
 $= 0.02$
 Concentration of A 0.02 mol dm^{-3}

Commentary

This answer has only scored the first mark for 0.0064 mol in the first 5 mark section.

In the second section the expression is correct but the units are wrong. (If the expression used () brackets this would have been penalised.)

In the third section the student has incorrectly multiplied by the volume so loses M2.

The M1 is scored since the student uses the incorrect figures that are calculated, substitutes them into the expression and rearranges correctly. (M1 is rearrangement) as the value of A^2 is correct from their figures. The answer should be to the appropriate number of significant figures and in this question that is 3 sig figs as per data given. The student has only shown 1 sig fig.

1+1+1 = 3 marks

I am comfortable when I have a case study

Use the exam question as a starting point

Use resources* to revisit the content

I know what I need to know from the specification

I know how to structure the questions and what assessment criteria I need to show and I have exemplars/guides

I know about how else this might be assessed

A successful student will:

Use 2 hours per
night to study



Exercise regularly

Have/maintain
outside interests

Apply strategies which suit you