Course Content, Revision, Revision Guides: How to do it effectively

AQA Trilogy Combined Science

Know Your Course Content

- You are following the AQA Trilogy Science qualification, have a look at the course specification to make sure you are happy you have covered all of the content. Identify areas of weakness to address.

- Link to access course specification: https://filestore.aqa.org.uk/resources/science/specifications/AQA-8464-SP-2016.PDF

- **Combined Science – Trilogy:** All examinations are 1hr 15 minutes
- 8464/B/1F&H **Paper 1: Biology** 1h 15m: 13th May – PM Exam
- 8464/B/2F&H **Paper 2: Biology** 1h 15m: 9th June – PM Exam
- 8464/C/1F&H **Paper 1: Chemistry** 1h 15m: 19th May – AM Exam
- 8464/C/2F&H **Paper 2: Chemistry** 1h 15m: 13th June – AM Exam
- 8464/P/1F&H **Paper 1: Physics** 1h 15m: 22nd May – AM Exam
- 8464/P/2F&H **Paper 2: Physics** 1h 15m: 16th June – AM Exam

Course Content: Biology

Biology Paper 1

Cell Biology

Cell Structure (the structure and function of a typical plant and animal cell, prokaryotic and eukaryotic cells, bacterial cell structure, especially location of genetic information)

Investigating Cells (size of cells (cm, mm, µm, nm), using a microscope, calculating magnification)

Cell Division (chromosomes, mitosis and cell cycle, stem cells and uses)

Transport in and out of Cells (diffusion, factors affecting diffusion, osmosis, active transport and comparing the processes)

Organisation

Levels of Organisation (specialised cells, tissues, organs, organ systems, enzymes, enzymes in digestion, blood, blood vessels, heart, gaseous exchange)

Transport in Plants (plant tissues, water transport, translocation)

Infection and Response

Non-Communicable Diseases (health & disease, risk factors, diseases of the heart, cancer)

Pathogens and Disease (pathogens and disease, risk factors, disease of the heart, cancer)

Human Defences against Disease (preventing entry of pathogens, the immune system, boosting immunity (vaccinations and antibodies)

Treating Disease (Antibiotics, developing new drugs)

Bioenergetics

Photosynthesis (photosynthesis word and symbol equation, factors affecting photosynthesis, converting glucose, how reactants get into plant)

Respiration and Exercise (the importance of respiration, aerobic respiration, anaerobic respiration, exercise and respiration, metabolism)

Biology Paper 2

Homeostasis and Response

Homeostasis and The Nervous System (the importance of homeostasis, control systems, the nervous system)

Hormones and Homeostasis (the endocrine system, control of blood glucose)

Hormones and Reproduction (the sex hormones, control of menstrual cycle, reducing fertility)

Inheritance, Variation & Evolution

Sexual and asexual Reproduction (asexual reproduction, sexual reproduction and meiosis, the genome, DNA)

Patterns of Inheritance (genetic inheritance, genetic crosses, inherited disorders, sex determination)

Variation and Evolution (variation, evolution, evidence for evolution)

Manipulating Genes (selective breeding, genetic engineering)

Classification (principles of classification, extinction, evolutionary trees)

Ecology

Ecosystems (relationships between organisms, adaptations, studying ecosystems)

Cycles and Feeding Relationships (recycling materials, feeding relationships)

Disrupting Ecosystems (biodiversity, pollution, overexploitation, conserving biodiversity)

Biology Required Practical Activities

Paper 1:

Microscopy
Enzymes
Food Tests
Photosynthesis
Osmosis

Paper 2:

Reaction Times
Ecology Field Investigations

Prioritise Areas You Need to Work On:

(General areas based on **Biology** November mock results for whole cohort)

Foundation Paper

Math Skills

- Calculating surface area
- Resolution

Ecology

- Required Practical Activity
- Biotic / Abiotic factors (ecology terminology in general)

Structure of the heart

Variables

Higher Paper

Math Skills

- Calculating populations
- Resolution

Ecology

- Required Practical Activity
- Biotic / Abiotic factors (ecology terminology in general)
- Biodiversity

Hormones & blood sugar

Variables

Course Content: Chemistry

Chemistry Paper 1

Atomic Structure and The Periodic Table

Atoms, Elements, Compounds and Mixtures (atoms, elements, compounds, separating mixtures)

Atoms and the Periodic Table (scientific models of the atom, subatomic particles, isotopes and ions, electron configuration)

The Periodic Table (development of the periodic table, group 0, group 1, group 7)

Bonding, Structure and Properties of Matter

States of Matter (3 states of matter, changing states, identifying the state of a substance, state symbols)

Ionic Compounds (chemical bonds, ionic bonding, properties of ionic compounds)

Covalent Compounds (covalent bonding, small molecules, giant covalent structures)

Metals and Special Metals (graphene, fullerenes, polymers, metallic bonding, properties of metals, alloys)

Quantitative Chemistry

Conservation of Mass (the conservation of mass, relative formula mass, apparent changes in mass, concentration)

Chemical Changes

Reactivity of Metals (oxidation and reduction, reactivity series, displacement reactions, extraction of metals)

The pH Scale and Salts (the pH scale, neutralisation of acids, soluble salts from insoluble bases)

Electrolysis (electrolysis, extraction of metals, electrolysis of aqueous solutions)

Energy Changes

Exothermic and Endothermic Reactions (energy transfers, energy level diagrams)

Chemistry Paper 2

Rate and Extent

Rate of Reaction (calculating the rate of a reaction, collision theory, plotting reaction rates)

Reversible Reactions (catalysts, reversible reactions, closed systems)

Organic Chemistry

Alkanes (crude oil and hydrocarbons, fractional distillation, alkanes, burning fuels)

Cracking Hydrocarbons (cracking hydrocarbons, bromine water)

Structure & Formulae of Alkenes, Reactions of Alkenes

Chemical Analysis

Purity, formulations and chromatography.
Identification of common gasses.

Chemistry of the Atmosphere:

The Earth's Atmosphere (the earth's early atmosphere, the atmosphere today, increase in oxygen levels, decrease in carbon dioxide levels)

Greenhouse Gasses (greenhouse gasses, the impact of human activities, global climate change, carbon footprints)

Using Resources

Earth's Resources (sustainable development, drinking water, waste water treatment)

Using Resources (life cycle assessment (LCA), reducing the use of resources)

Corrosion and its prevention, alloys as useful metals, ceramics, polymers and composites

Chemistry Required Practical Activities

Paper 1:

Making Salts

Temperature Changes

Paper 2:

Rates of Reactions

Chromatography

Water Purification

Electrolysis

Course Content: Physics

Physics Paper 1

Energy

Energy Stores and Transfers (energy stores and systems, calculating energy changes, specific heat capacity and internal energy)

Energy Transfers and Resources (energy transfers, national and global energy resources)

Electricity

Electricity (standard circuit symbols, electric charge and current, resistance and potential difference)

Circuits and Resistance (resistors and other components)

Circuits and Power (series and parallel circuits, power in circuits)

Domestic use of Electricity (direct and alternating potential difference, mains electricity, dangers of mains electricity, power and efficiency)

Electrical Energy in Devices (energy transfers in appliances, the national grid)

Magnetism and Electromagnetism

Magnetism and Electromagnetism (magnetic poles and fields, plotting fields, electromagnetism and solenoids, electromagnetic devices)

Particle Model of Matter

Particle Model of Matter (states of matter, density, change of state and specific latent heat, particle motion and pressure in gasses)

Atomic Structure

Atoms and Isotopes (the structure of the atom, isotopes, the plum pudding model, Rutherford, Geiger and Marsden, further developments)

Nuclear Radiation (nuclear decay and radiation, alpha, beta and gamma decay, radioactive contamination)

Half Life (half-life, nuclear equations)

Physics Paper 2

Forces

Forces - Basics (scalar and vector quantities, contact, non-contact forces, gravity, resultant forces,)

Forces in Action (work done and energy transfer, forces and elasticity)

Forces and Motion (distance and displacement, speed, velocity, Newton's first law, distance-time graphs)

Forces and Acceleration (acceleration, velocity-time graphs, Newton's second law)

Terminal Velocity, Stopping and Breaking (terminal velocity, Newton's third law, stopping distance, reaction time, factors affecting breaking distance)

Waves

Waves and Wave Properties (transverse and longitudinal waves, properties of waves, wave speed)

Electromagnetic Waves (electromagnetic waves, refraction, reflection, ray diagrams)

The Electromagnetic Spectrum (uses and applications of electromagnetic (EM) waves, hazards of EM waves)

Loudspeakers, Induced Potential, Transformers and the National Grid

Physics Required Practical Activities

Paper 1:

Specific Heat Capacity

Resistance

I-V Characteristics

Density

Paper 2:

Force and Extension

Acceleration

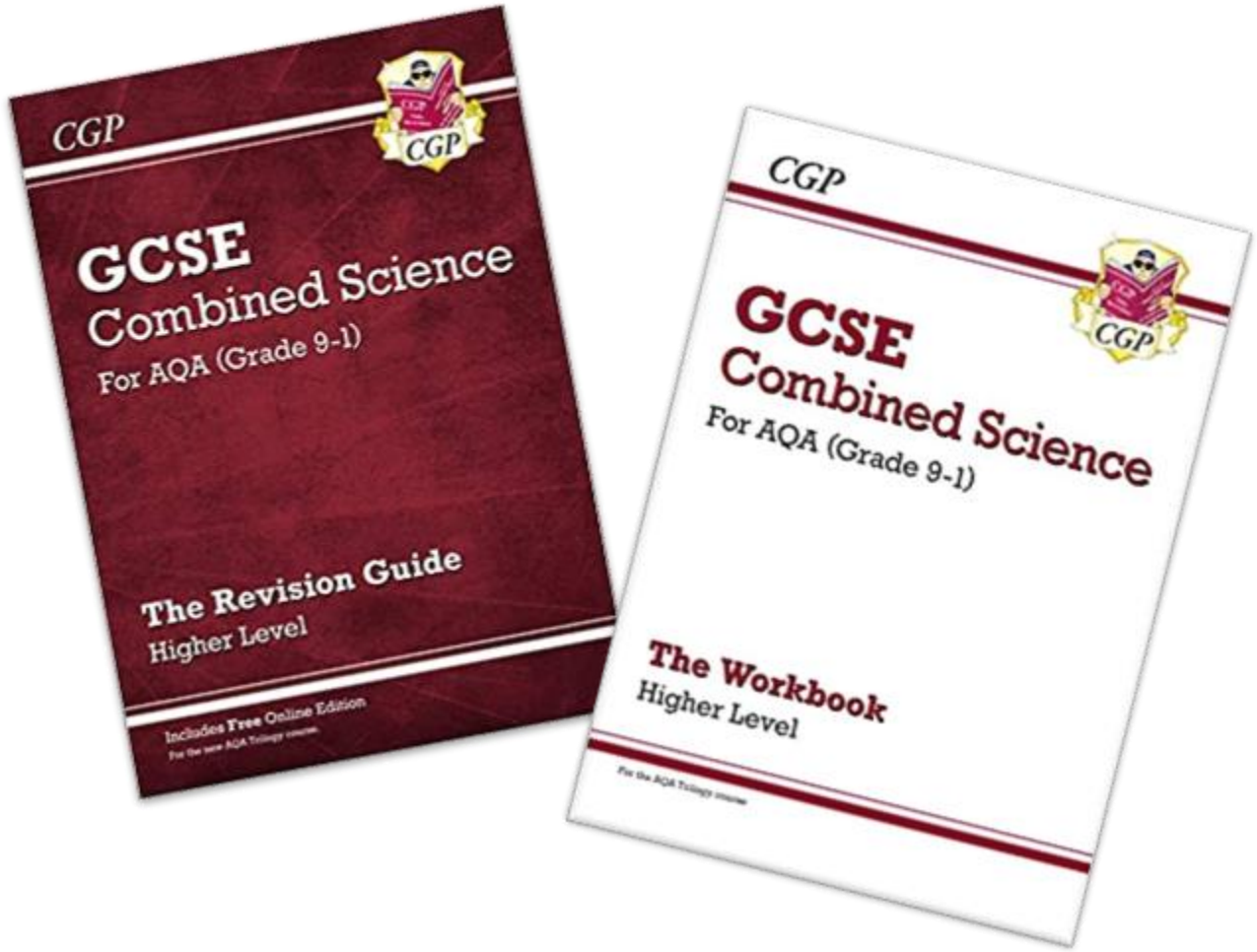
Waves

Radiation and Absorption

Revision guides and Workbooks

Foundation: GCSE Combined Science AQA Revision Guide - Foundation includes Online Edition, Videos & Quizzes: superb for the 2023 and 2024 exams (CGP AQA GCSE Combined Science) : CGP Books, CGP Books: Amazon.co.uk: Books

Higher: GCSE Combined Science AQA Revision Guide - Higher includes Online Edition, Videos & Quizzes: perfect for the 2023 and 2024 exams (CGP AQA GCSE Combined Science): Amazon.co.uk: CGP Books, CGP Books: 9781782945598: Books



If you are just reading the revision guides you are not revising….

Effective use of revision guides:

MEDIUM IMPACT

- Mind maps
- Key-words – Post It
- Highlighting

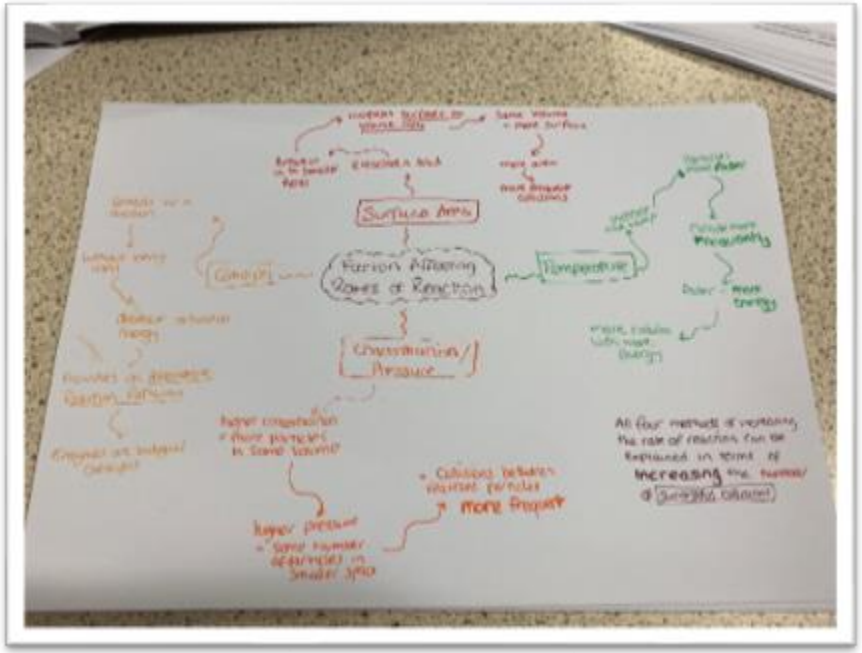
HIGH IMPACT

- Flash cards
- Family and friends test

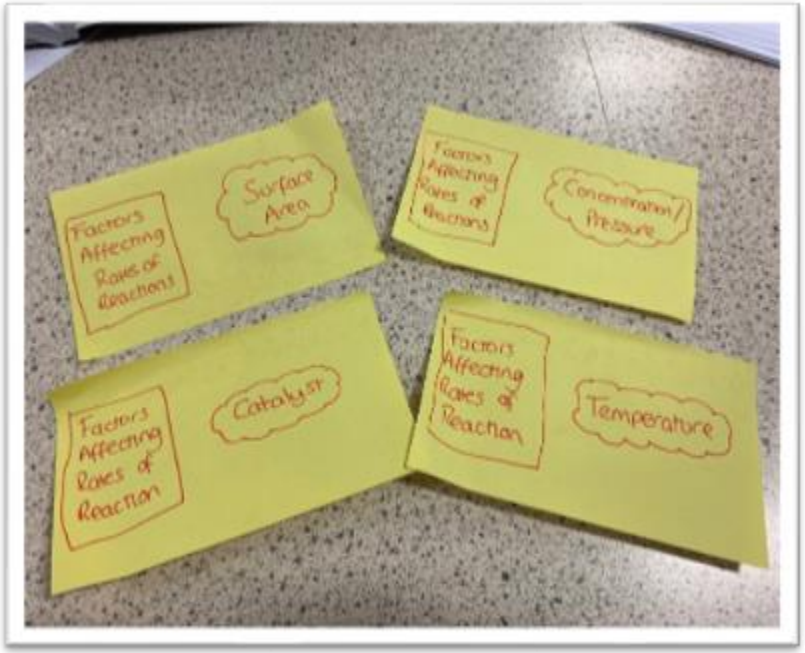
GREATEST IMPACT

- Applying the knowledge to exam questions and marking them

Medium Impact

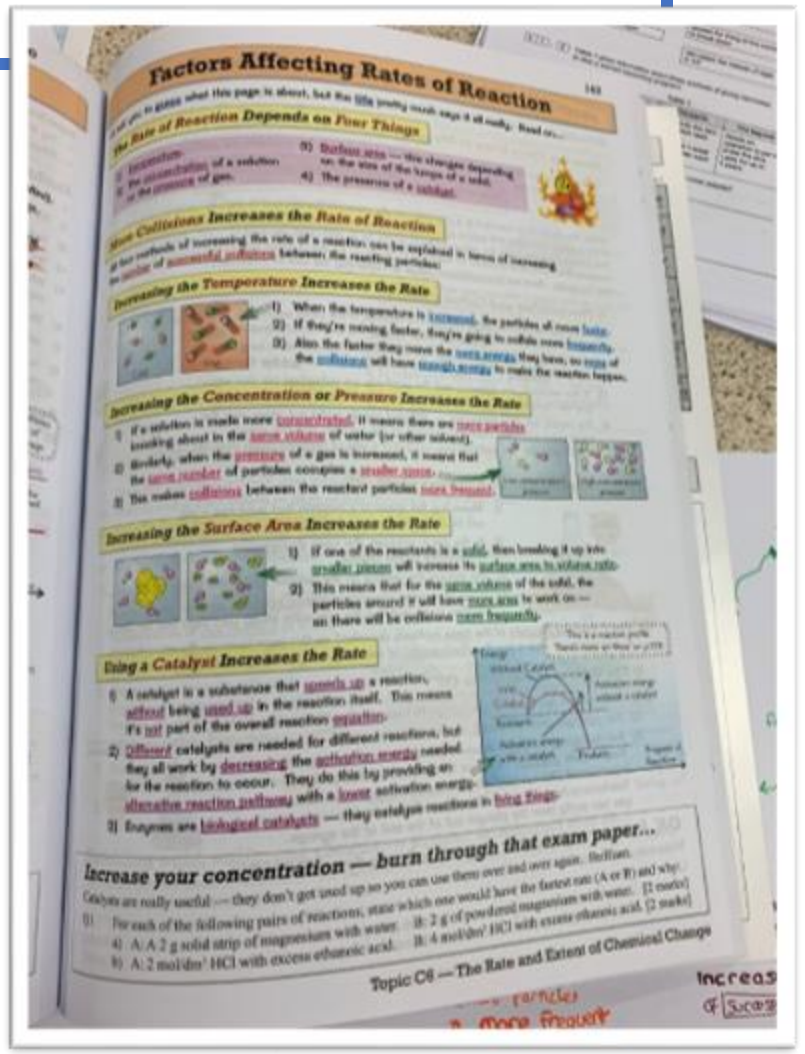


Mind Maps



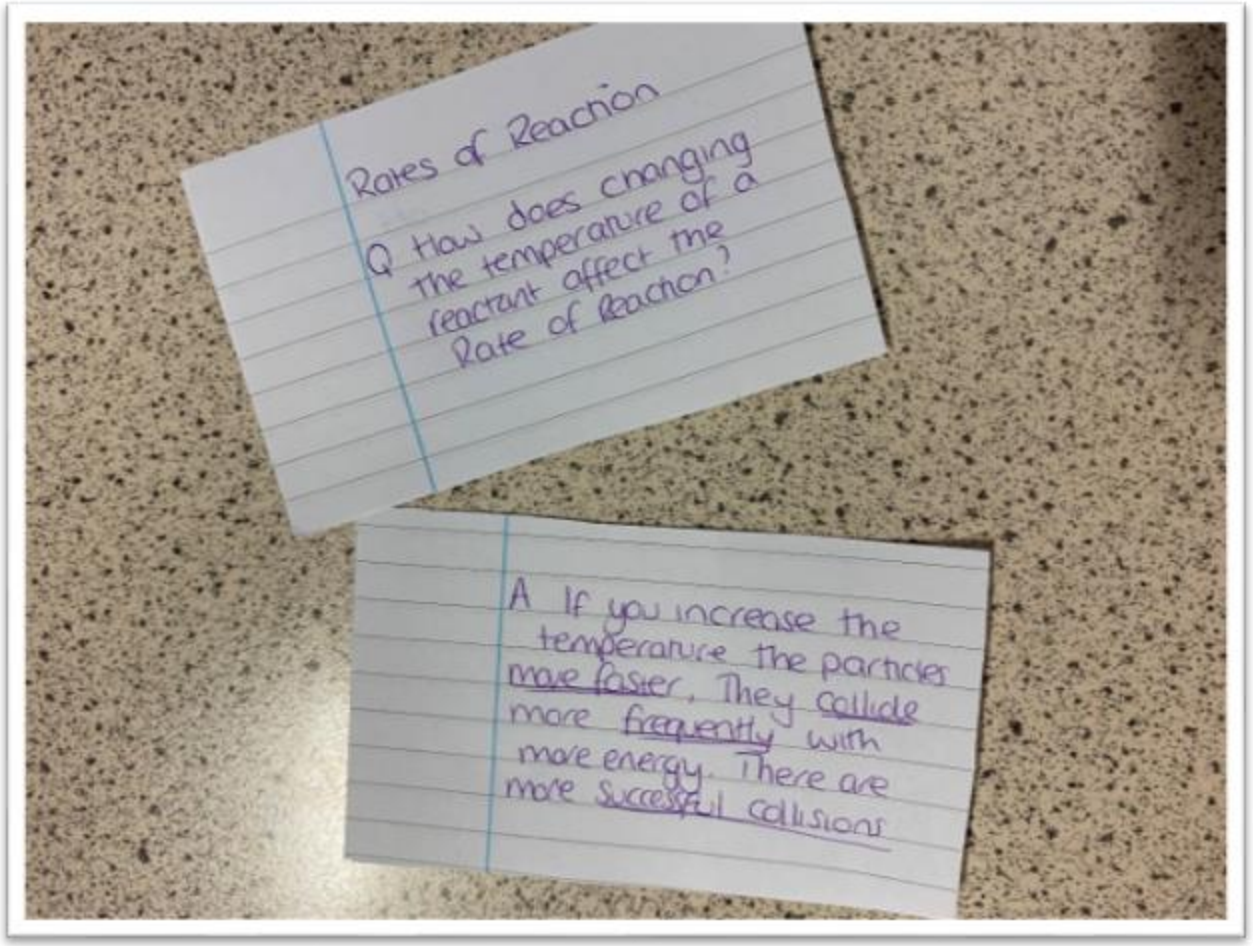
Post – It Notes

Highlighting



High Impact

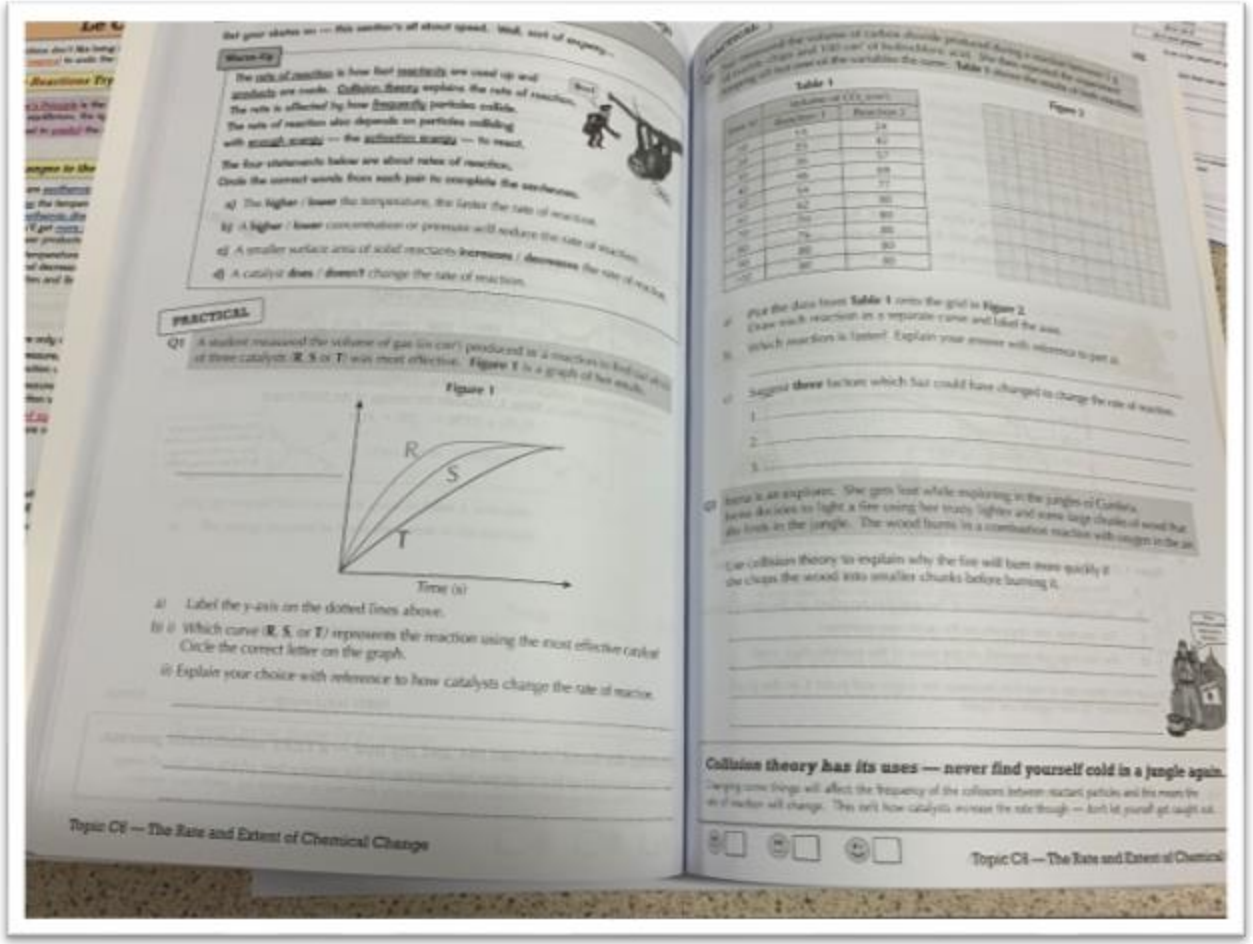
Flash cards



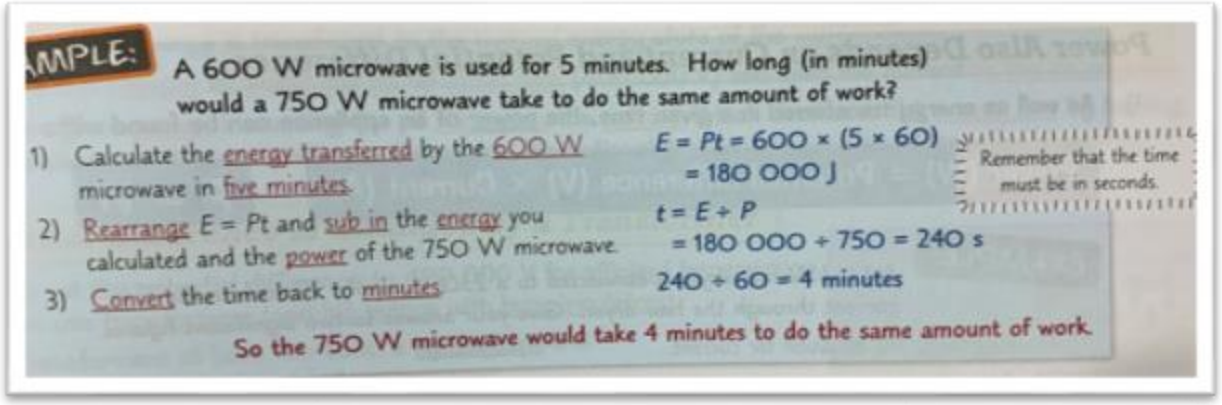
Family and Friends testing

Greatest Impact

Practice Exam Questions



Extra Parts of the Revision Guide



AMPLE:

A 600 W microwave is used for 5 minutes. How long (in minutes) would a 750 W microwave take to do the same amount of work?

1) Calculate the energy transferred by the 600 W microwave in five minutes.
2) Rearrange $E = Pt$ and sub in the energy you calculated and the power of the 750 W microwave.
3) Convert the time back to minutes.

$E = Pt = 600 \times (5 \times 60)$
$= 180\,000$ J

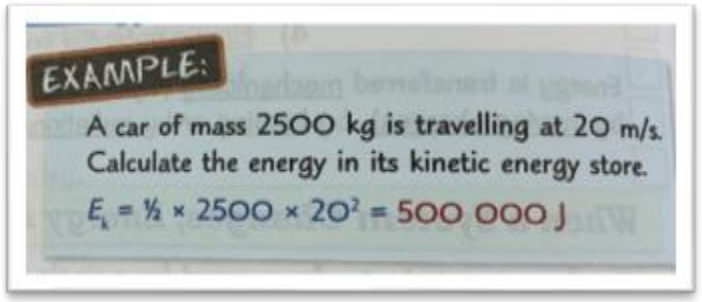
$t = E \div P$
$= 180\,000 \div 750 = 240$ s

$240 \div 60 = 4$ minutes

Remember that the time must be in seconds.

So the 750 W microwave would take 4 minutes to do the same amount of work.

Worked Examples

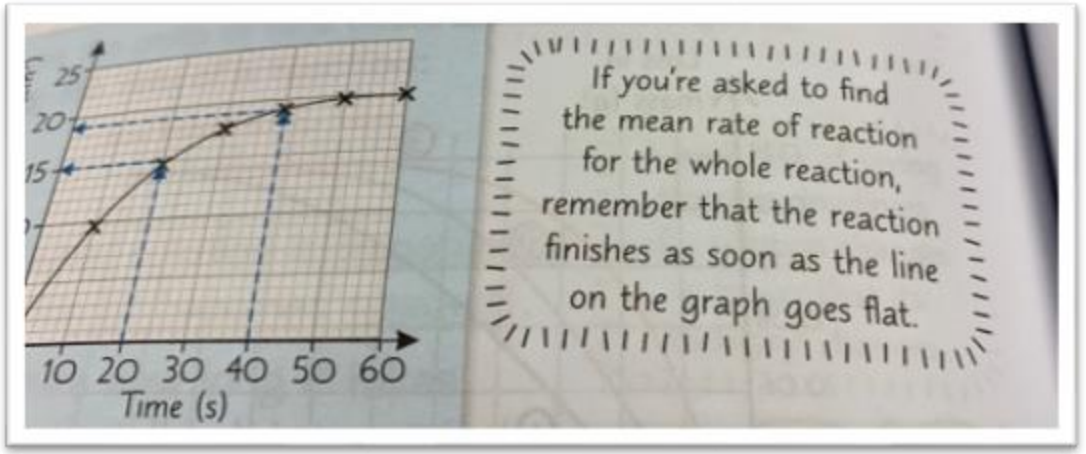


EXAMPLE:

A car of mass 2500 kg is travelling at 20 m/s. Calculate the energy in its kinetic energy store.

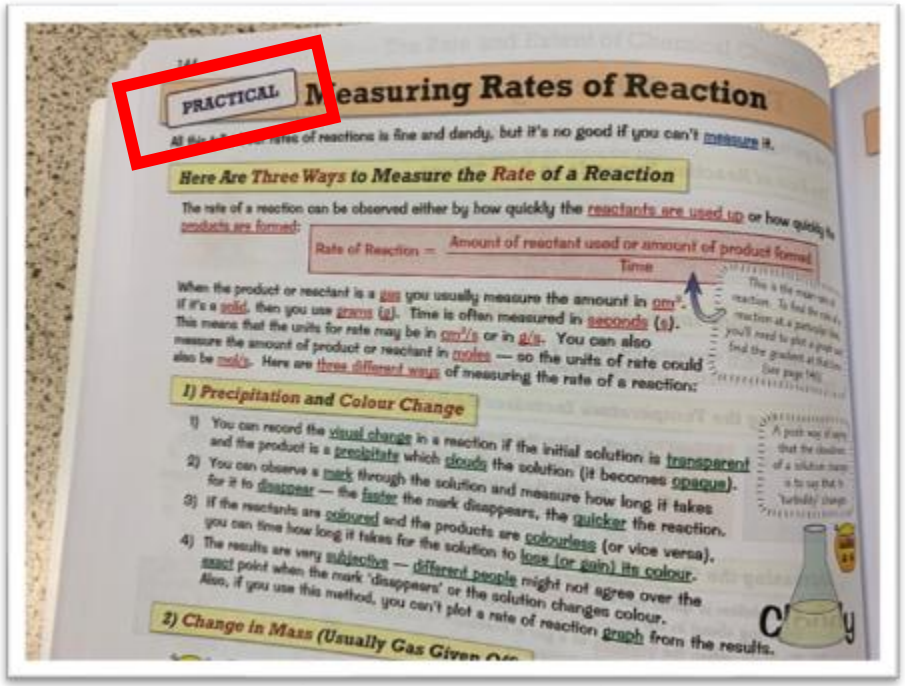
$E_k = \frac{1}{2} \times 2500 \times 20^2 = 500\,000$ J

Exam Tips



If you're asked to find the mean rate of reaction for the whole reaction, remember that the reaction finishes as soon as the line on the graph goes flat.

Practicals



PRACTICAL

Measuring Rates of Reaction

...rates of reactions is fine and dandy, but it's no good if you can't measure it.

Here Are Three Ways to Measure the Rate of a Reaction

The rate of a reaction can be observed either by how quickly the reactants are used up or how quickly the products are formed:

$$\text{Rate of Reaction} = \frac{\text{Amount of reactant used or amount of product formed}}{\text{Time}}$$

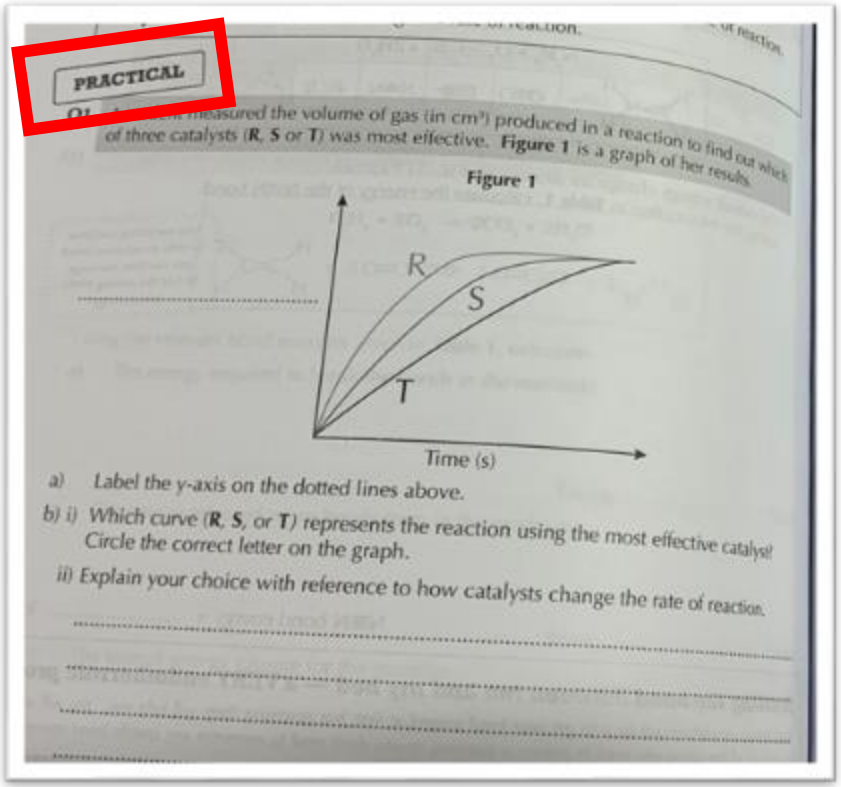
When the product or reactant is a gas you usually measure the amount in cm^3. If it's a solid, then you use grams (g). Time is often measured in seconds (s). This means that the units for rate may be in cm^3/s or in g/s. You can also measure the amount of product or reactant in moles — so the units of rate could also be mol/s. Here are three different ways of measuring the rate of a reaction:

1) Precipitation and Colour Change

1) You can record the visual change in a reaction if the initial solution is transparent and the product is a precipitate which clouds the solution (it becomes opaque).
2) You can observe a mark through the solution and measure how long it takes for it to disappear — the faster the mark disappears, the quicker the reaction.
3) If the reactants are coloured and the products are colourless (or vice versa), you can time how long it takes for the solution to lose (or gain) its colour.
4) The results are very subjective — different people might not agree over the exact point when the mark 'disappears' or the solution changes colour. Also, if you use this method, you can't plot a rate of reaction graph from the results.

2) Change in Mass (Usually Gas Given Off

Revision Material



PRACTICAL

...measured the volume of gas (in cm^3) produced in a reaction to find out which of three catalysts (**R**, **S** or **T**) was most effective. **Figure 1** is a graph of her results.

Figure 1

a) Label the y-axis on the dotted lines above.

b) i) Which curve (**R**, **S**, or **T**) represents the reaction using the most effective catalyst? Circle the correct letter on the graph.

ii) Explain your choice with reference to how catalysts change the rate of reaction.

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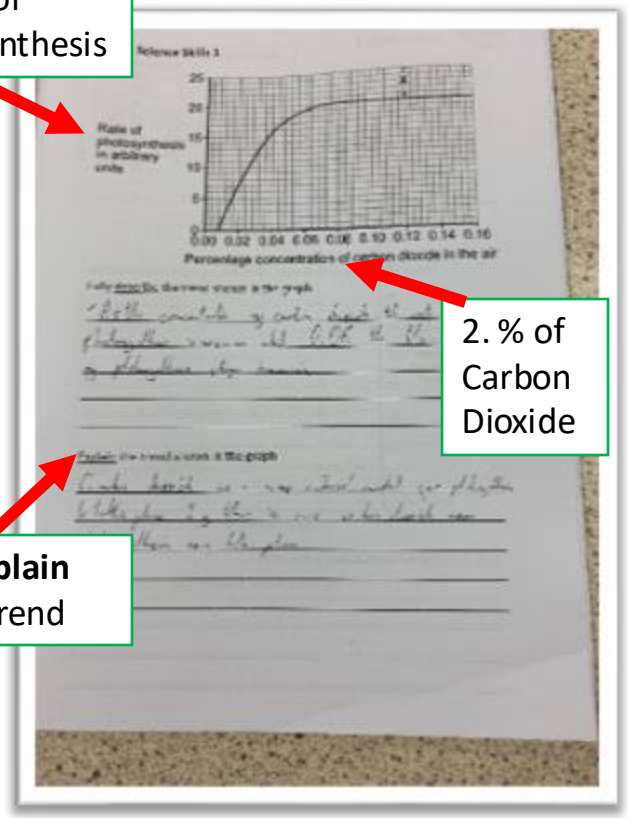
Practice Questions

Stuck on an Exam Question???

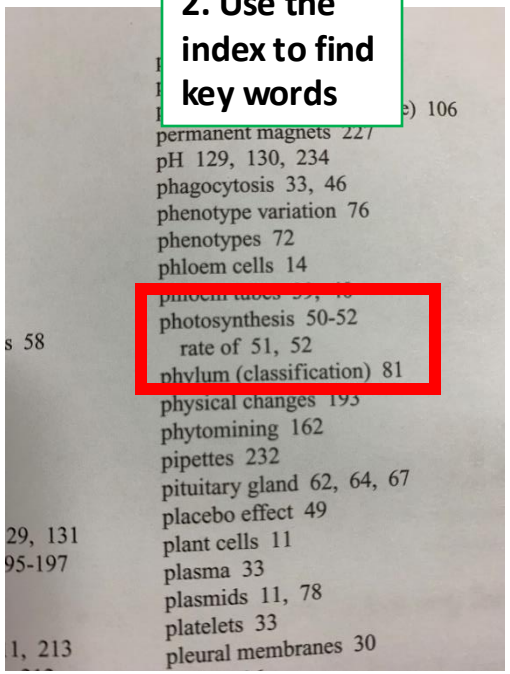
3. Rate of Photosynthesis

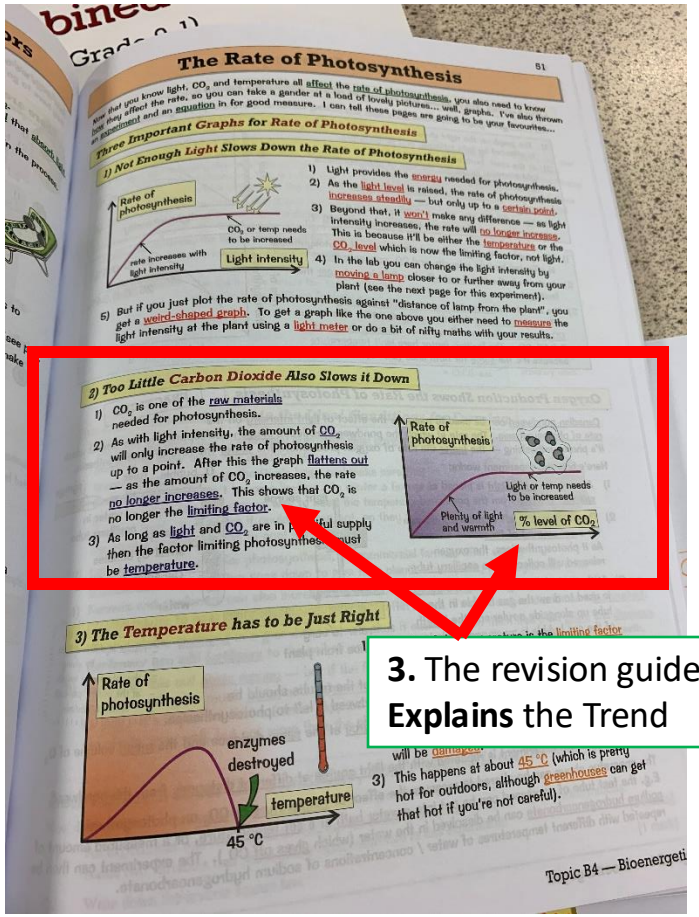


2. % of Carbon Dioxide

1. Explain the Trend

2. Use the index to find key words





3. The revision guide **Explains** the Trend

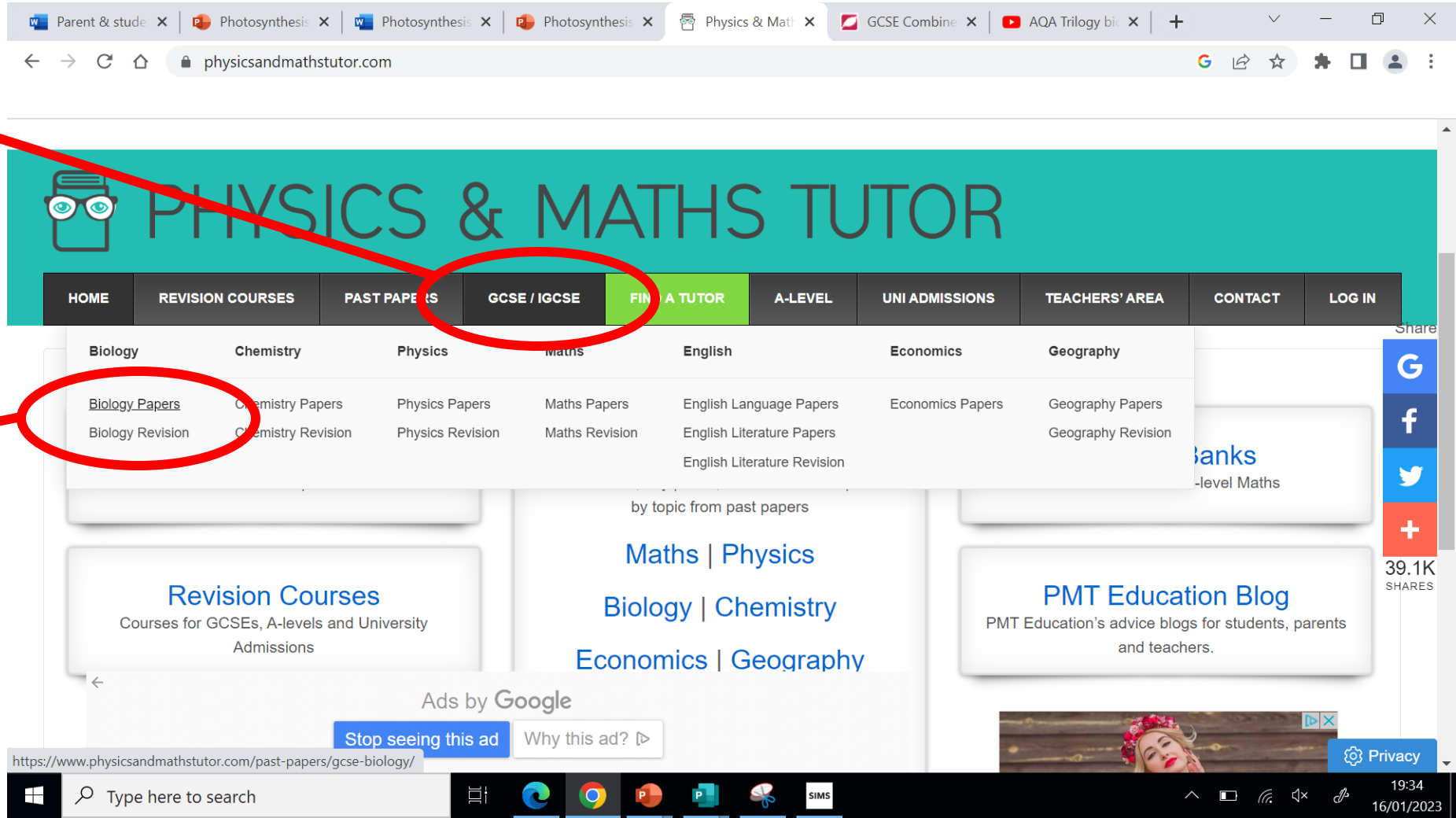
Physics & Maths Tutor:

https://www.physicsandmathstutor.com/biology-revision/gcse-aqa/cell-biology/#

Hover over GCSE / IGCSE this will open drop down menu

Select either revision or past papers

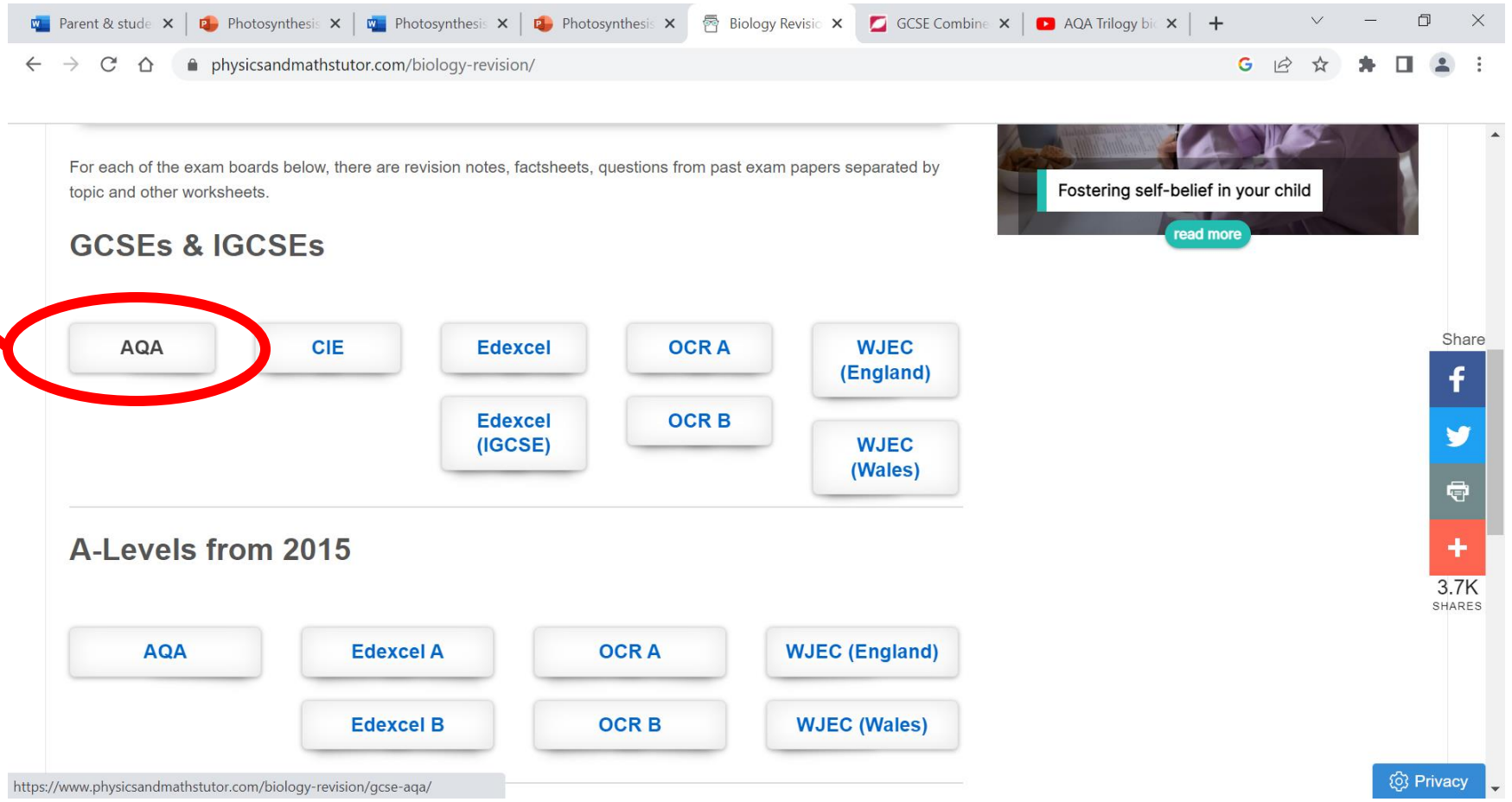
It's a **FREE RESOURCE**



Physics & Maths Tutor:

https://www.physicsandmathstutor.com/biology-revision/gcse-aqa/cell-biology/#

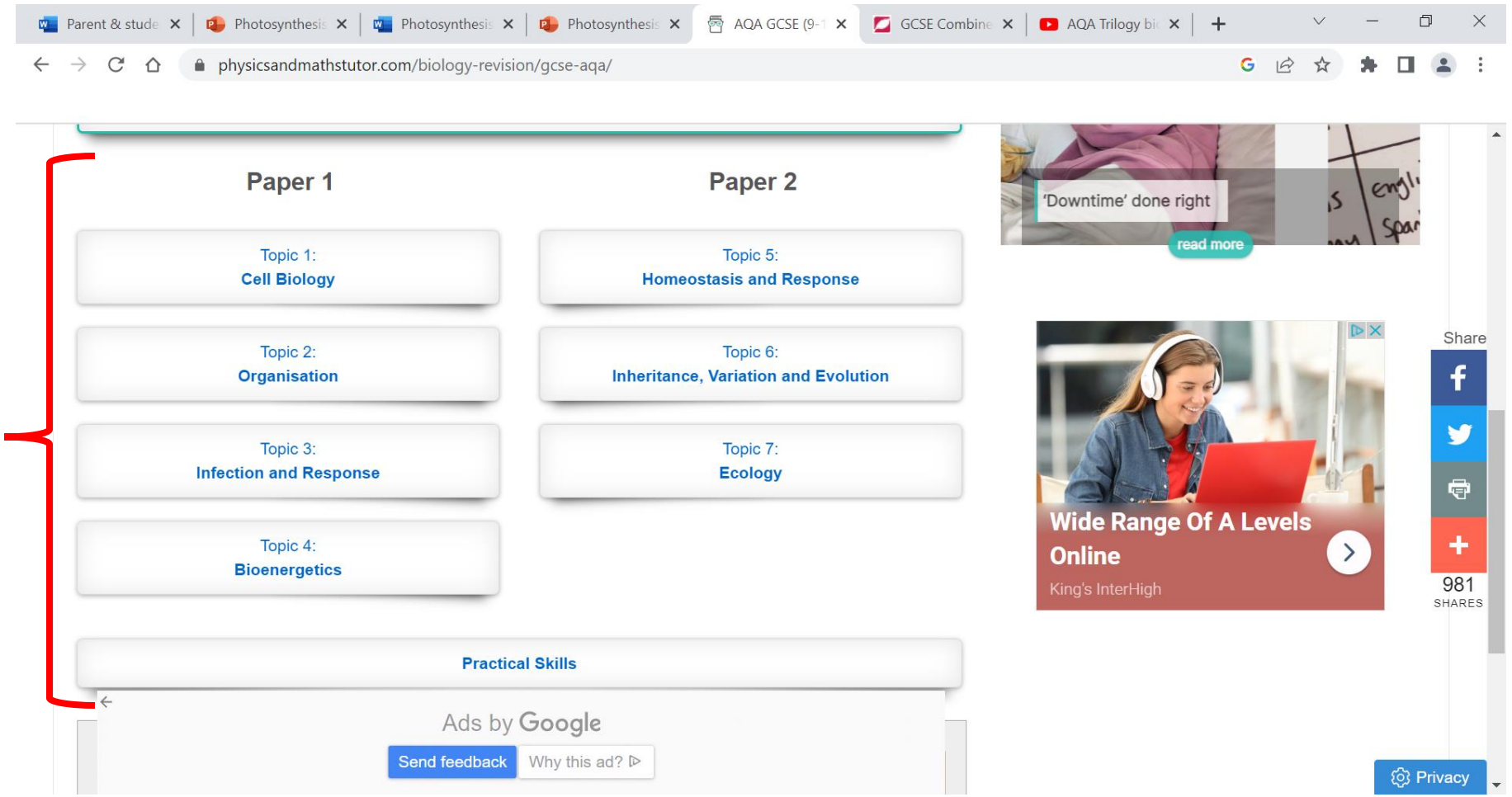
In the revision section, make sure you select the AQA option to access your course content



Physics & Maths Tutor:

https://www.physicsandmathstutor.com/biology-revision/gcse-aqa/cell-biology/#

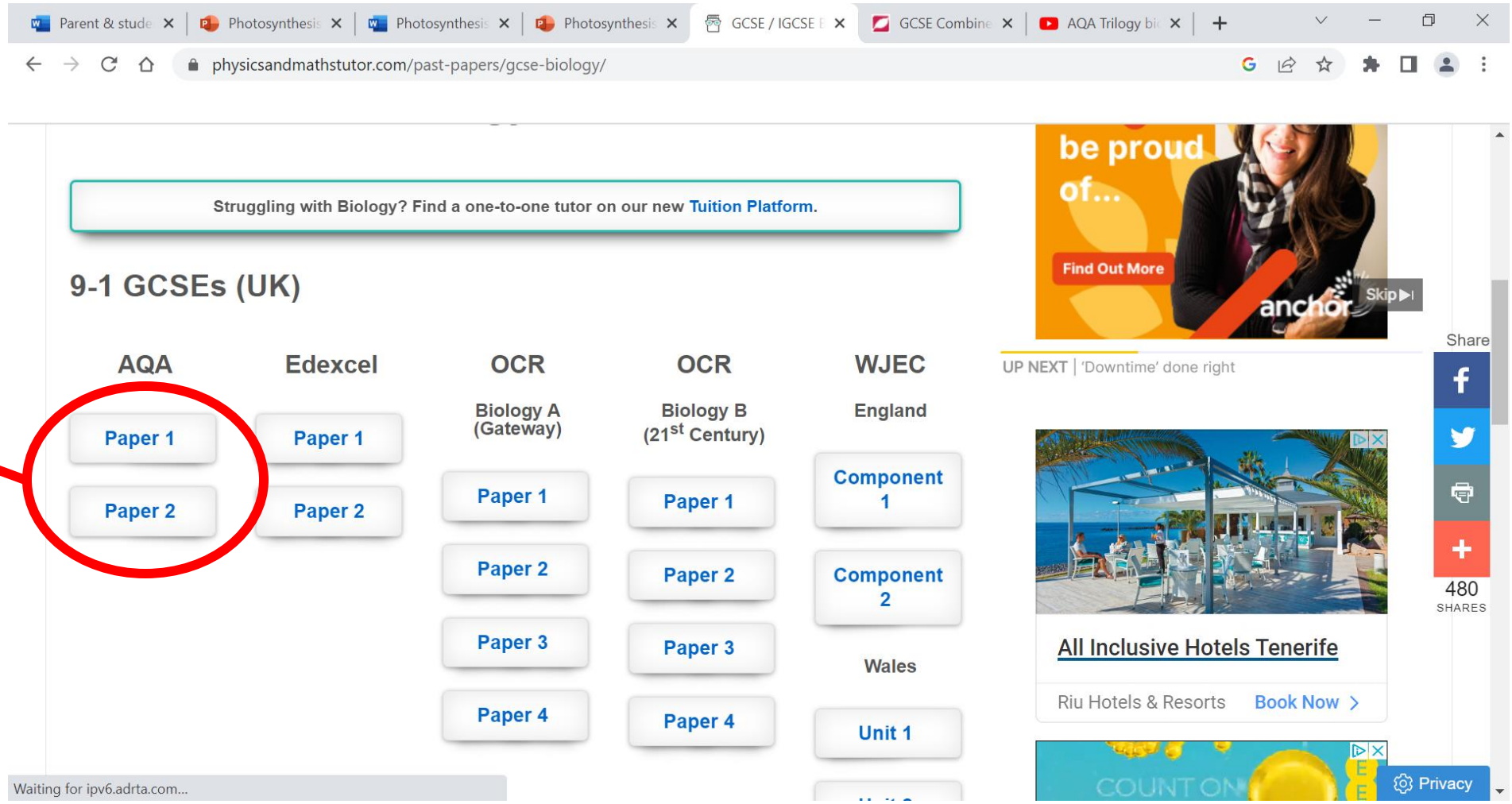
Here you can select which ever unit you feel you need to revise, start with the areas you find the hardest and remember to ask your teacher if you need more help.



Physics & Maths Tutor:

https://www.physicsandmathstutor.com/biology-revision/gcse-aqa/cell-biology/#

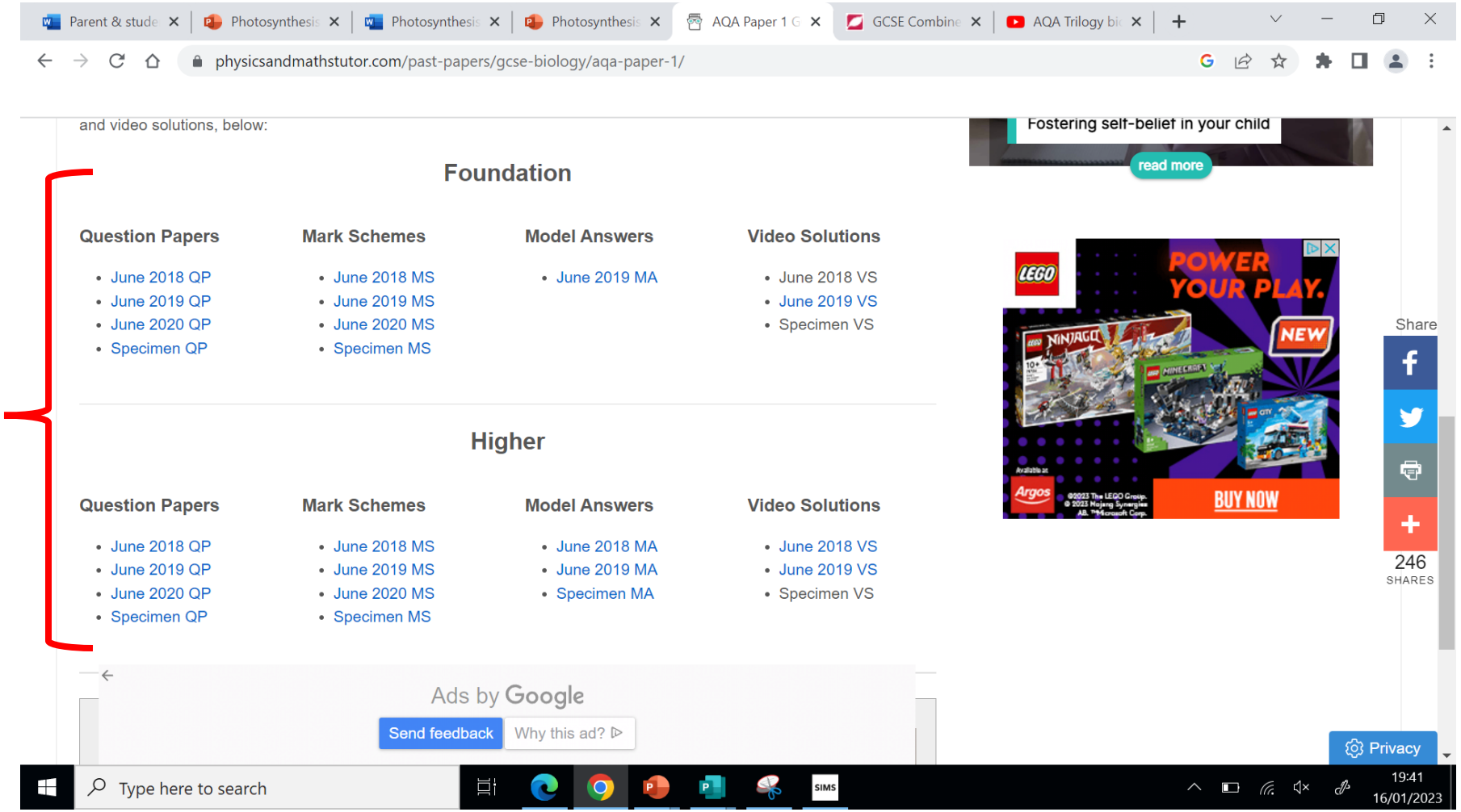
Select either paper 1 or 2 depending on area you wish to study



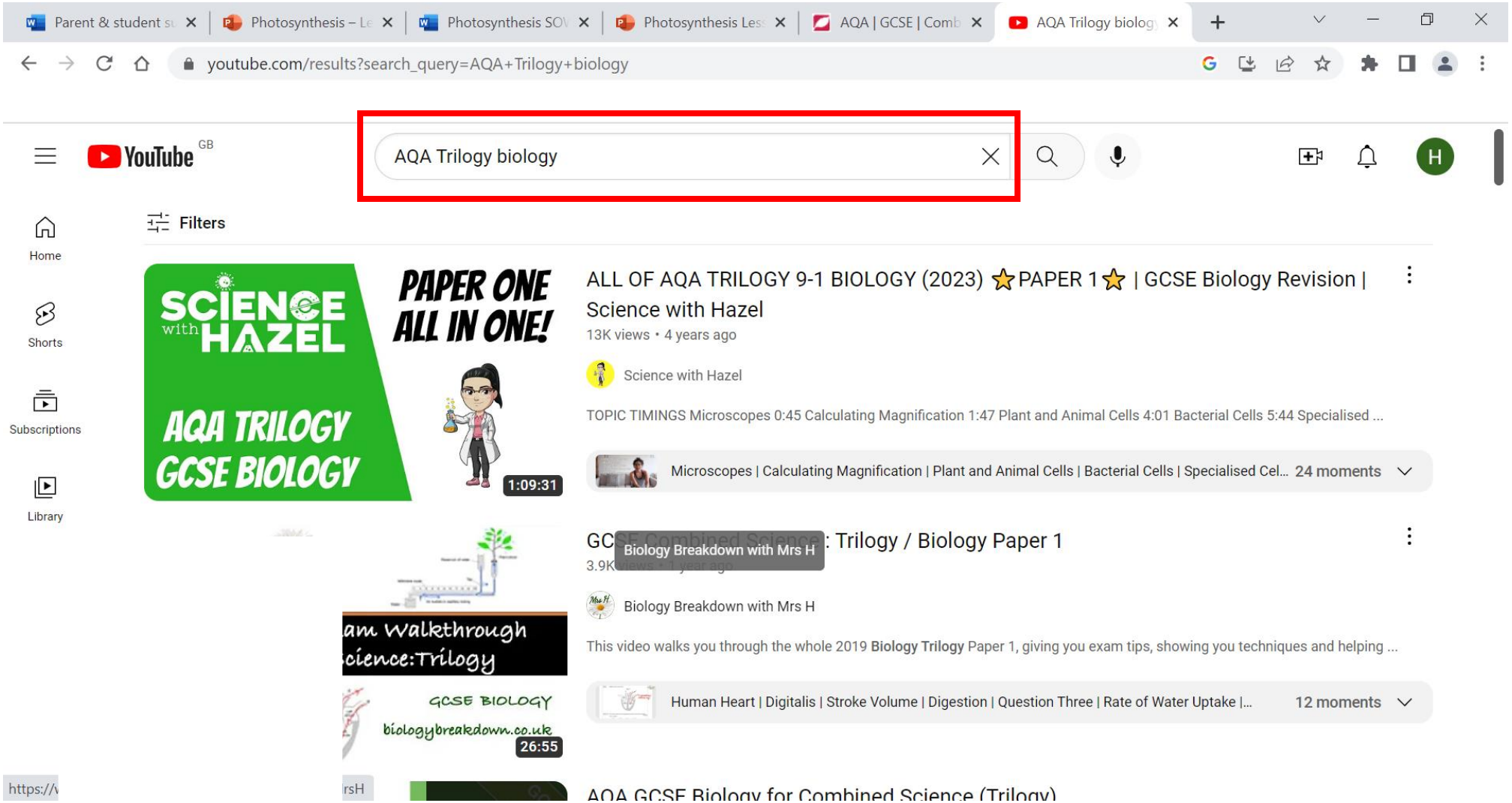
Physics & Maths Tutor:

https://www.physicsandmathstutor.com/biology-revision/gcse-aqa/cell-biology/#

Here you can find real examination past papers, mark schemes, model answers and video solutions, probably one of the most effective ways of revising – use the mark scheme!



YouTube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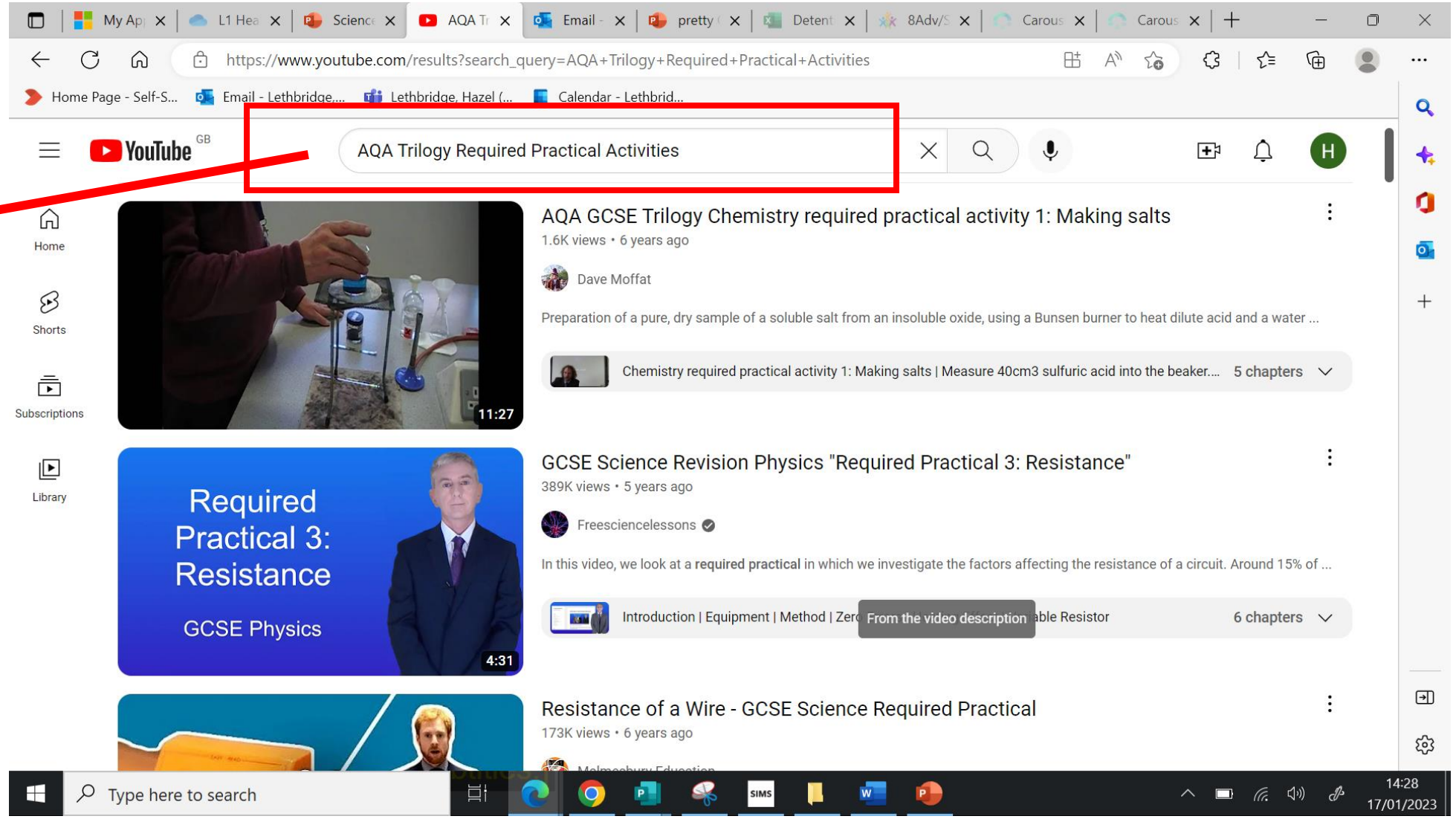
AQA TRILOGY GCSE BIOLOGY
1:09:31
ALL OF AQA TRILOGY 9-1 BIOLOGY (2023) ⭐PAPER 1⭐ | GCSE Biology Revision | Science with Hazel
13K views • 4 years ago
Science with Hazel
TOPIC TIMINGS Microscopes 0:45 Calculating Magnification 1:47 Plant and Animal Cells 4:01 Bacterial Cells 5:44 Specialised ...
Microscopes | Calculating Magnification | Plant and Animal Cells | Bacterial Cells | Specialised Cel... 24 moments
Biology Breakdown with Mrs H
GCSE Combined Science: Trilogy / Biology Paper 1
3.9K views • 1 year ago
Biology Breakdown with Mrs H
This video walks you through the whole 2019 Biology Trilogy Paper 1, giving you exam tips, showing you techniques and helping ...
Human Heart | Digitalis | Stroke Volume | Digestion | Question Three | Rate of Water Uptake |... 12 moments
GCSE BIOLOGY
biologybreakdown.co.uk
26:55
AQA GCSE Biology for Combined Science (Trilogy)

YouTube: Required Practical Activities

Understanding all of the required practical activities is essential, questions could come up on any of the required practical activities listed on the previous slides. YouTube is a great resource for this as you can see the actual experiment and have an expert talking you through the procedures, results, analysis and variables



Long Answer or Multi-step Questions

Exam Question:

The diagram below shows a root hair viewed using a microscope.:

The root hair was viewed at a magnification of ×50

The image length of the root hair **X–Y** is 43 mm

Calculate the real length of the root hair in micrometres (µm).

[4 marks]

So what do we know from reading the question?

Magnification = x50

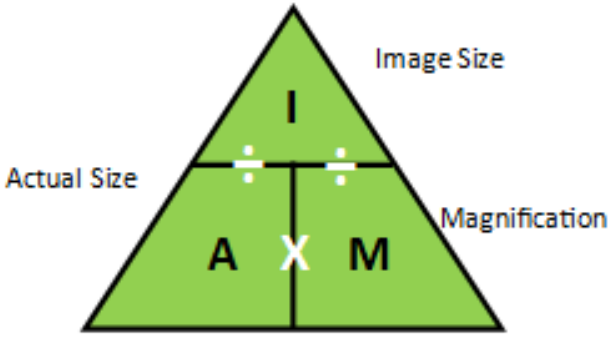
Image size = 43mm

We need to calculate the real length (the actual size)

We will need to make sure our answer is given in µm

Now, what do we need to know?

The microscopy calculation



Magnification = image size / actual size

Image size = actual size X magnification

Actual size = image size / magnification

Millimetres (mm)	Micrometres (µm)
1	1000
0.1	100
0.01	10
0.001	1

x 1000

÷ 1000

1 millimetre (mm) = 1/1000 m or 10^{-3} m

1 micrometre (µm) = 1/1000 mm or 10^{-3} mm or 10^{-6} m

1 nanometre (nm) = 1/1000 µm or 10^{-3} µm or 10^{-9} m

Model Answer

Step One: Place the given values into the equation:

$50 \times \frac{43}{\text{actual size}}$ [1 mark]

Step Two: re-arrange the formula to make *'actual size'* the focus of the equation:

Actual size = $\frac{43}{50}$ [1 mark]

= 0.86mm [1 mark]

Step Three: convert the units from mm to µm by multiplying by 1000: 0.86 x 1000 = 860 µm

[1 mark]

Long Answer or Multi-step Questions

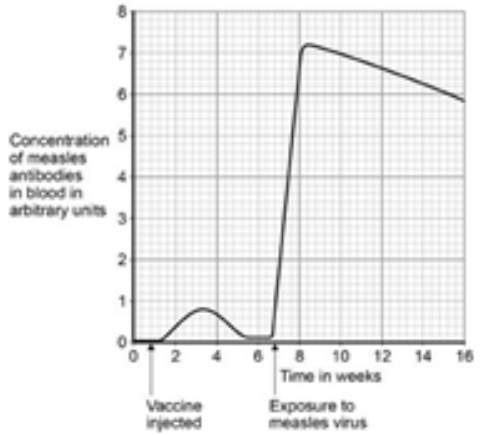
Exam Question

Measles is a serious disease. A person can die from measles. The table below shows the number of medically confirmed cases of measles in England and Wales between 2012 and 2015

Year	Number of medically confirmed cases of measles
2012	2030
2013	1843
2014	121
2015	91

One reason for the decrease in the number of cases of measles is that more children were vaccinated against the disease. Vaccinating a large proportion of the population reduces the spread of the measles virus.

The graph below shows the concentration of measles antibodies in the blood of a boy



Explain the differences between antibody production after the vaccine injection and after exposure to the measles virus.

You should include data from the graph above [6 marks]

Now, what do we need to know?

- Measles is caused by a virus, that means we can not treat it with antibiotics.
- Vaccines allow a dead or altered form of the disease causing pathogen to be introduced into the body, which contain a specific antigen . This causes the immune system, specifically the white blood cells , to produce complementary antibodies , which target and attach to the antigen.

Model Answer

differences (after exposure to measles virus):

- greater number / higher concentration of antibodies produced
- quantitative statement, e.g. 9 times higher **or** 0.8 to 7.2
- antibodies produced sooner − idea of immediate response
- antibodies produced quicker
- antibodies stay (in higher concentration) for longer

explanation

- white blood cells / leucocytes / lymphocytes / B cells
  ignore phagocytes / macrophages
- reference to previous exposure (of white blood cells) to pathogen / virus
- (white blood cells) recognise pathogen / virus / antigen
- memory cells
- production of specific / correct antibodies

Long Answer or Multi-step Questions

Exam Question

Arteries and veins have different structures and different functions. Explain how the different structures of arteries and veins relates to their different functions. [6 marks]

What do we need to know?

	Arteries	Veins
Function	Carry blood **away** from the heart at **high** pressure	**Return** blood to the heart at **low** pressure
Structure of wall	-**Thick**, strong -Contain **muscles**, **elastic** fibres and **fibrous** tissue	-**Thin** -Mainly **fibrous** tissue -Contain far **less muscle** and **elastic** tissue than arteries
Lumen	-**Narrow** -Varies with heartbeat (increases as a pulse of blood passes through)	**Wide**
Valves	(-)	(+) Prevent backflow
How structure fits function	-Strength and elasticity needed to withstand the pulsing of the blood, prevent bursting and maintain pressure wave -Helps to maintain **high blood pressure**, preventing blood flowing backwards	- No need for strong walls, as most of the blood pressure has been lost - Wide lumen offers **less resistance** to blood flow

What is the question asking us?

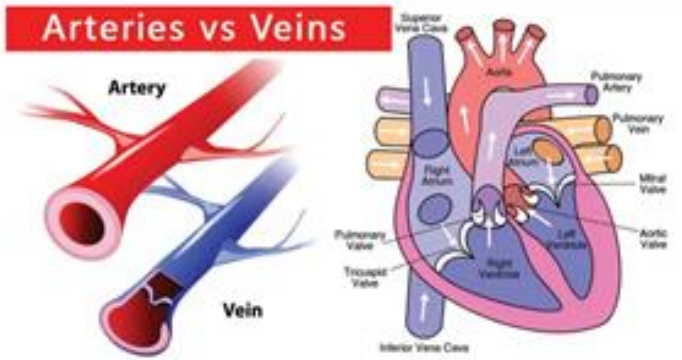
Identify the different structures.

Relate structure to function, what do they do?

What do veins and do? Wat is their job? Arteries and veins have different structures? How does this make them more efficient at carrying out their function/job?

Command word: Explain:

Students should make something clear, or state the reasons for something happening.



Long Answer or Multi-step Questions

Cells are the basic units of all forms of life.

(a) Describe **four** differences between a bacterial cell and a plant cell.

1. _____

_____

2. _____

_____

3. _____

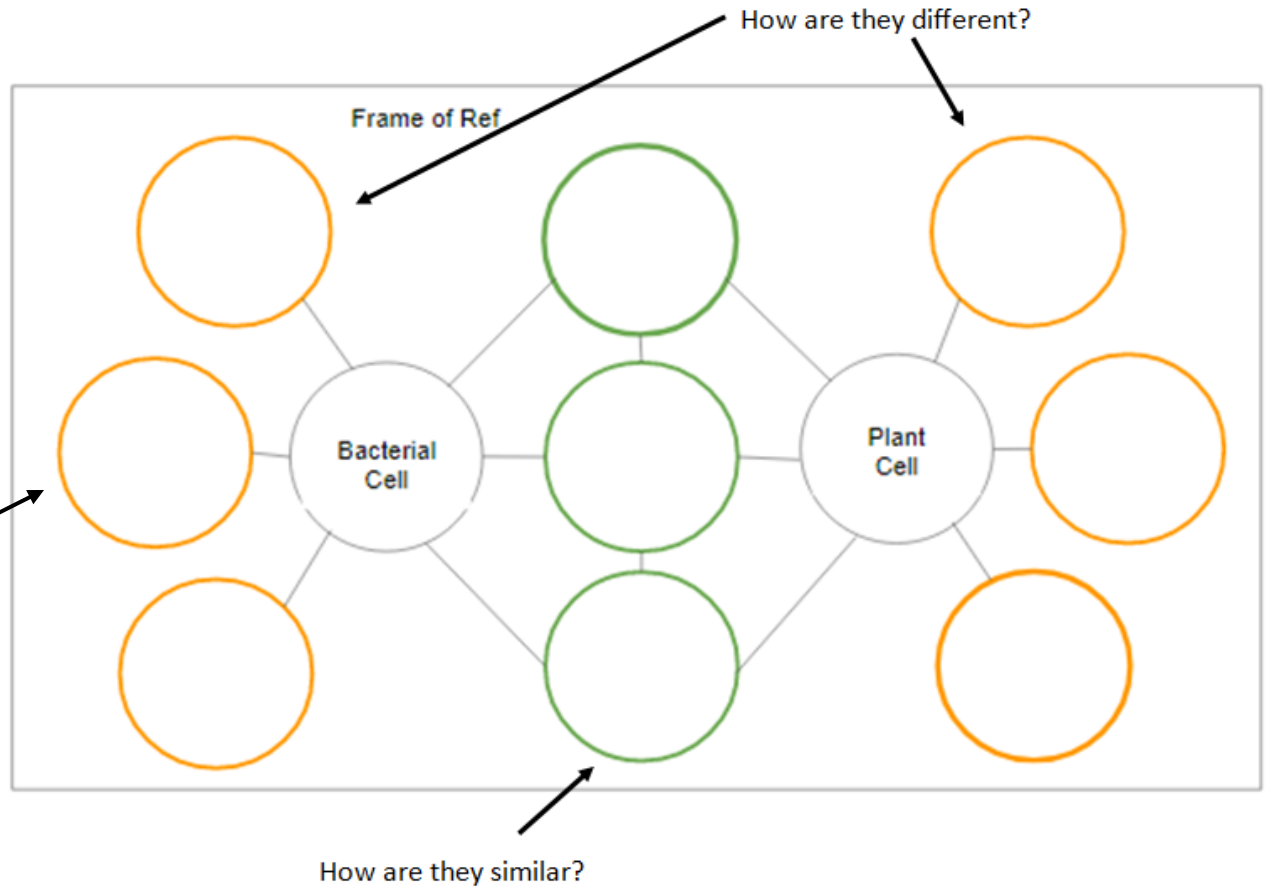
_____

4. _____

_____

This information can then be used to structure your answer

Organise your ideas, use the 'double bubble' thinking map to identify similarities and differences



Frame of reference—add information why there are similarities and differences, e.g. why doesn't a bacterial cell have a nucleus?

Other Support Available

Ask your teacher for any past papers, we do have some physical copies available.

Practice exam papers

AQA

GCSE
COMBINED SCIENCE: TRILOGY **H**

Higher Tier Paper 5: Physics 1H

Specimen 2018 Time allowed: 1 hour 15 minutes

Materials
For this paper you must have:
- a ruler
- a calculator
- the Physics Equation Sheet (enclosed).

Instructions
- Answer all questions in the spaces provided.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information
- There are 70 marks available on this paper.
- The marks for questions are shown in brackets.
- You are expected to use a calculator where appropriate.
- You are reminded of the need for good English and clear presentation in your answers.
- When answering questions 02.3, 04.4 and 06.4 you need to make sure that your answer:
  - is clear, logical, sensibly structured
  - fully meets the requirements of the question
  - shows that each separate point or step supports the overall answer.

Advice
- In all calculations, show clearly how you work out your answer.

Please write clearly, in block capitals.

Centre number Candidate number

Surname

Forename(s)

Candidate signature

Weekly Revision Sessions

Break 1 Science Intervention

Biology – Tuesday

Physics – Wednesday

Chemistry - Thursday