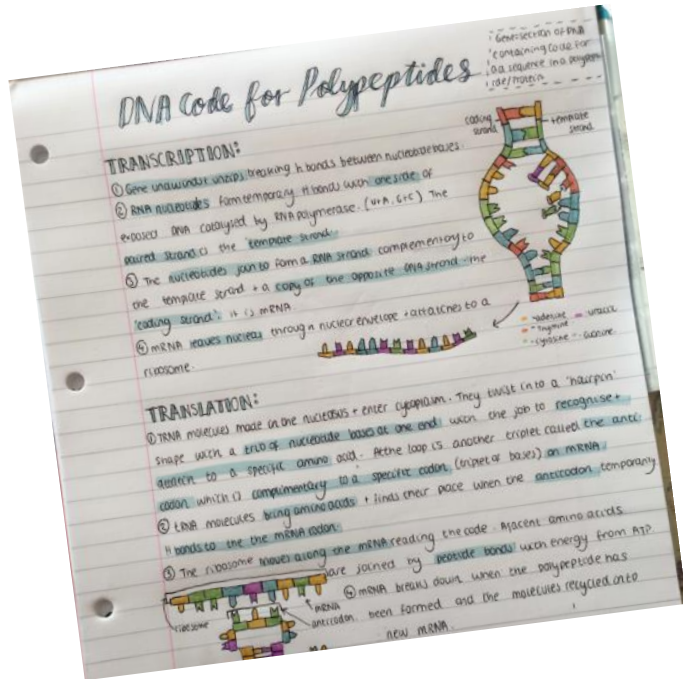


How to revise for GCSE Science



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What do we need to do?

How will we do it?

Know

Master

Apply

***Interleve**

Grades 7-9

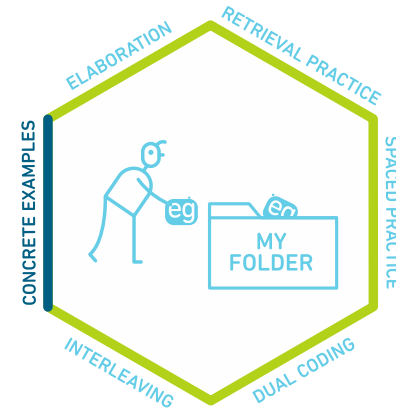


All of these strategies have supporting evidence from cognitive psychology. For each strategy, we explain how to do it, some points to consider, and where to find more information.



The first time we see information we 'know' it, but students must review, revise and consolidate to make sure that they 'master' knowledge.

This makes identification of question matter easier in exams and saves time.



Students must explain science using *specific scientific vocabulary*.



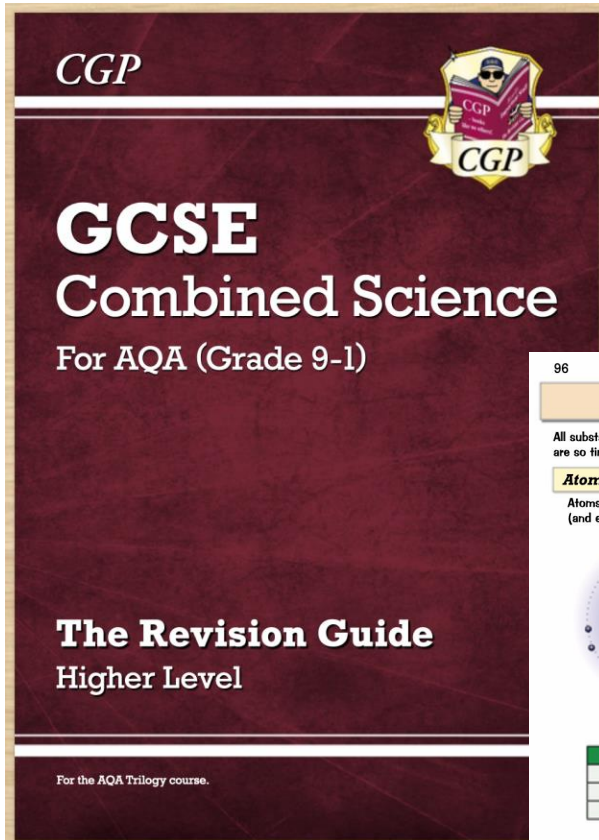
How can students 'master' content?

Flashcards



Look, cover, write, check...

Quiz questions



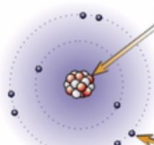
96 Topic C1 — Atomic Structure and the Periodic Table

Atoms

All substances are made of **atoms**. They're really **tiny** — too small to see, even with your microscope. Atoms are so tiny that a **50p piece** contains about 7740000000000000000000000 of them. Quite a lot then...

Atoms Contain Protons, Neutrons and Electrons

Atoms have a radius of about **0.1 nanometers** (that's 1×10^{-10} m). There are a few different (and equally useful) modern models of the atom — but chemists tend to like the model below best.



The Nucleus

- 1) It's in the **middle** of the atom.
- 2) It contains **protons and neutrons**.
- 3) The nucleus has a **radius** of around 1×10^{-14} m (that's around 1/10 000 of the radius of an atom)
- 4) It has a **positive charge** because of the protons.
- 5) Almost the **whole** mass of the atom is **concentrated** in the nucleus.

A nanometer (nm) is one billionth of a meter. Shown in standard form, that's 1×10^{-9} m. Standard form is used for showing really large or really small numbers.

Protons are heavy and positively charged.
Neutrons are heavy and neutral.
Electrons are tiny and negatively charged.

Particle	Relative Mass	Charge
Proton	1	+1
Neutron	1	0
Electron	Very small	-1

(Electron mass is often taken as zero.)

The Electrons

- 1) Move **around** the nucleus in **electron shells**.
- 2) They're **negatively charged** and **tiny**, but they cover a **lot of space**.
- 3) The **volume** of their orbits determines the size of the atom.
- 4) Electrons have virtually **no** mass.

Number of Protons Equals Number of Electrons

- 1) Atoms are **neutral** — they have **no charge** overall (unlike ions).
- 2) This is because they have the **same number of protons as electrons**.
- 3) The **charge** on the electrons is the **same size as the charge on the protons**, but **opposite** — so the charges **cancel out**.
- 4) In an ion, the number of protons **doesn't equal** the number of **electrons**. This means it has an **overall charge**. For example, an ion with a **2- charge**, has **two more** electrons than protons.

Atomic Number and Mass Number Describe an Atom

- 1) The **nuclear symbol** of an atom tells you its **atomic (proton) number** and **mass number**.
- 2) The **atomic number** tells you how many **protons** there are.
- 3) The **mass number** tells you the **total number of protons and neutrons** in the atom.
- 4) To get the number of **neutrons**, just subtract the **atomic number** from the **mass number**.

Nuclear symbol for sodium.

Mass number
23

Atomic number
11

Na

Element symbol
(see next page for more on symbols)

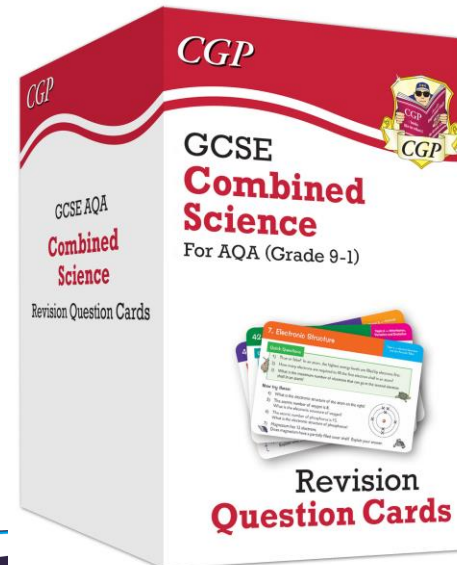
Let's be positive about this — unless you're an electron of course...

Atoms may be tiny, and the things inside them even smaller, but this stuff is still super important. If you can get to grips with the basic facts then you'll have a better chance understanding the rest of chemistry. Crack on.

Q1 An atom of nitrogen has an atomic number of 7 and a mass number of 14.
Give the number of electrons, protons and neutrons in the atom. [3 marks]



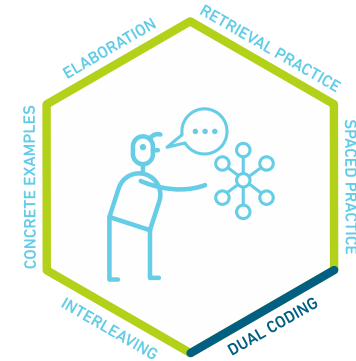
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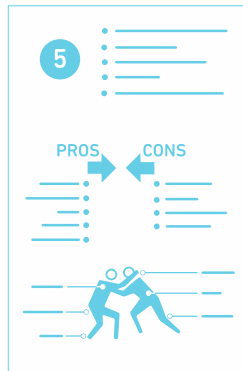


Active note taking involves turning the material into a different format...

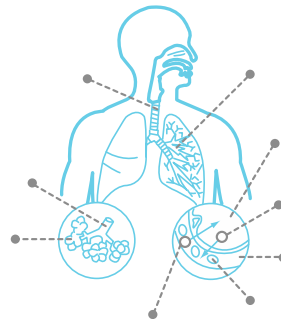
Simply copying notes is passive and limited in impact.



INFOGRAPHIC



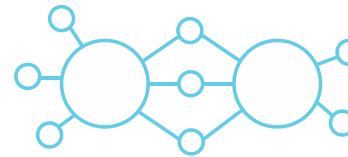
DIAGRAM



CARTOON STRIP



GRAPHIC ORGANIZER



TIMELINE

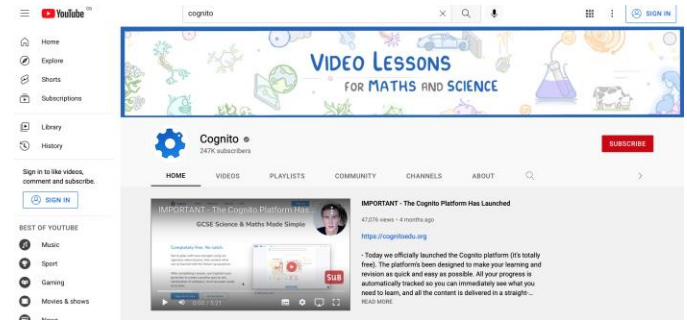


Students must process information to ensure active learning.

Useful Science Websites...

So many great YouTube channels for you to use, some of our favourites are;

Cognito <https://www.youtube.com/c/Cognitoedu>



Fuseschool <https://www.youtube.com/c/fuseschool/playlists>

FreeScienceLessons <https://www.youtube.com/c/Freesciencelessons>

Required Practicals https://www.youtube.com/channel/UC-TM-z1-tmX1iK_H4SxVhww



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How can students check that they have mastered content?

111

Revision Questions for Topic C1

Topic C1 — finished. But hold on there my friend, don't rush on to Topic C2 just yet. There's one more thing for you to do...

- Try these questions and **tick off each one** when you **get it right**.
- When you've done **all the questions** under a heading and are **completely happy** with it, tick it off.

Atoms, Elements and Compounds (p.96-99) ☒

- 1) Sketch an atom. Label the nucleus and the electrons.
- 2) What is the charge of a proton?
- 3) True or False? Elements contain more than one type of atom.
- 4) Give the formula for:
 - a) Carbon dioxide
 - b) Sodium carbonate
- 5) Balance these equations:
 - a) $\text{Mg} + \text{O}_2 \rightarrow \text{MgO}$
 - b) $\text{H}_2\text{SO}_4 + \text{NaOH} \rightarrow \text{Na}_2\text{SO}_4 + \text{H}_2\text{O}$

Mixtures and Separation (p.100-102) ☐

- 6) What is the difference between a compound and a mixture?
- 7) What is the name of the pattern formed from carrying out paper chromatography?
- 8) Which method of separation is useful to separate an insoluble solid from a liquid?
- 9) Give the name of a method to separate a soluble solid from a liquid.
- 10) Which method of distillation would you use to separate liquids with similar boiling points?

Electronic Structure and the History of the Periodic Table (p.103-106) ☒

- 11) Who discovered that the plum pudding model was wrong?
- 12) Who first devised an experiment that proved the existence of the neutron?
- 13) What is the electronic structure of sodium?
- 14) Why did Mendeleev leave gaps in his Table of Elements?

Groups of the Periodic Table (p.107-110) ☒

- 15) How are the group number and the number of electrons in the outer shell of an element related?
- 16) What kind of ions do metals form?
- 17) Where are non-metals on the periodic table?
- 18) State three trends as you go down Group 1.
- 19) State the products of the reaction of sodium and water.
- 20) How do the boiling points of halogens change as you go down the group from fluorine to astatine?
- 21) What is the charge of the ions that halogens form when they react with metals?
- 22) Predict whether iodine is displaced by chlorine in a solution of potassium iodide.
- 23) What is the trend in boiling point as you go down Group 0?



Quick fact recall questions – revision guide, Educake online, definition checks, YouTube Videos with questions.



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Subtle differences in the specialisms and how we prepare

Biology

Knowledge
Key terminology
Application
Required Practicals
Abstract contexts

Chemistry

Knowledge
Key terminology
Application
Required Practicals
Using Periodic Table

Physics

Knowledge
Key terminology
Application
Required Practicals
Equation sheet 2023
Units

Calculator required for every science exam!



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The most important step, applying knowledge to exam questions.



A student investigated the effect of ethanol, hydrochloric acid and temperature on the loss of red pigment from beetroot cells.

During the procedure, the student:

- added 10 cm³ water into one test tube
- added 10 cm³ ethanol into a second test tube
- added 10 cm³ hydrochloric acid into a third test tube
- put the three tubes into a 25 °C water bath
- cut four cylinders of tissue from a beetroot
- put a cylinder into each tube and fitted bungs
- added 10 cm³ water into a fourth test tube and put this tube into a 70 °C water bath
- placed the fourth cylinder into this tube and fitted a bung
- later removed the cylinders from the tubes
- estimated the intensity of red pigment in each solution by eyesight.

- (a) Give **one** way in which the student could ensure the first three beetroot cylinders were kept at 25 °C throughout her experiment.

(1)



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When approaching a question;

1. What is the **topic**?

2. What are the **command** words... describe, explain, compare, evaluate.

3. What is the question **specifically** looking for?

4. Has there been any **information** provided that you must use?

5. What key **scientific terms** will you make sure are in your answer?

Figure 2 shows an axolotl.

Figure 2



(d) Explain why an axolotl may die in water with a low concentration of oxygen. **4 Marks**

– Oxygen concentration gradient is low

– less oxygen diffuses into blood / cells / gills

– less aerobic respiration and more anaerobic occurs so less energy is released

– Less metabolism

– Lactic acid produced which is toxic



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Useful Science Websites...

- Physics and Maths Tutor: <https://www.physicsandmathstutor.com/>

Summary notes, flashcards, mind maps and practise questions for every topic.

Home > Chemistry Revision > AQA GCSE

AQA GCSE Chemistry Revision

Paper 1

Topic 1:

Atomic Structure and the Periodic Table

Topic 2:

Bonding, Structure and the Properties of Matter

Topic 3:

Quantitative Chemistry

Topic 4:

Chemical Changes

Topic 5:

Energy Changes

Paper 2

Topic 6:

The Rate and Extent of Chemical Change

Topic 7:

Organic Chemistry

Topic 8:

Chemical Analysis

Topic 9:

Chemistry of the Atmosphere

Topic 10:

Using Resources

Topic 2 – Bonding, Structure, and The Properties of Matter

This topic is included in Paper 1 for GCSE AQA Chemistry.

Notes:

- Definitions
- Flashcards

Summary Notes

- 2.1 Chemical bonds and types of bonding
- 2.2. How bonding and structure are related to the properties of substances
- 2.3. Structure and bonding of carbon
- 2.4. Bulk and surface properties of matter including nanoparticles

Mind Maps

- 2.1. Chemical Bonds - Ionic, Covalent and Metallic
- 2.2. How Bonding and Structure are Related to the Properties of Substances
- 2.3. Structure and Bonding of Carbon
- 2.4. Bulk and Surface Properties of Matter Including Nanoparticles

Questions by Topic:

- Bonding & Structure 1 MS
- Bonding & Structure 1 QP
- Bonding & Structure 2 MS
- Bonding & Structure 2 QP
- Bonding & Structure 3 MS
- Bonding & Structure 3 QP
- Bulk & Surface Properties of Matter 1 MS
- Bulk & Surface Properties of Matter 1 QP
- Bulk & Surface Properties of Matter 2 MS
- Bulk & Surface Properties of Matter 2 QP
- Bulk & Surface Properties of Matter 3 MS
- Bulk & Surface Properties of Matter 3 QP
- Ionic, Covalent & Metallic Bonds 1 MS
- Ionic, Covalent & Metallic Bonds 1 QP
- Ionic, Covalent & Metallic Bonds 2 MS
- Ionic, Covalent & Metallic Bonds 2 QP
- Ionic, Covalent & Metallic Bonds 3 MS
- Ionic, Covalent & Metallic Bonds 3 QP
- Structure & Bonding Carbon 1 MS
- Structure & Bonding Carbon 1 QP

Past Papers

Combined Science Past Papers and Mark schemes

<https://revisionscience.com/gcse-revision/science/science-gcse-past-papers/aqa-gcse-science-past-papers>

GCSE Biology Past Papers

<https://revisionscience.com/gcse-revision/biology/biology-gcse-past-papers/aqa-gcse-biology-past-papers>

GCSE Chemistry Past Papers

<https://revisionscience.com/gcse-revision/chemistry/chemistry-gcse-past-papers/aqa-gcse-chemistry-past-papers>

GCSE Physics Past Papers

<https://revisionscience.com/gcse-revision/physics/physics-gcse-past-papers/aqa-gcse-physics-past-papers>



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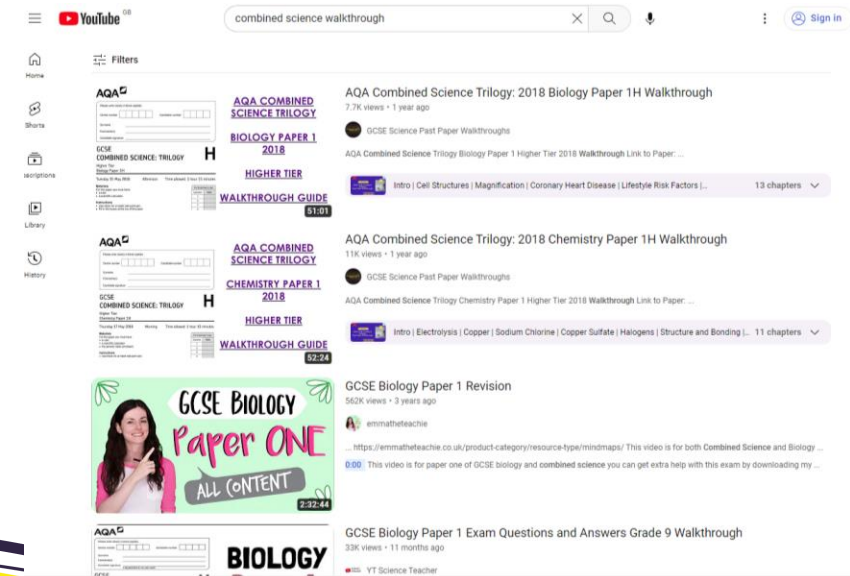


YouTube Walking Talking mocks

<https://www.youtube.com/@YTScienceTeacher>

Triple papers on this link.

For Combined Science only search on YouTube
'Combined Science walkthrough'



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The key points

- Revision needs to involve **active** strategies (not just reading!)
- You cannot do enough past questions – move away from making notes and out of your comfort zone to complete practice questions.

When approaching a question;

1. What is the topic?
 2. What are the command words... describe, explain, compare, evaluate.
 3. What is the question specifically looking for?
 4. Has there been any information provided that you must use?
 5. What key scientific terms will you make sure are in your answer?
- Use spaced retrieval and interleaving so that you have to decipher the question content before you begin.





What's next?

- Bespoke plans in each class and subject to review areas of weakness from mock exams.
- Homework and self-study are vital – please support us in ensuring students are completing.
- Wednesday revision after school
- Lunch time revision sessions

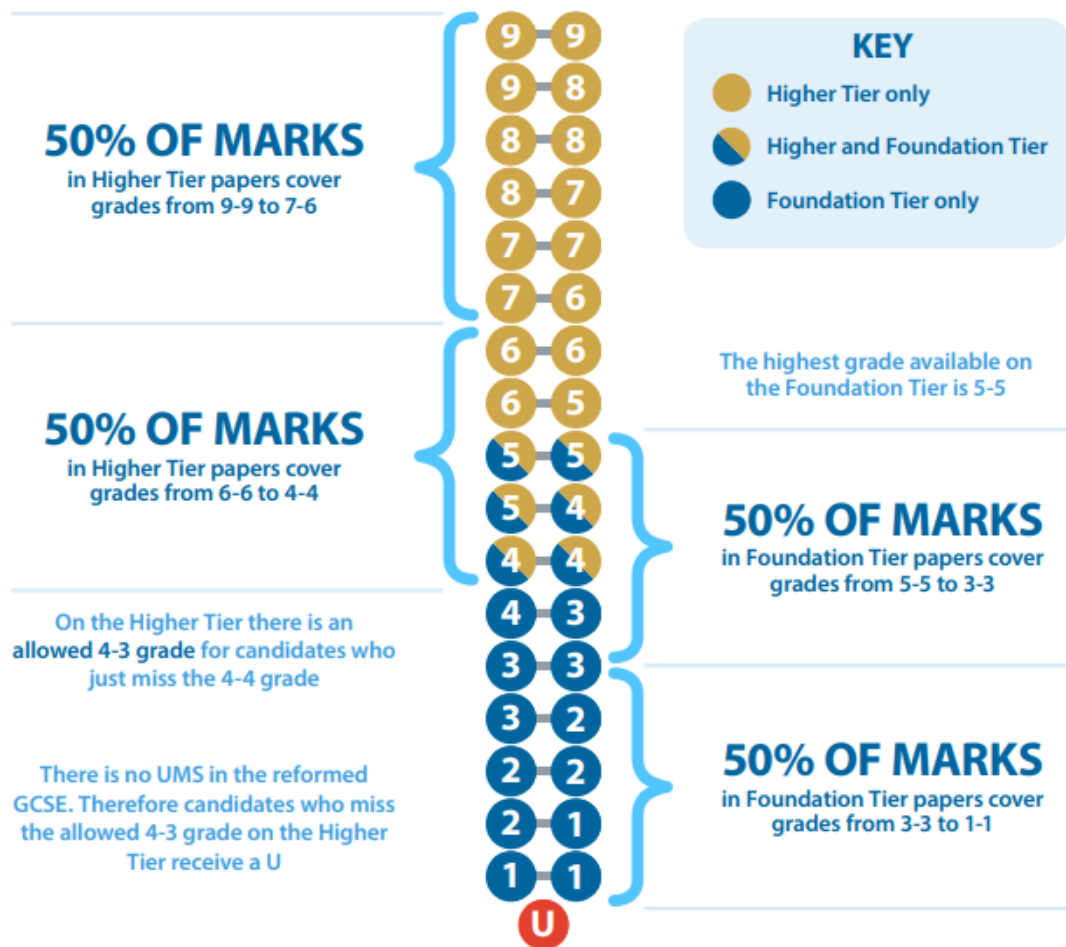
GCSE Combined Science (Biology)

Biology Paper 1	Tuesday 16 th May (am)	Biology Paper 2	Friday 9 th June (pm)
Chemistry Paper 1	Monday 22 nd May (am)	Chemistry Paper 2	Tuesday 13 th June (am)
Physics Paper 1	Thursday 25 th May (pm)	Physics Paper 2	Friday 16 th June (am)

Week	Lessons and class work	Homework (Educake)	Independent work
20/3/23	Exam papers, mark schemes and feedback		
27/3/23	1 – Classification and evolution 2 – Sampling	Classification, evolution, and sampling	Practice paper 2
3/4/23 & 10/4/23	Easter holidays		
17/4/23	3 – Reproductive hormones 4 – Controlling blood glucose levels	Reproductive hormones and blood glucose levels	Topic 5 (Homeostasis & nervous system) – question pack
24/4/23	5 – Genetic inheritance & pollution 6 – Microscopy	Pollution and human effects	Practice paper 1
1/5/23	<i>Bank Holiday Monday</i> 7 – Communicable diseases & treatments	Communicable diseases and treatments	Topic 3 (Communicable and non-communicable diseases) – question pack
8/5/23	<i>Bank Holiday Monday</i> 8 – Cell transport (including osmosis practical)	Cell transport	Practice paper 1 and/or 2

Combined Science

Tiers & grading



Candidates who are aiming for a 4-4 in GCSE Combined Science are able to access twice as many marks in the Foundation Tier papers as they can in the Higher Tier papers.

COMMON GRADES



**20%
OF MARKS**

targeted at grades common to

MATHS DEMAND

Higher Tier

Not lower than demand expected for Foundation Tier GCSE Maths



Foundation Tier

Not lower than demand

PRACTICAL



**MINIMUM
15%
OF MARKS**

assess practical skills, in both tiers across all components and



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