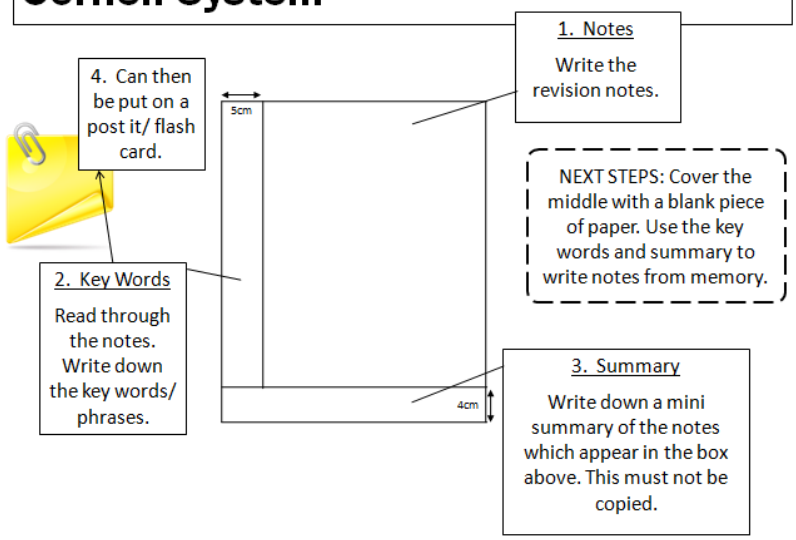
GCSE science revision pack

https://www.youtube.com/channel/UCBgvmal8AR4QIK2e0EfJwaA

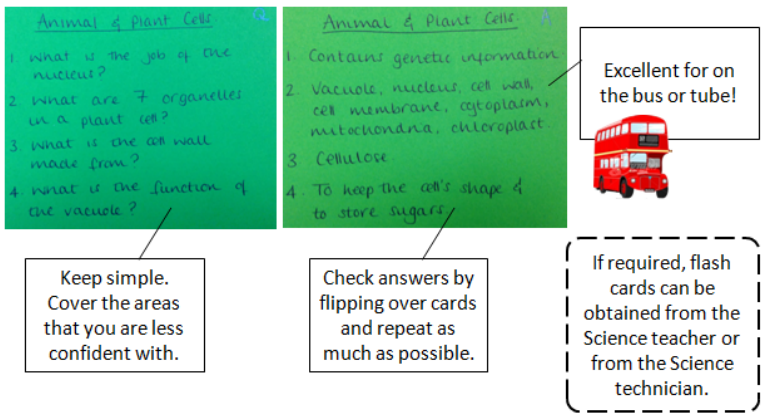
- **26th February, 5pm:** Where to start and how to revise
- **5th March, 5pm:** Six-markers – how to structure your answers and where to gain marks
- **12th March, 5pm:** Practicals – how and why these questions are different
- **19th March, 5pm:** Exam technique – how to interpret questions and where students commonly lose marks

Cornell System



Q&A Cards

- Use small pieces of card or paper to write questions on a particular topic. The answer should be written on the other side.



What NOT to do:

- read/copy notes

Revise actively:

- Look cover write check
- The Cornell system
- Making & using Q&A cards
- Mind maps
- Past exam questions on AQA
- Activities on the school website in the science department section

The exam

	Combined Science Details for each paper	*Triple Science* *Details for each paper*
Biology paper 1	1hr 15 mins 70 marks 16.7% of GCSE Multiple choice, structures, closed short answer & open response Qs	*1hr 45 mins* *100 marks* *50% of respective GCSE* *Multiple choice, structures, closed short answer & open response Qs*
Biology paper 2		
Chemistry paper 1		
Chemistry paper 2		
Physics paper 1		
Physics paper 2		

Biology		
Module	Year taught	Test paper
1. Cell Biology	9	1
2. Organisation	9	1
3. Infection & response	10	1
4. Bioenergetics	10	1
5. Homeostasis	10	2
6. Inheritance, variation & evolution	11	2
7. Ecology	11	2

Chemistry		
Module	Year taught	Test paper
1. Atomic structure & the periodic table	9	1
2. Bonding, structure, and the properties of matter	9	1
3. Quantitative Chemistry	11	1
4. Chemical changes	11	1
5. Energy changes	11	1
6. The rate & extent of chemical change	10	2
7. Organic chemistry	10	2
8. Chemical analysis	10	2
9. Chemistry of the atmosphere	10	2
10. Using resources	10	2

Physics		
Module	Year taught	Test paper
1. Energy	10 (11)	1
2. Electricity	10/11	1
3. Particle model of matter	9 (10)	1
4. Atomic structure	9 (10)	1
5. Forces	10	2
6. Waves	11	2
7. Magnetism & electromagnetism	11	2
8. Space (triple only)	*10*	*2*

Recall Physics equations

Equation number	Word equation	Symbol
1	weight = mass × gravitational field strength (g)	$W = m\,g$
2	work done = force × distance (along the line of action of the force)	$W = F\,s$
3	force applied to a spring = spring constant × extension	$F = k\,e$
4	distance travelled = speed × time	$s = v\,t$
5	acceleration = $\frac{\text{change in velocity}}{\text{time taken}}$	$a = \frac{\Delta v}{t}$
6	resultant force = mass × acceleration	$F = m\,a$
8	kinetic energy = 0.5 × mass × (speed)^2	$E_k = \frac{1}{2}mv^2$
9	gravitational potential energy = mass × gravitational field strength (g) × height	$E_p = m\,g\,h$
10	power = $\frac{\text{energy transferred}}{\text{time}}$	$P = \frac{E}{t}$
11	power = $\frac{\text{work done}}{\text{time}}$	$P = W$
12	efficiency = $\frac{\text{useful output energy transfer}}{\text{total input energy transfer}}$	
13	efficiency = $\frac{\text{useful power output}}{\text{total power input}}$	
14	wave speed = frequency × wavelength	$v = f\,\lambda$
15	charge flow = current × time	$Q = I\,t$
16	potential difference = current × resistance	$V = I\,R$
17	power = potential difference × current	$P = V\,I$
18	power = (current)^2 × resistance	$P = I^2\,R$
19	energy transferred = power × time	$E = P\,t$
20	energy transferred = charge flow × potential difference	$E = Q\,V$
21	density = $\frac{\text{mass}}{\text{volume}}$	$\rho = \frac{m}{V}$
7 Higher	momentum = mass × velocity	$p = m\,v$
23 Triple	moment of a force = force × distance (normal to direction of force)	$M = F\,d$
24 Triple	pressure = $\frac{\text{force normal to a surface}}{\text{area of that surface}}$	$P = \frac{F}{A}$

Calculations in Biology

Magnification

Magnification = $\frac{\text{size of image}}{\text{Size of real object}}$

1mm = 1000µm µm → mm = ÷1000

Sampling

Estimated population size = average count in $1m^2$ x total area

Calculations in Chemistry *higher tier*

Sub-particles

Proton no, = atomic number

Electron no. = atomic number

Proton no. = mass number – atomic number

Relative Atomic Mass is the average mass of an atom of an element compared to the mass of 1/12th of an atom of carbon-12.

Relative atomic mass

Relative atomic mass = $\frac{\text{(abundance of isotope 1 x mass of isotope 1) + (abundance of isotope 2 x mass of isotope 2)}}{\text{Total abundance}}$

CONCENTRATION

A measure of the amount of moles in a given volume.

Conc.(g dm^{-3}) = $\frac{\text{mass (g)}}{\text{Volume (dm}^3\text{)}}$

Conc.(mol dm^{-3}) = $\frac{\text{moles (mol)}}{\text{Volume (dm}^3\text{)}}$

Rate of reaction (g/s or cm^3/s)

Mean rate of reaction = $\frac{\text{quantity of reactant used}}{\text{time taken}}$

Mean rate of reaction = $\frac{\text{quantity of product formed}}{\text{Time taken}}$

Cm^3 and dm^3

cm^3 → dm^3 = ÷1000

Chromatography

Rf = $\frac{\text{spot distance}}{\text{solvent front distance}}$

PERCENTAGE COMPOSITION

% = $\frac{\text{atomic mass element}}{\text{molar mass of compound}}$ x 100

MOLES higher

A measure of the amount of substance.

Number of moles (n) = $\frac{\text{mass (m)}}{\text{Molar mass } (M_r)}$

Mass is measured in grams.

Molar mass is calculated by adding the atomic masses (from the Periodic Table) together.

REACTING MASSES higher

	H	C
mass		
A_r		
moles		
mass		

From the question.

Number of moles = mass ÷ molar mass

Molar mass from the atomic mass number on the Periodic Table.

Mass = moles (from above) x molar mass

Energy change higher

Energy change = sum of energy needed to break bonds – sum of energy released making bonds

Calculations in Chemistry triple only

EMPIRICAL FORMULA

Number of moles = mass ÷ molar mass

	H	C
mass		
A_r		
moles		
÷ by smallest		
Round		
formula		

From the question.

Molar mass from the atomic mass number on the Periodic Table.

Smallest number of moles from above

Round to nearest whole number unless .5 – in this case double all answers

GASES triple higher

Moles of gas = $\frac{\text{volume of gas (dm}^3\text{)}}{24\ \text{dm}^3}$

TITRATIONS higher triple

1. *Balance the equation.*
2. *Work out the number of moles using n = c x V*
3. *Work out the molar ratio using equation.*
4. *Work out concentration using n from step 3 and c = n / V*

Percentage yield triple only

Percentage yield = $\frac{\text{Actual yield}}{\text{Theoretical yield}} \times 100$

Atom economy triple only

Atom economy = $\frac{\text{Mr of desired product}}{\text{Mr of all products}} \times 100$

Required practicals

Biology Practicals	Paper
1. Microscopy	1
2. Osmosis	1
3. Enzymes	1
4. Food Tests	1
5. Photosynthesis	1
6. Reaction times	2
7. Field Observations	*2*
8. Microbiology (Triple only)	*1*
9. Germination (Triple only)	*2*
10. Decay (Triple only)	*2*

Chemistry Practicals	Paper
1. Making salts	1
2. Electrolysis	1
3. Temperature change	1
4. Water purification	2
5. Chromatography	2
6. Rates of reaction	2
7. Neutralisation (Triple only)	*1*
8. *Identifying ions (Triple only)*	2

Physics Practicals	Paper
1. Density	1
2. Specific heat capacity	1
3. Resistance	1
4. IV characteristics	1
5. Force and extension	2
6. Acceleration	2
7. Waves	2
8. Radiation and absorption	2
9. Thermal insulation (Triple only)	*1*
10. Light (Triple only)	*2*

Required practicals video links

Topic & Paper		Chemistry			
Water purification	2	https://www.youtube.com/watch?v=N0f73tbGCRE			
Chromatography	2	https://www.youtube.com/watch?v=kxrjvLvbY28		https://www.youtube.com/watch?v=-XCPPB-sBFU	
Rate of reaction	2	https://www.youtube.com/watch?v=WlitM81qGqE		https://www.youtube.com/watch?v=wJXoUrBV6rk&index=3&list=PLDB8KPHmXFyc14g6QuLodbPgddhkYGA4o	
Making salts	1	https://www.youtube.com/watch?v=qIOMlwBoe_4		https://www.youtube.com/watch?v=B1oS1_vDmUk	
Electrolysis	1	https://www.youtube.com/watch?v=pW8oBf-UCWQ		https://www.youtube.com/watch?v=KvW-g1FQV9E	
Temperature change	1	https://www.youtube.com/watch?v=xO7QL0S90e8		https://www.youtube.com/watch?v=htiSN2qGuGc	
TRIPLE ONLY Identifying ions	2	https://www.youtube.com/watch?v=2vCU9pVAyVE		https://www.youtube.com/watch?v=OVbW72RnzXQ	
TRIPLE ONLY Neutralisation	1	https://www.youtube.com/watch?v=8yHYoENtCEY			

Topic & Paper		Physics			
Density	1	https://www.youtube.com/watch?v=F7uto-YfSRc		https://www.youtube.com/watch?v=Ih4W-cXcsBQ	
		https://www.youtube.com/watch?v=Ypg6mRbEhWs			
Specific heat capacity	1	https://www.youtube.com/watch?v=jW2ANwnfsUY		https://www.youtube.com/watch?v=ZYSdBU0pLvc	
Resistance	1	https://www.youtube.com/watch?v=ZJKmovo-MoM		https://www.youtube.com/watch?v=m_3JrA-sDEg	
		https://www.youtube.com/watch?v=XSukRnxGy5c		https://www.youtube.com/watch?v=1DI0By1Osrc	
IV characteristics	2	https://www.youtube.com/watch?v=1QtI15E-GMU			
Force & extension	2	https://www.youtube.com/watch?v=XoukVo6MR40		https://www.youtube.com/watch?v=QQCJeAqBumE	
Acceleration	2	https://www.youtube.com/watch?v=gaKXmWdmeVQ&list=PLM2vhNffrPZf2tUarsQounK6plAUim2z9		https://www.youtube.com/watch?v=nRaJd59ooIE	

Waves	2	https://www.youtube.com/watch?v=kgL-hOBvQcc		https://www.youtube.com/watch?v=HANMKi6-Guk	
Radiation & absorption	2	https://www.youtube.com/watch?v=ClRrU6JuBOc		https://www.youtube.com/watch?v=4Pz8xcEQtMU	
TRIPLE ONLY – Thermal insulation	1	https://www.youtube.com/watch?v=RZfSA2Xa6SU			
TRIPLE ONLY – Light	2	https://www.youtube.com/watch?v=XTMbYDrMr0w		https://www.youtube.com/watch?v=4VKtq6GMbDA&index=5&list=PLM2vhNffrPZf2tUarsQounK6plAUim2z9	

Topic & Paper		**Biology**			
Microscopy	1	https://www.youtube.com/watch?v=XKPdnE6BGew		https://www.youtube.com/watch?v=DyL6s15WeqY	
		https://www.youtube.com/watch?v=GXqrpb91JPg		https://www.youtube.com/watch?v=J3HfSss5YPs	
Osmosis	1	https://www.youtube.com/watch?v=oieXYuQm_xE		https://www.youtube.com/watch?v=aA_UvVeQbww&t=32s	
Food tests	1	https://www.youtube.com/watch?v=sLP8dcnWnJg		https://www.youtube.com/watch?v=81SpohOUHjA	
Enzymes	1	https://www.youtube.com/watch?v=7wJItifm9Ws		https://www.youtube.com/watch?v=8Yqbu56ImXk&t=11s	

Photosynthesis	1	https://www.youtube.com/watch?v=yg8vqsBOFMw&t=6s		https://www.youtube.com/watch?v=6xEEDZAiTME	
		https://www.youtube.com/watch?v=yg8vqsBOFMw&t=6s			
Reaction time	5	https://www.youtube.com/watch?v=81lPJtAp5Sc		https://www.youtube.com/watch?v=3XM-4Qavh5k	
Field investigations	5	https://www.youtube.com/watch?v=UDp3l07Wcrg		https://www.youtube.com/watch?v=lKyj7gEAAS8&t=53s	
TRIPLE ONLY Microbiology	1	https://www.youtube.com/watch?v=6SblFQHRnRY&list=PLyLdDAgC3ROjaTKJF1sORxcSZSdxvczq9&index=2		https://www.youtube.com/watch?v=sZueyuUQeFc	
TRIPLE ONLY Decay	2	https://www.youtube.com/watch?v=FVrOIMmmBQE			
TRIPLE ONLY Germination	2	https://www.youtube.com/watch?v=2TCu8GHS2nc		https://www.youtube.com/watch?v=pCFstSMvAMI	

Revision Timetable

Time	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
07:00							
08:00							
09:00							
10:00							
11:00							
12:00							
13:00							
14:00							
15:00							
16:00							
17:00							
18:00							
19:00							
20:00							
21:00							
22:00							
23:00							

Revision timetable

Combined Science is worth 2 GCSEs

- 24(25) topics to revise
- 10 weeks = 2-3 topics a week
- 2-3 hours revision a week