

Revision Checklist: GCSE AQA Combined Science: Trilogy (Foundation Tier)

	1. CELL BIOLOGY	<u>Subject Knowledge</u> (how well do I know this)	<u>Practice</u> (quiz/exam questions)
a.	Eukaryotes & prokaryotes		
b.	Animal & plant cells		
c.	Cell specialisation		
d.	Microscopy		
e.	The cell cycle		
f.	Stem cells		
g.	Diffusion		
h.	Exchange surfaces		
i.	Osmosis		
j.	Active transport		

	2. ORGANISATION	<u>Knowledge</u>	<u>Practice</u>
a.	Cells, tissues, organs & systems		
b.	Enzymes		
c.	Human digestive system		
d.	The lungs		
e.	The heart		
f.	Blood vessels		
g.	Blood		
h.	Coronary heart disease		
i.	Health & disease		
j.	Risk factors for non-communicable diseases		
k.	Cancer		
l.	Plant tissues		
m.	Transpiration & translocation		
n.	Adaptations of plant cells		
o.	Rate of transpiration		

	3. INFECTION & RESPONSE	<u>Knowledge</u>	<u>Practice</u>
a.	Communicable diseases		
b.	Viral diseases		
c.	Bacterial diseases		
d.	Fungal diseases		
e.	Protist diseases		
f.	Human defence systems		
g.	Vaccination		
h.	Antibiotics & painkillers		
i.	Discovery of drugs		
j.	Drug tests & trials		

	4. BIOENERGETICS	<u>Knowledge</u>	<u>Practice</u>
a.	Photosynthesis		
b.	Rate of photosynthesis		
c.	Uses of glucose		
d.	Aerobic & anaerobic respiration		
e.	Body's response to exercise		
f.	Metabolism		

	5. HOMEOSTASIS & RESPONSE	<u>Knowledge</u>	<u>Practice</u>
a.	Homeostasis		
b.	The reflex arc		
c.	The endocrine system		
d.	Blood glucose control		
e.	Diabetes		
f.	Hormones in reproduction		
g.	The menstrual cycle		
h.	Contraception		

	6. INHERITANCE, VARIATION & EVOLUTION	<u>Knowledge</u>	<u>Practice</u>
a.	Sexual & asexual reproduction		
b.	Meiosis		
c.	DNA structure		
d.	The genome		
e.	Alleles & inheritance		
f.	Inherited disorders		
g.	Sex determination		
h.	Variation		
i.	Selective breeding		
j.	Genetic engineering		
k.	Cloning		
l.	The theory of evolution		
m.	Speciation		
n.	Fossils		
o.	Extinction		
p.	Antibiotic resistant bacteria		
q.	Classification of organisms		

	7. ECOLOGY	<u>Knowledge</u>	<u>Practice</u>
a.	Communities & interdependence		
b.	Abiotic & biotic factors		
c.	Adaptations		
d.	Food chains & webs		
e.	Predator-prey cycles		
f.	Carbon & water cycle		
g.	Biodiversity		
h.	Waste management		
i.	Land use & deforestation		
j.	Global warming		
k.	Maintaining biodiversity		

	8. ATOMIC STRUCTURE & THE PERIODIC TABLE	<u>Knowledge</u>	<u>Practice</u>
a.	Elements, compounds & mixtures		
b.	Separating mixtures		
c.	Development of atomic model		
d.	Mass & atomic number		
e.	Relative atomic mass		
f.	Electronic structure		
g.	Groups & periods		
h.	Development of periodic table		
i.	Metals & non-metals		
j.	Group 0 elements		
k.	Group 1 elements		
l.	Group 7 elements		

	9. BONDING, STRUCTURE & THE PROPERTIES OF MATTER	<u>Knowledge</u>	<u>Practice</u>
a.	Ionic bonding		
b.	Covalent bonding		
c.	Dot & cross diagrams		
d.	Metallic bonding		
e.	States of matter		
f.	Properties of ionic compounds		
g.	Properties of small molecules		
h.	Polymers & giant covalent structures		
i.	Properties of metals		
j.	Alloys		
k.	Diamond & graphite		
l.	Graphene & fullerenes		

	10. QUANTITATIVE CHEMISTRY	<u>Knowledge</u>	<u>Practice</u>
a.	Balancing chemical equations		
b.	Conservation of mass		
c.	Relative formula mass		
d.	Estimating uncertainty		
e.	Concentration		

	11. CHEMICAL CHANGES	<u>Knowledge</u>	<u>Practice</u>
a.	The reactivity series		
b.	Extracting metals by reduction		
c.	Reacting acids with metals		
d.	Neutralisation of acids & naming salts		
e.	pH		
f.	Electrolysis of molten ionic compounds		
g.	Electrolysis of aqueous solutions		

	12. ENERGY CHANGES	<u>Knowledge</u>	<u>Practice</u>
a.	Exothermic & endothermic reactions		
b.	Reaction profiles		

	13. THE RATE & EXTENT OF CHEMICAL CHANGE	<u>Knowledge</u>	<u>Practice</u>
a.	Calculating rate of reaction		
b.	Factors affecting rate of reaction		
c.	Collision theory & activation energy		
d.	Catalysts		
e.	Reversible reactions		
f.	Equilibrium		

	14. ORGANIC CHEMISTRY	<u>Knowledge</u>	<u>Practice</u>
a.	Crude oil		
b.	Alkanes		
c.	Fractional distillation		
d.	Properties of hydrocarbons		
e.	Combustion reactions		
f.	Alkenes		
g.	Addition reactions		
h.	Cracking		

	15. CHEMICAL ANALYSIS	<u>Knowledge</u>	<u>Practice</u>
a.	Purity		
b.	Formulations		
c.	Paper chromatography		
d.	Tests for common gases		

	16. CHEMISTRY OF THE ATMOSPHERE	Knowledge	Practice
a.	Composition of Earth's atmosphere		
b.	Evolution of Earth's atmosphere		
c.	The greenhouse effect		
d.	Human activity & greenhouse gases		
e.	Global climate change		
f.	The carbon footprint		
g.	Atmospheric pollutants		

	17. USING RESOURCES	Knowledge	Practice
a.	Using Earth's resources		
b.	Potable water		
c.	Waste water treatment		
d.	Life cycle assessment		
e.	Recycling		

The Periodic Table of Elements

1	2	Key										3	4	5	6	7	8																
		relative atomic mass atomic symbol name atomic (proton) number																															
		<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>1</td> <td>H</td> </tr> <tr> <td>hydrogen</td> <td>1</td> </tr> </table>										1	H	hydrogen	1																		
1	H																																
hydrogen	1																																
7	9											11	12	14	16	19	20																
Li	Be											B	C	N	O	F	Ne																
lithium	beryllium											boron	carbon	nitrogen	oxygen	fluorine	neon																
3	4											5	6	7	8	9	10																
23	24											27	28	31	32	35.5	40																
Na	Mg											Al	Si	P	S	Cl	Ar																
sodium	magnesium											aluminium	silicon	phosphorus	sulfur	chlorine	argon																
11	12											13	14	15	16	17	18																
39	40	45	48	51	52	55	56	59	59	63.5	65	70	73	75	79	80	84																
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr																
potassium	calcium	scandium	titanium	vanadium	chromium	manganese	iron	cobalt	nickel	copper	zinc	gallium	germanium	arsenic	selenium	bromine	krypton																
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36																
85	88	89	91	93	96	[97]	101	103	106	108	112	115	119	122	128	127	131																
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe																
rubidium	strontium	yttrium	zirconium	niobium	molybdenum	technetium	ruthenium	rhodium	palladium	silver	cadmium	indium	tin	antimony	tellurium	iodine	xenon																
37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54																
133	137	139	178	181	184	186	190	192	195	197	201	204	207	209	[209]	[210]	[222]																
Cs	Ba	La*	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn																
caesium	barium	lanthanum	hafnium	tantalum	tungsten	rhenium	osmium	iridium	platinum	gold	mercury	thallium	lead	bismuth	polonium	astatine	radon																
55	56	57	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86																
[223]	[226]	[227]	[267]	[270]	[269]	[270]	[270]	[278]	[281]	[281]	[285]	[286]	[289]	[289]	[293]	[293]	[294]																
Fr	Ra	Ac*	Rf	Db	Sg	Bh	Hs	Mt	Ds	Rg	Cn	Nh	Fl	Mc	Lv	Ts	Og																
francium	radium	actinium	rutherfordium	dubnium	seaborgium	bohrium	hassium	meitnerium	darmstadtium	roentgenium	copernicium	nihonium	tennessine	moscovium	livermorium	tennessine	oganesson																
87	88	89	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118																

* The Lanthanides (atomic numbers 58 – 71) and the Actinides (atomic numbers 90 – 103) have been omitted. Relative atomic masses for Cu and Cl have not been rounded to the nearest whole number.

	18. ENERGY	<u>Knowledge</u>	<u>Practice</u>
a.	Energy stores		
b.	Changes in energy		
c.	Kinetic energy		
d.	Gravitational & elastic potential energy		
e.	Specific heat capacity		
f.	Power & work done		
g.	Conduction		
h.	Unwanted energy transfers		
i.	Efficiency		
j.	Energy resources (renewable & non-renewable)		
k.	Energy resources (environmental impact)		

	19. ELECTRICITY	<u>Knowledge</u>	<u>Practice</u>
a.	Circuit diagram symbols		
b.	Charge & current		
c.	Current, resistance & potential difference		
d.	I-V characteristic curves		
e.	LDR & thermistor		
f.	Series & parallel circuits		
g.	D.C. & A.C.		
h.	Mains electricity		
i.	Power in circuits		
j.	Energy transfers in electrical appliances		
k.	The national grid		
l.	Role of transformers		

	20. PARTICLE MODEL OF MATTER	<u>Knowledge</u>	<u>Practice</u>
a.	Density		
b.	Changes of state		
c.	Internal energy		
d.	Specific heat capacity (<i>again</i>)		
e.	Specific latent heat		
f.	Particle motion in gases		

	21. ATOMIC STRUCTURE	<u>Knowledge</u>	<u>Practice</u>
a.	Structure of an atom		
b.	Mass number, atomic number & isotopes		
c.	Development of atomic model		
d.	Radioactive decay		

e.	Properties of nuclear radiation		
f.	Nuclear equations		
g.	Half life		
h.	Contamination & irradiation		

	22. FORCES	<u>Knowledge</u>	<u>Practice</u>
a.	Scalars & vectors		
b.	Contact & non-contact forces		
c.	Gravity & weight		
d.	Resultant forces		
e.	Work done		
f.	Springs & elasticity		
g.	Distance & displacement		
h.	Speed & velocity		
i.	Distance-time graphs		
j.	Acceleration		
k.	Velocity-time graphs		
l.	Terminal velocity		
m.	Newton's first law		
n.	Newton's second law		
o.	Newton's third law		
p.	Stopping distance & reaction time		
q.	Factors affecting braking distance		

	23. WAVES	<u>Knowledge</u>	<u>Practice</u>
a.	Transverse & longitudinal waves		
b.	Properties of waves		
c.	Refraction		
d.	Ray diagrams (refraction)		
e.	Waves for detection & exploration		
f.	Electromagnetic (EM) spectrum		
g.	Risks of EM radiation		
h.	Uses of EM waves		

	24. MAGNETISM & ELECTRO-MAGNETISM	<u>Knowledge</u>	<u>Practice</u>
a.	Bar magnets		
b.	Magnetic fields		
c.	Electromagnets		

EQUATIONS	
Weight = mass x gravitational field strength	$W = m g$
Work done = force x distance	$W = F s$
Force (applied to a spring) = spring constant x extension	$F = k e$
Distance = speed x time	$s = v t$
Acceleration = $\frac{\text{change in velocity}}{\text{time}}$	$a = \frac{\Delta v}{t}$
Resultant force = mass x acceleration	$F = m a$
Momentum = mass x velocity	$p = m v$
Kinetic energy = 0.5 x mass x (speed)²	$E_k = \frac{1}{2} m v^2$
Gravitational potential energy = mass x gravitational field strength x height	$E_p = m g h$
Power = $\frac{\text{energy transferred}}{\text{time}}$	$P = \frac{E}{t}$
Power = $\frac{\text{work done}}{\text{time}}$	$P = \frac{W}{t}$
Efficiency = $\frac{\text{useful energy out}}{\text{total energy in}}$	
Efficiency = $\frac{\text{useful power out}}{\text{total power in}}$	
Wave speed = frequency x wavelength	$v = f \lambda$
Charge = current x time	$Q = I t$
Potential difference = current x resistance	$V = I R$
Power = potential difference x current	$P = V I$
Power = (current)² x resistance	$P = I^2 R$
Energy transferred = charge x potential difference	$E = Q V$
Density = $\frac{\text{mass}}{\text{volume}}$	$\rho = \frac{m}{V}$

PRACTICALS

RP 1: "Make use of a light microscope to observe, draw and label plant and animal cells."

RP 2: "Investigate the effect of different concentrations of salt or sugar solutions on the mass of plant tissue."

RP 3: "Make use of reagents to test for the presence of different carbohydrates, lipids and proteins."

RP 4: "Investigate the effect of pH on the rate of reaction of amylase."

RP 5: "Investigate the effect of light intensity on the rate of photosynthesis of an aquatic plant."

RP 6: "Investigate the effect of a specific factor on human reaction time."

RP 7: "Use sampling techniques to investigate the effect of a specific factor on the distribution of a species in a habitat."

RP 8: "Prepare a pure, dry sample of a soluble salt from an insoluble oxide or carbonate."

RP 9: "Investigate the electrolysis of aqueous solutions (a hypothesis must be formed and developed)."

RP 10: "Investigate factors affecting temperature change when reacting solutions together."

RP 11a: "Investigate how concentration affects the rate of reaction by measuring the volume of gas produced (a hypothesis must be formed and developed)."

RP 11b: "Investigate how concentration affects the rate of reaction by observing a colour change (a hypothesis must be formed and developed)."

RP 12: "Use paper chromatography to separate coloured substances and determine R_f values."

RP 13: "Identify pH and amount of dissolved solids in water samples from different sources, and use distillation to purify them."

RP 14: "An investigation to determine the specific heat capacity of one or more materials."

RP 15a: "Investigate how the length of a wire at constant temperature affects the resistance of electrical circuits."

RP 15b: "Investigate how combinations of resistors in series and parallel affect the resistance of electrical circuits."

RP 16: "Use circuit diagrams to investigate the I-V characteristics of a filament lamp, a diode and a resistor at constant temperature."

RP 17: "Determine the densities of regular and irregular solid objects and liquids."

RP 18: "Investigate the relationship between force and extension of a spring."

RP 19: "Investigate separately how varying the force and mass of an object affect its acceleration."

RP 20: "Measure the frequency, wavelength and speed of waves in a ripple tank, and waves in a solid."

RP 21: "Investigate how the amount of infrared radiation absorbed and radiated depends on the type of surface."

ASSESSMENTS	Duration	Marks	Topics
Biology Paper 1	1 hour 15 min	70 marks	Topics 1 – 4
Biology Paper 2	1 hour 15 min	70 marks	Topics 5 - 7
Chemistry Paper 1	1 hour 15 min	70 marks	Topics 8 – 12
Chemistry Paper 2	1 hour 15 min	70 marks	Topics 13 - 17
Physics Paper 1	1 hour 15 min	70 marks	Topics 18 – 21
Physics Paper 2	1 hour 15 min	70 marks	Topics 22 - 24