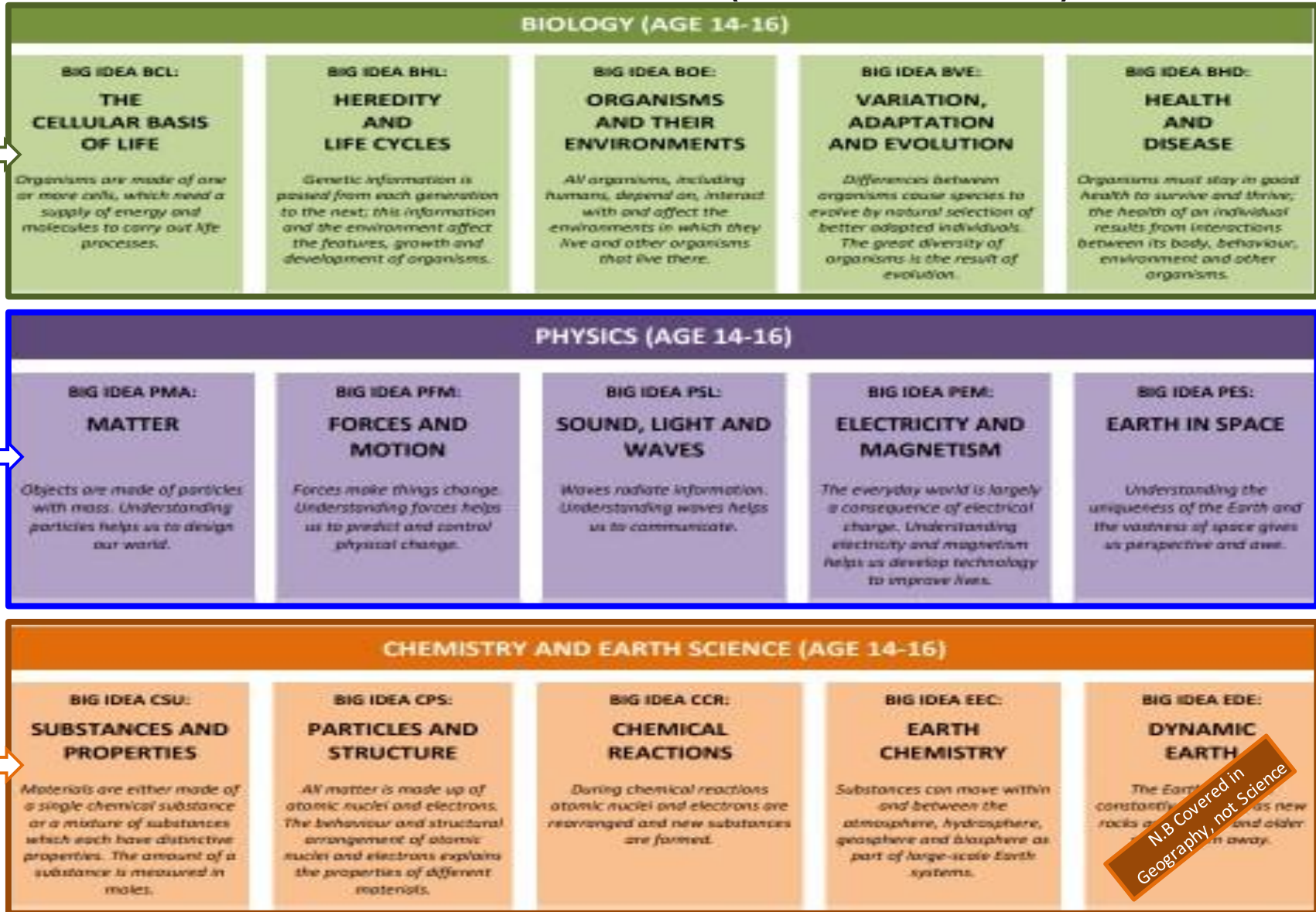


Key Concept Map for Teaching GCSE Science KS4 (Edexcel 9-1)



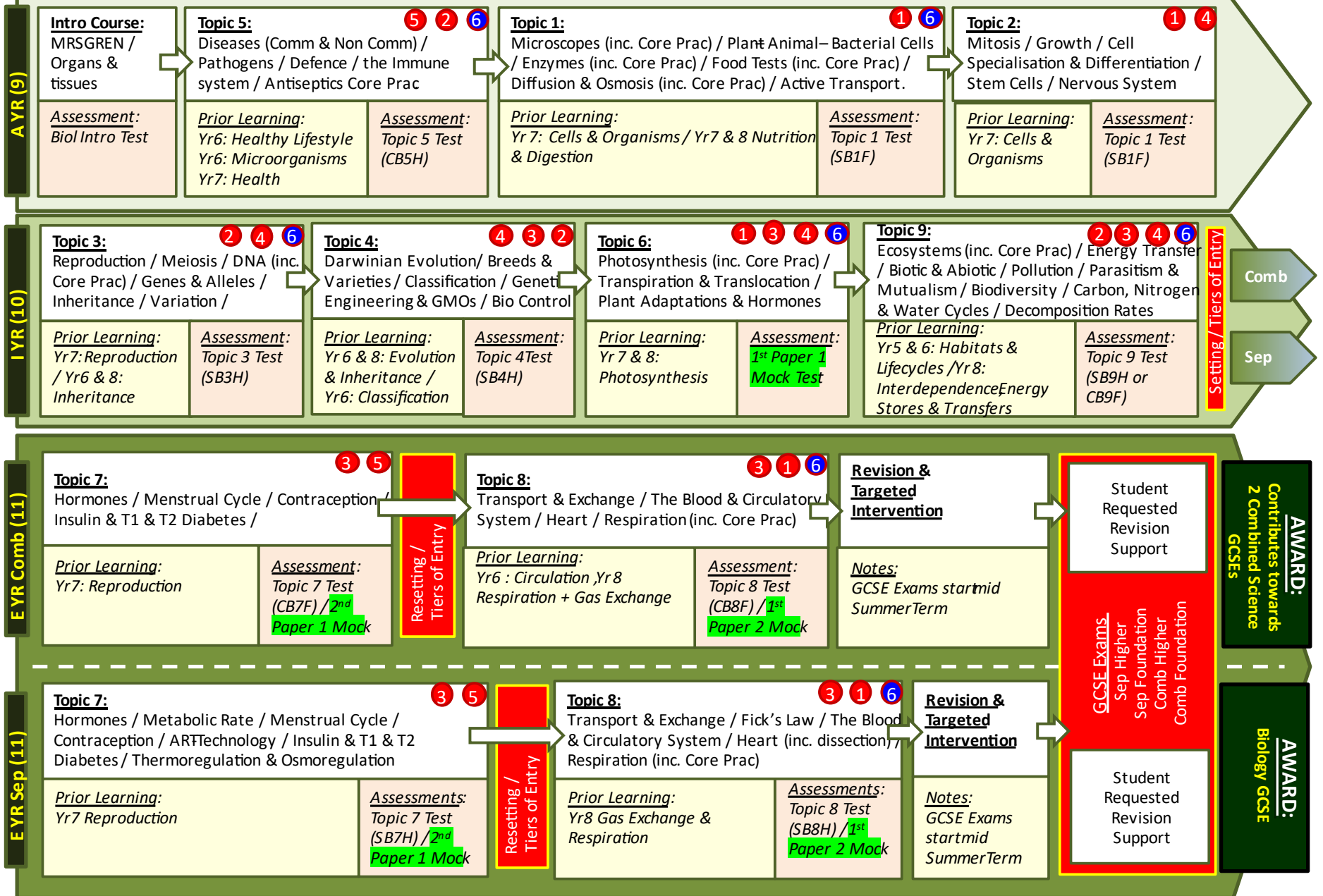
3 Parallel Streams of 5 Concepts per Science Subject, Encompassing Each Subject's Full GCSE Specification, Delivered Via a Timetable of Integrated Theory & Practical Based Lessons



N.B Covered in Geography, not Science

Biology Edexcel (91) GCSE Road Map

1 Cellular Basis of Life	2 Heredity & Life Cycles	3 Organisms & Their Environment
4 Variation, Adaptation & Evolution	5 Health & Disease	6 Learning Through Experiment

Chemistry Edexcel (1-9) GCSE Road Map

1 Substances & Properties

4 Earth Chemistry

2 Particles & Structure

6 Learning Through Experimentation

3 Chemical Reactions



A YR (9)

Intro Course: <u>diagrams/formulae/equations</u> <i>Assessment:</i> Chemistry Intro Test	Topic 2 – States and Separation methods: S/L/G, state changes, filtration, crystallisation, distillation , chromatography (core practical)	6 1	Topic 1 – Atomic structure and Periodic table Subatomic particles, atomic number and RAM, isotopes, Mendeleev, groups, periods, electron configuration	2	Topic 1: Bonding and material properties Ions and ionic bonding, covalent (simple molecular and carbon allotropes), metallic, linking properties to structure	1 6 3 2

I YR (10)

Topic 3 – Acids and Bases: pH and indicators, changing pH (CP) Reactions with metals and bases, strong and weak acids, gas tests, solubility, making CuSO₄ (CP)	2 1 3 6	Topic 4/5 – metals, Transition metals and alloys: extracting metals (CP) , redox, catalysts	4 3 2 1 6	Topic 3/5 – electrolysis, plating and fuel cells: molten and aqueous CuSO₄ with inert and Cu electrodes (CP) uses of plating	1 3 6 2	Topic 6/7 – groups, rates: alkali metals, halogens, halogen displacement reactions, noble gases, collision theory, using gas volume and opacity to measure rates (CP)	6 3 2 1

Setting / Tiers of Entry

Comb

Sep

E YR Comb (11)

Topic 7/4 – energy and dynamic equilibria: exothermic and endothermic, Haber process	3 6 2	Resetting / Tiers of Entry	Topic 1 – Calculations: RFM, empirical formula moles concentrations yields, limiting reagents	6 1 3 2	Topic 8: fuels and the atmosphere crude oil, homologous series, cracking	3 1 6 4 2	Revision & Targeted Intervention:	6

AWARD: Contributor towards 2 Combined Science GCSEs

Student Requested Revision Support

E YR Sep (11)

Topic 7/4 – energy and dynamic equilibria: exothermic and endothermic, bond enthalpies Haber process, changing conditions, fertilisers	6 3 2 1 3	Resetting / Tiers of Entry	Topic 1/5 – Calculations: RFM moles, emp. form. concentrations, titration (CP) , gas volumes, yields, limiting reagents, atom economy	3 1 6 2	Topic 8/9 – Fuels and the Atmosphere: crude oil, homologous series, alcohol combustion (CP)	6 4 3 2 1	Topic 9: ion id., materials, nanoparticles	6 2 1 3

AWARD: Chemistry GCSE

Student Requested Revision Support

GCSE Exams


Sep Higher

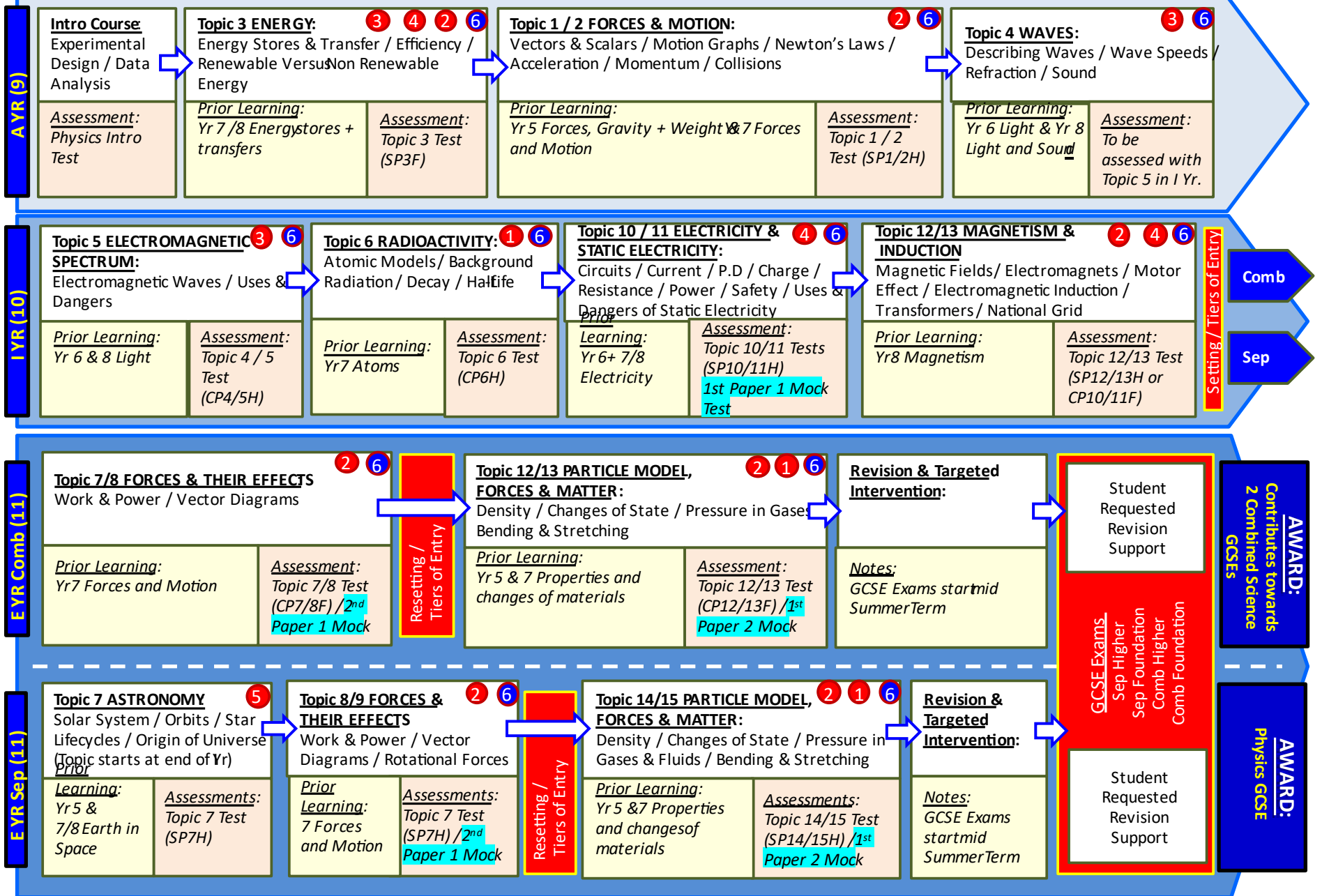
Sep Foundation

Comb Higher

Comb Foundation

Physics Edexcel (91) GCSE Road Map

1 Matter	2 Forces & Motion	3 Sound Light & Waves	
4 Electricity & Magnetism	5 Earth in Space	6 Learning Through Experiment	



AS '23/'24	AS/A Level Biology A (H020/H420)	Term 1 (Lessons): Content & PAGs & Topic Assessment	Term 1 Complete By & Summative Assessment ⁴	AS/A Level Biology A (H020/H420)	Term 2 (Lessons): Content & PAGs & Topic Assessment	Term 2 & 3 Complete By & Summative Assessment ⁴
1 st Teacher Lessons (5)	Module 2. (2.1.1-3) Foundations in Biology (~35 Lesson slots available)	<ul style="list-style-type: none"> • Mark Summer Work • 2.1 Cell Structure (11) / (PAG1.1 – Microscope) • 2.2 Biological Molecules (14) / (PAG9.1-3–Food test) / Topic (Biomols & Enzymes) Assment⁵ 	<p>Summer work graded by HT</p> <p>By mid Nov</p>	Module 3. Exchange & Transport (~46 Lesson slots available)	<ul style="list-style-type: none"> • Review Mock Paper (1) • 3.1 Exchange Surfaces (7) / Topic Assment⁵ Mock Revision (4) • 3.2 Transport in Animals (14) / (PAG2.1-Heart Dissection) / (PAG 11.1 Pulse Rate) 	<p>(Note: AS Mock in Jan)</p> <p>By half term of 2nd term</p>
		<ul style="list-style-type: none"> • 2.3 Nucleotides & Nucleic Acids (4) / (PAG10.1 – data-logger - RASMOL) • Maths Skills (all 4 stats) (4) 	<p>By end 1st term</p>		<ul style="list-style-type: none"> • 3.3 Transport in Plants (10) / (PAG5.3–Potometer) / Topic Assment⁵ / Exam Revision (?) 	<p>By All Change (Full AS Mock in June)</p>
2 nd Teacher lessons (4)	Module 2. (2.1.4-6) Foundations in Biology (~28 lessons available)	<ul style="list-style-type: none"> • Mark Summer Work • 2.4 Enzymes (8) / (PAG4.1- Rates of Reaction) / 	<p>By mid Nov</p>	Module 4. Biodiversity, Evolution & Disease (~37 lessons available)	<ul style="list-style-type: none"> • 4.1 Communicable Diseases (9) / Topic Assment⁵ / Mock Revision (2) 	<p>By 1st half of 2nd term</p>
		<ul style="list-style-type: none"> • 2.5 Biological Membranes (8) / (PAG8.1-Osmosis) 	<p>By end 1st Term</p>		<ul style="list-style-type: none"> • 4.2 Biodiversity (11) / Revise for Mock (PAG3.1or 3.2–Sampling – on Biol Field Trip) 	<p>By end 2nd term</p>
		<ul style="list-style-type: none"> • 2.6 Cell Division (8) / Topic (DNA & Cell Div) Assment⁵ 			<ul style="list-style-type: none"> • 4.3 Classifictn & Evolution (7) / Revise for Mock / Exam Revision (?) 	<p>By All Change (Full AS Mock in June)</p>

A2 '23/'24	A Level Biology A (H420)	Term 1 (Lessons): Content & PAGs & Topic Assessment	Term 1 Complete By & Summative Assessment⁴	A Level Biology A (H420)	Term 2 (Lessons): Content & PAGs & Topic Assessment	Term 1 Complete By & Summative Assessment⁴
1st Teacher Lessons (5)	Module 5. Communication / Homeostasis / Energy	<ul style="list-style-type: none"> • 5.1 Communication & homeostasis (4) / • 5.2 Excretion as e.g. of homeostatic control (6) / Topic Assmnt⁵ • 5.3 & 5.4 Neuronal & hormonal Communication (10) / Topic Assmnt⁵ 	Complete all work by end of 1 st half of 1 st term 2nd AS mock (just after HT ~ Nov?)	Module 6. Genetics / Evolution / Ecosystems (continued)	<ul style="list-style-type: none"> • 6.1 Cellular Control (5) • 6.2 Patterns of Inheritance (9) / Topic Assmnt 	Complete all work by end of 1 st half of 2 nd term
		<ul style="list-style-type: none"> • 5.5 Plant & Animal Responses (10) / Topic Assmnt (only on Animals)⁵ 	Complete all work by end of 1 st term		<ul style="list-style-type: none"> • Revision for Mocks (2) • 6.3 Manipulating Genomes (8) / Topic Assmnt • PAG6.2 - Electrophoresis • Revision (i.e. any remaining lessons?) 	(N.B Late Feb: A2 mock) By end 2 nd Term
2nd Teacher Lessons (4)	Module 5. Communication / Homeostasis / Energy	<ul style="list-style-type: none"> • 5.6 Photosynthesis (10) / Topic Assmnt⁵ • PAG6.3 – TLC • 5.7 Respiration(9)/ Topic Assmnt⁵ • PAG12.1 Yeast Resp: Research Task (4) 	Complete all work by end of 1 st term	Module 6. Genetics / Evolution / Ecosystems (continued)	<ul style="list-style-type: none"> • 6.4 Cloning & Biotech (11)/ Topic Assmnt⁵ • PAG7.1 Microbe Growth • 6.5 Ecosystems (6) & 6.6 Populations - Sustainability(6)/ Topic (Ecology) Assmnt⁵ • Revision(remaining lessons) (6) 	By end 2 nd Term

AQA Chemistry A level Road Map

Physical Chemistry

Organic Chemistry

Inorganic Chemistry



Year 12

Atomic structure
Electron arrangement
Mass spectrometry

Bonding

I/C/M bonding
Intermolecular forces
Shapes of molecules

End of topic tests

Amount of substance
 M_r , Moles, concentrations
Ideal gas equation
Empirical formulae
Using chemical equations

End of topic tests

Intro to Organic Chemistry
Nomenclature
Isomerism

Energetics

Exothermic and endothermic
Enthalpy changes
Hess's Law
Bond enthalpies

End of topic tests

Xmas LAG

Alkanes
Crude oil
Cracking
Combustion
Formation of halogenoalkanes

Kinetics

Collision theory
Maxwell Boltzmann
Catalysts

End of topic tests

Halogenoalkanes

Introduction
Nucleophilic substitution
Elimination reactions

Year 12

Equilibria

Changing conditions
 K_c and calculations

End of topic tests

Alkenes

Electrophilic addition
Addition polymers

Oxidation, reduction and redox reactions
Oxidation states
Redox equations

End of topic tests

Alcohols

Production of ethanol
Reactions of alcohols
Oxidation of alcohols

Periodicity

Trends in Period 3

End of topic tests

Organic analysis

Test tube reactions
Mass spectrometry
Infrared spectroscopy

Group 2

Reactions
Solubility
Thermal stability

End of topic tests

Year 12 Mock Exam

Group 7

The Halogens
Reactions of Halogens
Reactions of halide ions

Year 13

Thermodynamics

Born-Haber cycles
Other enthalpy changes
Entropy and spontaneity

End of topic tests

Carbonyl containing compounds

Nomenclature 2
Reactions of the carbonyl group
Carboxylic acids and esters
Acylation

Kinetics

Rates of reaction
Rate expression and orders
Finding the rate equation
The rate determining step

End of topic tests

Aromatic Chemistry

Arenes— properties and naming
Reactions of arenes

K_p

The K_p equilibrium constant in homogeneous systems

End of topic tests

Amines

Amines as bases
Amines as nucleophiles
Amine synthesis

Electrochemistry

Half cells and voltages
Predicting reaction directions
Electrochemical cells

End of topic tests

Polymerisation

Condensation polymers

Year 13

Acids, Bases and Buffers

Defining acids, the pH scale
Weak acids and bases
Titrations
Buffers

End of topic tests

Amino acids, proteins and DNA

Peptides and enzymes
DNA and anticancer drugs

Period 3

Reactions of the elements
Oxides of Period 3

End of topic tests

Organic Synthesis and analysis

Synthetic routes
Analysis of unknown compounds

Transition metals

Properties
Complex ions and shapes
Coloured ions
Variable oxidation states
Catalytic activity

End of topic tests

Structural determination

N.M.R— carbon and proton

Reactions in solutions

Transition metal acid/base
Ligand substitution

End of topic tests

Chromatography

Methods and uses

AWARD:
Chemistry A level

Yr12 '22/'23	AS/A Level Physics	Term 1 (Lessons): Content & Pracs & Topic Assessment	Term 1 Complete By & Summative Assessment	AS/A Level Physics	Term 2 (Lessons): Content & Pracs & Topic Assessment	Term 2 & 3 Complete By & Summative Assessment
Teacher Lessons (4)	(~28 lessons available)	Mark Summer Work Electricity CPAC 2 (Resistivity) CPAC 3 (Internal resistance) CPAC 12 (Thermistors) Electricity Topic Assessment	By Christmas	(~37 lessons available)	Mock revision + review mock Paper Waves continued CPAC 7 (Vibrations) CPAC 8 (Diffraction) Waves Topic Assessment	(Note: AS Mock in Jan – electricity, waves, mech) By All Change
		Start Waves CPAC 6 (Speed of sound)			Mock Revision Nuclear (year 13 content) CPAC 15 (Radiation)	(Full AS Mock in June) By Summer hols
Teacher lessons (5)	(~35 Lesson slots available)	Introductory topic Mark Summer Work	Intro test by 5 th October By Christmas	(~46 Lesson slots available)	Materials CPAC 4 (Viscosity) CPAC 5 (Young modulus) Materials Topic Assessment	By Easter
		Mechanics CPAC 1 (Acceleration)			Space (year 13 content) Space Topic Assessment	By All Change

					Mock Revision Start Circular motion (year 13 content)	(Full AS Mock in June) By Summer Hols
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Student Name: _____

Target Grade _____

Freman College

Edexcel Year 12 Physics: Practical / Assessment Record Sheet

Module / Work	Date	Mark (x out of y) or for PAG: "completed"	Grade	Above/Below Target	Student / Teacher Improvement Strategy (i.e. What content needs further revision? / Which concepts need better understanding? / Which exam technique needs improving? / Etc.)	Student Sign.	Teacher Sign.
Summer Prac Write Up & Research							
			N/A	N/A	N/A	N/A	N/A
Assessment							
			N/A	N/A	N/A	N/A	N/A
			N/A	N/A	N/A	N/A	N/A
			N/A	N/A	N/A	N/A	N/A
			N/A	N/A	N/A	N/A	N/A
Assessment							
AS Mock							
			N/A	N/A	N/A	N/A	N/A
Assessment							
Assessment							
			N/A	N/A	N/A	N/A	N/A
Assessment							
Assessment							
			N/A	N/A	N/A	N/A	N/A
Assessment							
Full AS Mock June							

Notes: Keep this Assessment Record at the front of your folder. Bring it to every lesson so it is available for inspection at all times.

Yr 13 '22/'23	A Level Physics	Term 1 (Lessons): Content & Pracs & Topic Assessment	Term 1 Complete By & Summative Assessment	A Level Physics	Term 2 (Lessons): Content & Pracs & Topic Assessment	Term 1 Complete By & Summative Assessment
Teacher Lessons (5)	(~35 Lesson slots available)	Electricity and magnetic fields CPAC 11 (Capacitors) Elec and magnetic Topic Assessment	2nd AS mock (just after HT ~ Nov?)		Particle Physics	By Feb half term
		Thermodynamics CPAC 13 (Specific heat) CPAC 14 (Pressure) Thermodynamics Topic Assessment	By Christmas		Revision for Mocks (2) Revision	(N.B Late Feb: A2 mock – grav, further mech, elec + mag, thermo)
Teacher Lessons (4)	(~28 lessons available)	Further mechanics CPAC 9 (Momentum) CPAC 10 (Collisions) Further mechanics Topic Assessment	Further Mechanics by 5 th October Complete all work by end of 1 st term		Oscillations CPAC 16 (res frequencies) Gravitational fields Gravitational fields Topic Assessment	By Easter
		Start Gravitational fields			Revision	

Student Name: _____

Target Grade _____

Freman College

Edexcel Physics: Prac / Assessment Record Sheet

Module / Work	Date	Mark (x out of y) or for PAG: "completed"	Grade	Above/ Below Target	Student / Teacher Improvement Strategy (i.e. What content needs further revision? / Which concepts need better understanding? / Which exam technique needs improving? / Etc.)	Student Sign.	Teacher Sign.
			N/A	N/A	N/A	N/A	N/A
Assessment							
Assessment							
Assessment							
Assessment							
			N/A	N/A	N/A	N/A	N/A
Assessment							
			N/A	N/A	N/A	N/A	N/A
			N/A	N/A	N/A	N/A	N/A
AS Mock (Nov)							
Assessment							
Assessment							
A2 Mock Exam (Early Jan)							
Assessment							
			N/A	N/A	N/A	N/A	N/A
Assessment							
Revision Questions / Paper 1...	Term 3						
Revision Questions / Paper 2...	Term 3						

Notes: Keep this Assessment Record at the front of your folder. Bring it to every lesson so it is available for inspection at all times.