

Combined Science Paper 2 FOUNDATION

Biology

These specification points will be the **major focus** of this paper.

Spec point	Concepts	CGP revision guide pages	Bitesize	YouTube
4.5.3 Hormonal Control in Humans	<ul style="list-style-type: none"> -definition of 'hormone' function of the tissues and organs of the endocrine system -identifying position of glands, and the hormones secreted from them -hormones involved in control of blood glucose concentration -Type 1 and Type 2 diabetes 	103-107	https://www.bbc.co.uk/bitesize/guides/zq4mk2p/revision/1 (1 to 5)	https://www.youtube.com/watch?v=c6olhi88KZs https://www.youtube.com/watch?v=77oyUdNZ054
4.6.1 Reproduction	<ul style="list-style-type: none"> -describe the structure of DNA -define 'genome' -structure of a chromosome -definition of 'gene' -definition of key inheritance terms e.g. heterozygous, recessive allele, phenotype -construct punnett squares -determine probability -inherited disorders -make informed judgements about the economic, social and ethical issues concerning embryo screening, 	113 120-125	https://www.bbc.co.uk/bitesize/guides/zycmk2p/revision/3 https://www.bbc.co.uk/bitesize/guides/zcdfmsg/revision/1	https://www.youtube.com/watch?v=ww1TQXBQ6wQ https://www.youtube.com/watch?v=zNEtVaNQ0s8 https://www.youtube.com/watch?v=mvWy5lbUoHA https://www.youtube.com/watch?v=sYPwWHszLDo
4.7.1 Adaptations, interdependence and competition	<ul style="list-style-type: none"> -Describe the different levels of organisation in an ecosystem -Describe the importance of interdependence and competition in a community. -Identify biotic and abiotic factors -Suggest the factors for which organisms are competing in a given habitat 	141-143	https://www.bbc.co.uk/bitesize/guides/z86gpbk/revision/1 (1 to 7)	https://www.youtube.com/watch?v=XVD5izWXmKo https://www.youtube.com/watch?v=0mjafH5pVLA
4.7.2 Organisation of an ecosystem	<ul style="list-style-type: none"> -interpret food chains and webs -identify producers, consumers, predators and prey from food chains and webs -describe the carbon and water cycles 	145-150	https://www.bbc.co.uk/bitesize/guides/zqskv9q/revision/1	https://www.youtube.com/watch?v=dRFQ8rZCK6Q https://www.youtube.com/watch?v=urzpnjwazV0
Required Practical 7: measure the population size of a common species in a habitat. Use sampling techniques to investigate the effect of a factor on the distribution of this species	<ul style="list-style-type: none"> -Using transects and quadrats are used by ecologists to determine the distribution and abundance of species in an ecosystem. -Understand the terms mean, mode and median -Calculate arithmetic means 	147	https://www.bbc.co.uk/bitesize/guides/zqskv9q/revision/3	https://www.youtube.com/watch?v=2MW6nwf80XM https://www.youtube.com/watch?v=RhMOCxXcDrQ https://www.youtube.com/watch?v=yLHz2Ea10Mg&t=2s

These specification points will **not be assessed** on this paper.

Spec point	CGP Revision Guide Pages
4.5.2 The human nervous system	98-101
4.5.3.3 Hormones in human reproduction	108-109
4.5.3.4 Contraception	110-111
4.6.1.1 Sexual and asexual reproduction	114-115
4.6.1.2 Meiosis	116-117
4.6.1.6 Sex Determination	118
4.6.2.1 Variation 4.6.2.2 Evolution 4.6.2.3 Selective Breeding 4.6.3.3 Extinction 4.6.3.4 Resistant Bacteria	126-133
4.7.1.4 Adaptations	
4.7.3.1 Biodiversity	
4.7.3.3 Land Use	
4.7.3.4 Deforestation	
4.7.3.5 Global Warming	
4.7.3.6 Maintaining Biodiversity	

Chemistry

These specification points will be the **major focus** of this paper.

Spec point	Concepts	CGP revision guide pages	Bitesize	YouTube
<p>5.6.1 Rate of Reaction</p> <p>5.6.2 Reversible reactions and dynamic equilibrium</p>	<ul style="list-style-type: none"> -Calculating the rate of a reaction -Describe collision theory -Define activation energy -Describe and explain the factors that increase the rate of reaction -Describe and explain the effect of catalysts on rate of reaction -identify and give examples of reversible reactions -apply the conservation of energy to reversible reactions -define dynamic equilibrium 	233-245	<p>https://www.bbc.co.uk/bitesize/guides/zpkp7p3/revision/1</p> <p>https://www.bbc.co.uk/bitesize/guides/z32bbpk/revision/1</p> <p>Only page 1</p>	<p>https://www.youtube.com/watch?v=UkrBJ6-uGFA</p> <p>https://www.youtube.com/watch?v=GCR5xeduq2o</p> <p>https://www.youtube.com/watch?v=-4HXaUBbv04</p> <p>https://www.youtube.com/watch?v=hel8fQjxcO8</p> <p>https://www.youtube.com/watch?v=66qcNNJFy6E</p>
Required Practical 11: investigate how concentration affects the rates of reaction by a method involving measuring the volume of a gas produced/change in colour	<ul style="list-style-type: none"> -identify independent, dependent and control variables -describe how to measure the dependent variable -analyse results and draw conclusions from graphed data -calculate rate of reaction from data 	237-241	<p>https://www.bbc.co.uk/bitesize/guides/zpkp7p3/revision/6</p>	<p>https://www.youtube.com/watch?v=N5p06i9ilmo</p> <p>https://www.youtube.com/watch?v=Gl6LVl7oAlU</p>
5.7.1 Carbon compounds as fuels and feedstock	<ul style="list-style-type: none"> -describe crude oil as a mixture of different length hydrocarbons -define the term hydrocarbon -identify the first 4 alkanes from their chemical formula and name them -Describe the trend in properties as hydrocarbon chain length increases -Describe and explain the process of fractional distillation -describe the process of cracking -describe the use of alkenes 	246-253	<p>https://www.bbc.co.uk/bitesize/guides/zxd4y4j/revision/1</p>	<p>https://www.youtube.com/watch?v=CX2IYWggEBC</p> <p>https://www.youtube.com/watch?v=3I7yCkSXPos</p> <p>https://www.youtube.com/watch?v=7AWwjKbRa_o</p>
5.8.1 Purity, formulations and chromatography	<ul style="list-style-type: none"> -Define the term pure substance in chemistry -Use melting and boiling point data to identify pure and impure substances -Define the term formulation and give examples 	254-256	<p>https://www.bbc.co.uk/bitesize/guides/zp2wrwx/revision/1</p>	<p>https://www.youtube.com/watch?v=3oJxWwcnfJY</p>
Required Practical 12: investigate how paper chromatography can be used to separate and tell the difference between coloured substances.	<ul style="list-style-type: none"> -Describe the properties of the mixtures that chromatography can be used to separate -Describe and explain the experimental process of chromatography -Explain how substances are separated using chromatography -Interpret chromatograms + -Calculate R_f values 	256-258	<p>https://www.bbc.co.uk/bitesize/guides/zp2wrwx/revision/3</p>	<p>https://www.youtube.com/watch?v=TdJ57SQ6GAQ</p> <p>https://www.youtube.com/watch?v=pnTGNAfu6GE</p>

Spec point	Concepts	CGP revision guide pages	Bitesize	YouTube
5.9.1 The composition and evolution of the Earth's Atmosphere	-describe the composition of the current atmosphere -describe the composition of the early atmosphere and explain theories of how the early atmosphere formed -explain how the early atmosphere changed to that of the present atmosphere	262	https://www.bbc.co.uk/bitesize/guides/z9pk3k7/revision/1	https://www.youtube.com/watch?v=t1Z3GINldLA https://www.youtube.com/watch?v=l0h-3M0Pso
5.9.3 Common atmospheric pollutants and their sources	-State the atmospheric pollutants released into the atmosphere from the complete and incomplete combustion of fossil fuels -Describe the negative impacts of these pollutants on health and the environment	267	https://www.bbc.co.uk/bitesize/guides/zq3797h/revision/1	https://www.youtube.com/watch?v=yLp6LOgPHml
5.10.1 Using the Earth's resources and obtaining potable water	-Describe the renewable and non-renewable resources that we get from the Earth and its atmosphere -Define the term potable water -Describe how potable water can be produced. -Describe the differences in the treatment of waste water, salt water and ground water	270-272 276	https://www.bbc.co.uk/bitesize/guides/zswfxfr/revision/1 https://www.bbc.co.uk/bitesize/guides/zg6cfcw/revision/1	https://www.youtube.com/watch?v=-XczTGavTZU https://www.youtube.com/watch?v=n7pYRQs20bl

Exam date: 20th June

These specification points will **not be assessed** on this paper.

Spec point	CGP Revision Guide Pages
5.9.2 Carbon dioxide and methane as greenhouse gases	156-157

These areas **may still be assessed** in multiple choice questions/linked to a previous answer, so cannot be completely ignored in your revision.

Content	CGP Revision Guide Pages
Tests for Gases	259
LCA	273

Physics

Foundation paper 2

MAJOR FOCUS

Revision
Pages

6.5.1 Forces and their interactions	<ul style="list-style-type: none"> • Scalar quantities – magnitude only (mass, time, temperature, speed, distance) • Vector quantities – magnitude and direction (weight, force, velocity, acceleration, displacement) • Contact forces – objects physically touching – friction, drag, tension, normal contact force • Non-contact forces – not touching – magnetism, gravity, electrostatic force • Mass is constant, weight is the force acting on a mass due to gravity, with weight and mass being directly proportional • Weight = mass x gravitational field strength ($W = m \times g$) • Multiple forces acting on an object can be replaced by a single, resultant force 	347-349
6.5.4.1 Describing motion along a line	<ul style="list-style-type: none"> • Explain difference between distance (scalar) and displacement (vector) • Explain difference between speed (scalar) and displacement (vector) • Typical values (all can vary) <ul style="list-style-type: none"> ○ Walking ≈ 1.5 m/s ○ Running ≈ 3 m/s ○ Cycling ≈ 6 m/s ○ Sound in air ≈ 330 m/s • For object moving at constant speed, distance can found using distance = speed x time ($s = v \times t$) • A journey in a straight line can be represent by a distance-time graph • Speed can be found from the gradient of the distance-time graph • Acceleration = change in velocity/time ($a = \frac{v-u}{t}$) • Acceleration can be calculated from gradient of velocity-time graph • (Final velocity)² – (initial velocity)² = 2 x acceleration x distance ($v^2 - u^2 = 2 \times a \times s$) • Falling objects accelerate due to force of gravity. Eventually weight = drag, resultant force = zero and object reaches terminal velocity 	356-360
6.5.4.2 Forces, accelerations and Newton's laws of motion	<ul style="list-style-type: none"> • Newton's First Law: If the resultant force acting on an object is zero and: <ul style="list-style-type: none"> ○ Object is stationary, it remains stationary ○ Object is moving, it continues moving at same velocity • Velocity only changes if force acts on object • Newton's Second Law: acceleration is proportional to resultant force • Force = mass x acceleration ($F = m \times a$) • Newton's Third Law – when two objects interact, they exert an equal and opposite force on each other 	362-363
6.5.4.3 Forces and Braking	<ul style="list-style-type: none"> • Stopping distance = thinking distance + braking distance • Thinking distance – people naturally having different reaction times, tiredness, drugs, alcohol, distractions, speed of car • Braking distance – adverse road conditions (rain/ice/snow) condition of brakes, condition of tyres, speed of car • When brakes pressed, friction between brakes and wheel transfers energy from kinetic store to thermal store (car slows, brakes get hot) • Large deceleration can lead to brakes overheating/loss of control of car 	368-369
6.6.2 Electromagnetic waves	<ul style="list-style-type: none"> • All EM waves are transverse, travel at speed of light (3×10^8 m/s) in vacuum or air • Grouped by wavelength/frequency • In order, from long wavelength (low frequency) to short (high frequency) – radio, micro, infra-red, visible, UV, x-ray, gamma) • Refraction diagrams – less dense to more dense, moves towards normal – more dense to less dense, moves away from the normal • UV/X-ray/Gamma – can have hazardous effort on human tissue, depending on size of dose/type of radiation. • Radiation measured in Sieverts – 1000 milli Sievert (1000 mSV) = 1 Sievert (1 Sv) • UV can cause skin to age prematurely and lead to skin cancer. X-ray/gamma both ionising – can cause cancer/mutation of genes. 	378-383

	<ul style="list-style-type: none"> • Uses of EM spectrum <ul style="list-style-type: none"> ○ Radio – TV and radio ○ Microwave – satellite, wi-fi, mobile phone, heating food ○ Infra-red – electrical heaters, cooking food, IR cameras, remote controls ○ Visible light – telescopes, fibre optics ○ UV – energy efficient lamps, sun-tan beds ○ X-ray & Gamma – medical imaging and treatments 	
6.7.1 Permanent and induced magnetism, magnetic forces and fields	<ul style="list-style-type: none"> • Magnets have north and south poles • Poles are where magnets are strongest • North & north/south & south repel • North & south attract • Permanent magnet – has own magnetic field • Induced magnet – becomes a magnet when placed in magnetic field. Always causes force of attraction. Loses magnetism quickly when removed from magnetic field • Region around magnet where force acts is called magnetic field – strength of field depends on distance from magnet • Direction of field line is north to south 	386-387
6.7.2 The motor effect	<ul style="list-style-type: none"> • When a current flows through a wire a magnetic field is produced around the wire. • Shaping the wire into a solenoid (coil) increases the strength of the magnetic field – the field inside the solenoid is strong and uniform • Adding an iron core increases the strength of the solenoid – this is an electromagnet • When a wire carrying an electromagnet is placed in a magnetic field the field and conductor exert a force on each other – this is the motor effect • Fleming’s left-hand rule show the direction of the force (thumb), field (first finger) and current (middle finger) • Force = magnetic flux density x current x length ($F = B \times I \times l$) • A coil carrying a current in a magnetic field will rotate – this is the basis of electric motors 	388-389
Required Practical	<ul style="list-style-type: none"> • Investigate how the amount of infra-red radiation absorbed or radiated by a surface depends on the nature of the surface 	381-382
Low Tariff/Linked Topics		
6.5.2 Work done and energy transfer	<ul style="list-style-type: none"> • Work is done on an object when a force causes it to move. • Work done = force x distance ($W = F \times s$) • 1 joule of work done = 1 Newton metre • Work done against friction causes a rise in temperature 	349
6.6.1 Waves in air, fluids and solids	<ul style="list-style-type: none"> • Transverse – vibrate perpendicular (90°) to direction of energy transfer. Peaks/troughs. Water waves, all electromagnetic waves. • Longitudinal – vibrate parallel to direction of energy transfer. Compressions/rarefactions. Needs particles (mechanical). Sound waves/ultrasound. • Amplitude – distance from rest point of wave to peak. • Wavelength – distance from peak to peak • Frequency – number of waves passing a point per second • Period = 1/frequency ($T = 1/f$) • Wave speed = frequency x wavelength ($v = f \times \lambda$) 	371-374
NOT ON EXAM		
6.5.3 Forces and elasticity	<ul style="list-style-type: none"> • Give examples of forces involved in stretching and compressing • Describe difference in elastic and inelastic deformation • Extension of spring is directly proportional to force applied as long of limit of proportionality not exceeded • Force = spring constant x extension ($F = k \times e$) • Force on spring does work, and elastic store of spring fills • Elastic potential energy = $0.5 \times \text{spring constant} \times \text{extension}^2$ ($E_e = 0.5 \times k \times e^2$) 	351-353