GCSE BIOLOGY

GCSE2MED: BIO SPEC CHECK ✅

Tick things off as you learn them. Based on AQA (8461) — Edexcel & OCR differences flagged where they exist.

My exam details

Board: _____ Tier: _____ Course: _____

Exam date: _____ Target grade: _____

How to use this

Each topic has three columns, not one — because "I've seen it" and "I could answer an exam question on it" are very different things:

Covered — you've been taught it or read through it. **Test** — you've actually tested yourself on it with exam questions or past paper questions, not just notes.

Review — this is where you do RAG (Red, Amber, Green) rating. Colour the circle red if you're not confident, amber if you're getting there, or green if you could teach it — based on how you actually performed on exam questions, not just how it felt reading it.

Use the Board/Tier box above to filter what applies to you — skip anything tagged for a different tier or course. If you get to the end of a topic and most circles are red or amber, that's your revision priority, not the topics already green.

If a topic doesn't make sense: try a revision website (BBC Bitesize, Save My Exams, Seneca) or a YouTube GCSE Biology creator first — they're written specifically for this level, often walk through past exam questions, and are a good first stop before turning to AI.

Using AI to help you understand a topic: if a topic name on this checklist means nothing to you, type it into an AI chat and ask it to explain it — that's a genuinely good use of it. But keep it at GCSE level: you only need to know what's on the specification, not the full A-level or university explanation underneath it. Don't let it write your notes for you, and don't lean on it to answer every practice question — it won't be sitting next to you in the exam. Use it to understand, then close the chat and prove to yourself you can do it without it.

What the tags mean

[HT] — Higher tier only. Skip this if you're sitting Foundation.

[Biology only] — Separate Biology only. Skip this if you're doing Combined Science.

[Edexcel] — Extra content specific to the Edexcel exam board.

[OCR] — Extra content specific to the OCR exam board.

[Edexcel & OCR] — Extra content on both Edexcel and OCR, but not AQA.

RP — A required practical. These come up often as "describe how you would…" questions — know the method, not just the result.

No tag = examined on all three boards, both tiers, both Combined Science and separate Biology.

1. Cell Biology · *Paper 1*

Last revisited: _____ (update this whenever you go back over the whole topic)

Topic	Covered	Test	Review
Eukaryotic and prokaryotic cells — the key difference	☐	☐	◯
Structure of animal and plant cells, and their functions	☐	☐	◯
Structure of bacterial cells (plasmids, flagella)	☐	☐	◯
Cell specialisation — named examples (sperm, nerve, muscle, root hair, xylem, phloem)	☐	☐	◯

Specialised cells in more detail (sperm, egg, ciliated epithelial) [Edexcel]	☐	☐	◯
Cell differentiation — how a cell becomes specialised by gaining specific sub-cellular structures	☐	☐	◯
Chromosomes — number and pairs in a human cell	☐	☐	◯
The cell cycle and mitosis — growth and repair	☐	☐	◯
Named stages of mitosis (interphase, prophase, metaphase, anaphase, telophase) [Edexcel]	☐	☐	◯
Stem cells — embryonic, adult (bone marrow), and meristems in plants	☐	☐	◯
Risks and ethical issues of stem cell use	☐	☐	◯
Therapeutic cloning — producing embryonic stem cells genetically matched to a patient, to avoid rejection [HT]	☐	☐	◯
Light microscopy vs electron microscopy — magnification and resolution	☐	☐	◯
Magnification calculations, unit conversion, and standard form	☐	☐	◯
The pico (10^{-12}) prefix named explicitly [Edexcel]	☐	☐	◯
Investigating cells under a microscope RP	☐	☐	◯
Explaining clearly what embryonic and adult stem cells can and can't each become [OCR]	☐	☐	◯
Diffusion — definition and factors affecting rate	☐	☐	◯
Osmosis — definition and required practical	☐	☐	◯
The term "water potential" used to describe the direction of osmosis [OCR]	☐	☐	◯
Osmosis in potato/plant tissue — percentage mass change RP	☐	☐	◯
Active transport — moving substances against a concentration gradient, using energy from respiration	☐	☐	◯
Surface area to volume ratio, and why larger organisms need transport systems	☐	☐	◯
Fick's law (rate of diffusion as a proportional relationship) [Edexcel]	☐	☐	◯
Culturing microorganisms — aseptic technique, uncontaminated cultures [Biology only]	☐	☐	◯
Investigating antiseptics/antibiotics using zones of inhibition RP [Biology only]	☐	☐	◯
Calculating cross-sectional area of a zone of inhibition (πr^2) [Biology only]	☐	☐	◯
Bacterial population growth calculations, in standard form [HT] [Biology only]	☐	☐	◯

2. Organisation · *Paper 1*

Last revisited: _____

Topic	Covered	Test	Review
Levels of organisation — cell, tissue, organ, organ system, organism	☐	☐	◯
Enzymes — the lock and key model, active site, specificity	☐	☐	◯
Factors affecting enzyme activity — temperature and pH	☐	☐	◯

Testing foods for sugars, starch, protein and lipids RP	☐	☐	◯
Effect of pH on the rate of amylase activity RP	☐	☐	◯
Measuring the energy content of food (calorimetry) [Edexcel]	☐	☐	◯
The digestive system — organs and their functions	☐	☐	◯
Bile — where it's made, stored, and what it does	☐	☐	◯
The heart and circulatory system — structure	☐	☐	◯
Blood vessels — arteries, veins, capillaries: structure and function	☐	☐	◯
Naming the four heart valves (tricuspid, bicuspid, pulmonary, aortic) [Edexcel & OCR]	☐	☐	◯
Components of blood — plasma, red cells, white cells, platelets	☐	☐	◯
Fibrinogen/fibrin mechanism of blood clotting [Edexcel]	☐	☐	◯
Coronary heart disease — causes and treatments (stents, statins, transplants)	☐	☐	◯
Cardiac output calculations (stroke volume × heart rate) [Edexcel]	☐	☐	◯
Health as physical and mental well-being; how diseases interact	☐	☐	◯
Named disease-interaction pairs — HIV weakening immunity leading to TB; HPV causing cervical cancer [OCR]	☐	☐	◯
Risk factors and lifestyle links to non-communicable disease	☐	☐	◯
Correlation vs proven cause — a statistical link alone doesn't prove one factor causes the other	☐	☐	◯
BMI calculation and its use as a risk indicator [Edexcel]	☐	☐	◯
Cancer — benign vs malignant tumours	☐	☐	◯
Radiotherapy and chemotherapy — how each works and side effects [Edexcel]	☐	☐	◯
Plant tissues — the leaf as an organ, and the role of each tissue	☐	☐	◯
Plants adapted to survive in extreme environments [Edexcel]	☐	☐	◯
Xylem and phloem — structure, transport direction, transpiration	☐	☐	◯
Factors affecting the rate of transpiration	☐	☐	◯
The term "water potential" used again for plant water movement [OCR]	☐	☐	◯

3. Infection & Response · *Paper 1*

Last revisited: _____

Topic	Covered	Test	Review
The WHO definition of health [Edexcel]	☐	☐	◯
Communicable vs non-communicable disease — caused by a pathogen and spreads between people, or not	☐	☐	◯
The four types of pathogen — virus, bacteria, fungus, protist	☐	☐	◯
How pathogens spread — direct contact, water, air	☐	☐	◯
Estimating the number of infected cases from sample data [OCR]	☐	☐	◯

Named viral diseases — measles, HIV, TMV (tobacco mosaic virus)	☐	☐	◯
Ebola — a viral haemorrhagic fever, spread through contact with body fluids [Edexcel] [HT]	☐	☐	◯
The lytic and lysogenic pathways of viral reproduction [Edexcel] [HT]	☐	☐	◯
Named bacterial diseases — salmonella, gonorrhoea	☐	☐	◯
Cholera, tuberculosis (TB), chlamydia, stomach ulcers (Helicobacter) [Edexcel]	☐	☐	◯
Named fungal disease — rose black spot	☐	☐	◯
Chalara ash dieback — a fungal disease affecting ash trees, spread through the air [Edexcel]	☐	☐	◯
Powdery mildew — a fungal disease causing a white, powdery coating on leaves [OCR]	☐	☐	◯
Athlete's foot — a fungal skin infection, spread by direct contact [OCR]	☐	☐	◯
Malaria — a protist disease, spread by a vector	☐	☐	◯
Human defence systems — physical and chemical barriers (skin, nose, trachea, stomach)	☐	☐	◯
Lysozyme as a named chemical defence [Edexcel]	☐	☐	◯
White blood cells — phagocytosis, antibody production, antitoxin production	☐	☐	◯
The four-step process: antigen → antibody → memory lymphocytes → secondary response [Edexcel]	☐	☐	◯
Vaccination — how it works, and herd immunity	☐	☐	◯
The specific term "herd immunity" [Edexcel]	☐	☐	◯
Antibiotics, painkillers, antiseptics — what each actually does	☐	☐	◯
Antivirals as their own named category [OCR]	☐	☐	◯
Discovery and development of drugs — preclinical testing, clinical trials, placebos, peer review	☐	☐	◯
Named drug origins — digitalis (foxgloves), aspirin (willow), penicillin (Fleming)	☐	☐	◯
Monoclonal antibodies — production by the hybridoma method [Biology only] [HT]	☐	☐	◯
Uses of monoclonal antibodies (pregnancy tests, diagnosis, research, treating disease) [Biology only] [HT]	☐	☐	◯
Direct comparison: monoclonal antibody targeting vs standard chemotherapy [Edexcel]	☐	☐	◯
PSA and prostate cancer as a named diagnostic example [OCR]	☐	☐	◯
Detection and identification of plant diseases [Biology only] [HT]	☐	☐	◯
Ion deficiencies in plants — nitrate causes stunted growth, magnesium causes yellowing leaves	☐	☐	◯
DNA probes to identify a pathogen [OCR]	☐	☐	◯
Plant defence responses — physical, chemical and mechanical	☐	☐	◯

4. Bioenergetics · *Paper 1*

Last revisited: _____

Topic	Covered	Test	Review
Photosynthesis — word and symbol equations, and why it's endothermic	☐	☐	◯
Rate of photosynthesis — light, CO_2, and temperature as limiting factors	☐	☐	◯
Investigating the effect of light intensity on rate of photosynthesis RP	☐	☐	◯
The inverse square law for light intensity and distance [HT]	☐	☐	◯
Limiting factors in the economics of greenhouses [HT]	☐	☐	◯
Uses of glucose from photosynthesis (respiration, storage, cell walls, proteins)	☐	☐	◯
Aerobic and anaerobic respiration — word and symbol equations	☐	☐	◯
ATP as the named energy-carrying molecule [OCR]	☐	☐	◯
Investigating the rate of respiration using a respirometer RP [Edexcel]	☐	☐	◯
Response to exercise — heart rate, breathing rate and breath volume	☐	☐	◯
Oxygen debt and the role of the liver [HT]	☐	☐	◯
Metabolism — the sum of all reactions in a cell	☐	☐	◯
The terms "monomer" and "polymer" used for this content [OCR]	☐	☐	◯

5. Homeostasis and Response · *Paper 2*

Last revisited: _____

Topic	Covered	Test	Review
Homeostasis — definition, and the receptor/coordinator/effector model	☐	☐	◯
The nervous system — structure and the reflex arc	☐	☐	◯
Neurone structure in detail — dendron, axon, myelin sheath, synapse [Edexcel]	☐	☐	◯
Investigating human reaction time RP	☐	☐	◯
The brain — cerebrum, cerebellum, medulla, and their functions [Biology only]	☐	☐	◯
Cerebral hemispheres; CT and PET scanning to study brain function [Edexcel]	☐	☐	◯
The hypothalamus and pituitary gland named as brain structures [OCR]	☐	☐	◯
The eye — structure and accommodation [Biology only]	☐	☐	◯
Eye defects — myopia (short-sightedness) and hyperopia (long-sightedness)	☐	☐	◯
Rod and cone cells, cataracts, and colour blindness [Edexcel] [OCR]	☐	☐	◯
Control of body temperature — the thermoregulatory centre [Biology only]	☐	☐	◯
The endocrine system — glands and hormones, compared with the nervous system	☐	☐	◯
Control of blood glucose — insulin and glucagon	☐	☐	◯
Type 1 and Type 2 diabetes — causes and treatment	☐	☐	◯
Reading graphs comparing insulin response in diabetic vs non-diabetic people	☐	☐	◯
Maintaining water and nitrogen balance — the kidneys [Biology only]	☐	☐	◯

Nephron structure — glomerulus, Bowman's capsule, filtration and reabsorption [Edexcel] [OCR]	☐	☐	◯
Thirst as a named physiological response [OCR]	☐	☐	◯
Reproductive hormones — the menstrual cycle (FSH, LH, oestrogen, progesterone)	☐	☐	◯
Contraception — hormonal and non-hormonal methods, and evaluating them	☐	☐	◯
The use of hormones to treat infertility (IVF) [HT]	☐	☐	◯
Clomifene therapy — a drug that stimulates ovulation in women not ovulating regularly [Edexcel]	☐	☐	◯
Feedback systems — thyroxine and adrenaline [HT]	☐	☐	◯
Plant hormones — auxins, phototropism and gravitropism [Biology only]	☐	☐	◯
Investigating the effect of light or gravity on seedling growth RP [Biology only]	☐	☐	◯
Flower opening and leaf shedding as extra named hormone effects [OCR]	☐	☐	◯
Gibberellins and ethene — gibberellins trigger seed germination, ethene controls fruit ripening [HT] [Biology only]	☐	☐	◯
Commercial uses of plant hormones [HT] [Biology only]	☐	☐	◯

6. Inheritance, Variation and Evolution · *Paper 2*

Last revisited: _____

Topic	Covered	Test	Review
Sexual and asexual reproduction — the key differences	☐	☐	◯
Meiosis — halving the chromosome number	☐	☐	◯
Advantages and disadvantages of sexual vs asexual reproduction [Biology only]	☐	☐	◯
DNA and the genome — what each term means	☐	☐	◯
Extracting DNA from fruit [Edexcel]	☐	☐	◯
DNA structure — nucleotides, the double helix, and the four bases [Biology only]	☐	☐	◯
Complementary base pairing (A-T, C-G) [HT]	☐	☐	◯
Protein synthesis — a simple description [Biology only] [HT]	☐	☐	◯
Full transcription and translation — mRNA, tRNA, codons, RNA polymerase [Edexcel] [HT]	☐	☐	◯
Mutations — effect on protein shape and function [HT]	☐	☐	◯
Genetic inheritance — alleles, genotype, phenotype, homozygous/heterozygous	☐	☐	◯
Zygote as a defined term; ABO blood groups; sex-linked disorders [Edexcel]	☐	☐	◯
Punnett squares — reading and interpreting genetic crosses	☐	☐	◯
Constructing a Punnett square and using probability [HT]	☐	☐	◯
Haploid and diploid as named terms [OCR]	☐	☐	◯
Inherited disorders — polydactyly and cystic fibrosis	☐	☐	◯

Ethical issues around embryo screening — testing embryos for genetic disorders before implantation	☐	☐	◯
Sex determination — the 23rd chromosome pair	☐	☐	◯
Variation — genetic causes, environmental causes, or both	☐	☐	◯
Evolution by natural selection — individuals with useful characteristics are more likely to survive and reproduce	☐	☐	◯
Selective breeding — the process and its risks (inbreeding)	☐	☐	◯
Genetic engineering — what it is and named examples	☐	☐	◯
The main steps of genetic engineering **[HT]**	☐	☐	◯
Restriction enzymes, ligase, and sticky ends named **[Edexcel]** **[OCR]**	☐	☐	◯
Selection using antibiotic resistance markers **[OCR]**	☐	☐	◯
Cloning — tissue culture, cuttings, embryo transplants, adult cell cloning	☐	☐	◯
Theory of evolution — Darwin, and Lamarck's rival theory **[Biology only]**	☐	☐	◯
Speciation, and the work of Darwin and Wallace **[Biology only]**	☐	☐	◯
Seedbanks — storing seeds from many species/varieties as insurance against extinction **[OCR]**	☐	☐	◯
The understanding of genetics — Mendel and the development of gene theory **[Biology only]**	☐	☐	◯
Evidence for evolution — fossils and antibiotic resistance	☐	☐	◯
Named fossils (Ardi, Lucy, Leakey's find) and the pentadactyl limb **[Edexcel]**	☐	☐	◯
Fossils — the three ways they can form	☐	☐	◯
Extinction — new predators, disease, competitors, or a changing/catastrophic environment	☐	☐	◯
Resistant bacteria — MRSA, and how to slow the development of resistance	☐	☐	◯
Classification — the Linnaean system and the three-domain system	☐	☐	◯

7. Ecology · *Paper 2*

Last revisited: _____

Topic	Covered	Test	Review
Communities — interdependence and competition	☐	☐	◯
Parasitism and mutualism as named relationships **[Edexcel]** **[OCR]**	☐	☐	◯
Abiotic factors affecting a community	☐	☐	◯
Pollutants named as an abiotic factor **[Edexcel]**	☐	☐	◯
Biotic factors affecting a community	☐	☐	◯
Adaptations — structural, behavioural, functional, and extremophiles	☐	☐	◯
Levels of organisation, and predator-prey population cycles	☐	☐	◯
Measuring population size and distribution — quadrats and transects **RP**	☐	☐	◯

Capture-recapture as a sampling technique **[OCR]**	☐	☐	◯
The carbon cycle and the water cycle — how carbon and water are constantly recycled between living things and the environment	☐	☐	◯
The nitrogen cycle **[Edexcel]** **[OCR]**	☐	☐	◯
Decomposition — factors affecting the rate of decay	☐	☐	◯
Investigating the rate of decay of milk (pH change) **RP**	☐	☐	◯
Food preservation vs composting as opposite applications **[Edexcel]**	☐	☐	◯
Impact of environmental change on species distribution **[HT]** **[Biology only]**	☐	☐	◯
Biodiversity — the variety of species in an ecosystem; more variety generally means a more stable ecosystem	☐	☐	◯
Waste management — water, air and land pollution	☐	☐	◯
Eutrophication — the full mechanism **[Edexcel]**	☐	☐	◯
Land use — including the conflict over peat bogs	☐	☐	◯
Deforestation — causes and consequences	☐	☐	◯
Global warming — causes and biological consequences	☐	☐	◯
Maintaining biodiversity — named strategies	☐	☐	◯
Reforestation as a named strategy **[Edexcel]**	☐	☐	◯
Hunting as a threat; ecotourism; the difficulty of conservation agreements **[OCR]**	☐	☐	◯
Trophic levels in an ecosystem **[Biology only]**	☐	☐	◯
Pyramids of biomass — constructing one from data **[Biology only]**	☐	☐	◯
Transfer of biomass between trophic levels, and efficiency calculations **[Biology only]**	☐	☐	◯
Factors affecting food security **[Biology only]**	☐	☐	◯
Farming techniques — restricting energy transfer to improve efficiency **[Biology only]**	☐	☐	◯
Sustainable fisheries — net size and quotas **[Biology only]**	☐	☐	◯
The role of biotechnology — mycoprotein, GM insulin, golden rice **[Biology only]**	☐	☐	◯
Hydroponics and biological control **[OCR]**	☐	☐	◯

8. Maths Skills & Working Scientifically · *Both papers*

Last revisited: _____

Not its own topic — but examined throughout both papers, inside questions on the topics above. Roughly a fifth of your marks depend on these skills, so don't skip them.

Topic	Covered	Test	Review
Using and rearranging standard form	☐	☐	◯
Rearranging and substituting into equations (e.g. magnification, rate)	☐	☐	◯
Calculating percentages, means, and simple ratios	☐	☐	◯

Reading values off, and drawing, graphs, tables and bar charts	☐	☐	◯
Reading histograms, and knowing when to use one over a bar chart	☐	☐	◯
Understanding sampling principles, including for epidemiological data	☐	☐	◯
Using appropriate units and significant figures	☐	☐	◯
Identifying independent, dependent and control variables	☐	☐	◯
Evaluating an experimental method & suggesting improvements	☐	☐	◯
Identifying hazards and suggesting ways to reduce risk	☐	☐	◯
Spotting anomalous results, and calculating a mean without them	☐	☐	◯
Understanding the difference between correlation and causation	☐	☐	◯
Using ratios, fractions and percentages in genetic crosses	☐	☐	◯
Constructing and interpreting food chains, webs, and pyramids of biomass	☐	☐	◯

My weakest topics

This page is for topics that **past papers** have exposed as weak — not just things you haven't got to yet. Ticking "Covered" in the checklist tells you what you've seen; getting a question wrong under exam conditions tells you what you actually don't know, and that's a more reliable signal.

Every time you mark a past paper, add anything you got wrong or were unsure of here, with the page number so you can find it fast. **Treat this list as your priority order for revision** — work down it before going back over topics you've already rated green in Review.

A note on accuracy: specifications get updated. Always check the live specification document for your exact board and tier alongside this checklist — treat this as a study companion, not a replacement for it.