This guide is for students, parents and carers. It outlines: Information about the GCSE course; the topics on each examination paper and where students can find revision resources; and ends with examination tips specific to this subject.

**Course Title and Exam Board**

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| --- | --- | --- |
| Exam board | AQA | |
| Course title | Biology | |
| Course structure and assessment | 2 x 1Hour 45 Minute Examinations | |
| Key dates | Paper 1 | 14th May |
| Paper 2 | 7th June |

**GCSE Examinations**

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| --- | --- | --- | --- | --- |
| Paper | Marks | Duration | Weighting | Topics on this paper |
| Paper 1 | 100 | 1 hour 45 minutes | 50% | Topics 1–4: Cell biology; Organisation; Infection and response; and Bioenergetics. |
| Paper 2 | 100 | 1 hour 45 minutes | 50% | Topics 5–7: Homeostasis and response; Inheritance, variation and evolution; and Ecology. |

**Course Components (a more detailed explanation of skills and topics)**

*Examination Paper 1 –* Topics 1–4: Cell biology; Organisation; Infection and response; and Bioenergetics

*Examination Paper 2 -* Topics 5–7: Homeostasis and response; Inheritance, variation and evolution; and Ecology.

**Where are the revision resources?**

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| --- | --- |
| Revision topics | What resources to use (website links, student: drive titles of folders/ documents; books recommended etc.) |
| **Biology Paper 1** | |
| Cell structure and transport | * the world of the microscope * animal and plant cells * eukaryotic and prokaryotic cells * specialisation in animal cells * specialisation in plant cells * diffusion * osmosis * osmosis in plants * active transport * exchanging material |
| Cell division | * cell division * growth and differentiation * stem cells * stem cell dilemmas |
| Organisation and the digestive system | * tissues and organs * the human digestive system * the chemistry of food * catalysts and enzymes * factors affecting enzyme action * how the digestive system works * making digestion efficient |
| Organising animals and plants | * the blood * blood vessels * the heart * helping the heart * breathing and gas exchange * tissues and organs in plants * transport systems in plants * evaporation and transpiration * factors affecting transpiration |
| Communicable diseases | * health and disease * pathogens and disease * preventing infections * viral diseases * bacterial diseases * diseases caused by fungi and protists * human defence responses * more about plant diseases * plant defence responses |
| Preventing and treating disease | * vaccination * antibiotics and painkillers * discovering drugs * developing drugs * making monoclonal antibodies * uses of monoclonal antibodies |
| Non-communicable diseases | * Non-communicable diseases * Cancer * Smoking and the risk of disease * Diet, exercise and disease * Alcohol and other carcinogens |
| Photosynthesis | * Photosynthesis * The rate of photosynthesis * How plants use glucose * Making the most of photosynthesis |
| Respiration | * Aerobic respiration * The response to exercise * Anaerobic respiration * Metabolism and the liver |
|  | |
|  | |
| **Biology Paper 2** | |
| Human nervous system | * Principles of homeostasis * The structure and function of the nervous system * Reflex actions * The brain * The eye * Common problems of the eye |
| Hormonal coordination | * Principles of hormonal control * The control of blood glucose levels * Treating diabetes * The role of negative feedback * Human Reproduction * Hormones and the menstrual cycle * The artificial control of fertility * Infertility treatments * Plant hormones and responses * Using plant hormones |
| Homeostasis in action | * Controlling body temperature * Removing waste products * The human kidney * Dialysis- an artificial kidney * Kidney transplants |
| Reproduction | * Types of reproduction * Cell division in sexual reproduction * The best of both worlds * DNA and the genome * DNA structure and protein synthesis * Gene expression and mutation * Inheritance in action * More about genetics * Inherited disorders * Screening for genetic disorders |
| Variation and evolution | * Variation * Evolution by natural selection * Selective breeding * Genetic engineering * Cloning * Adult cell cloning * Ethics of genetic technologies |
| Genetics and evolution | * The history of genetics * Theories of evolution * Accepting Darwin’s ideas * Evolution and speciation * Evidence for evolution * Fossils and extinction * More about extinction * Antibiotic resistant bacteria * Classification * New systems of classification |
| Adaptations, interdependence and competition | * The importance of communities * Organisms in their environment * Distribution and abundance * Competition in animals * Competition in plants * Adapt and survive * Adaptation in animals * Adaptations in plants |
| Organising an ecosystem | * Feeding relationships * Materials cycling * The carbon cycle * Rates of decomposition |
| Biodiversity and ecosystems | * The human population explosion * Land and water pollution * Air pollution * Deforestation and peat destruction * Global warming * The impact of change * Maintaining biodiversity * Trophic levels and biomass * Biomass transfers * Factors affecting food security * Making food production efficient * Sustainable food production |

Standard Practicals

**Required practical activity 1**

Use a light microscope to observe, draw and label a selection of plant and animal cells. A magnification scale must be included.

Apparatus and techniques

* use appropriate apparatus to record length and area.
* use a microscope to make observations of biological specimens and produce labelled scientific drawings.

**Required practical activity 2**

Investigate the effect of antiseptics or antibiotics on bacterial growth using agar plates and measuring zones of inhibition.

Apparatus and techniques

* use appropriate apparatus to record length and area.
* use appropriate apparatus and techniques to observe and measure the process of bacterial growth.
* safe and ethical use of bacteria to measure physiological function and response to antibiotics and antiseptics in the environment.
* the use of appropriate techniques and qualitative reagents in problem-solving contexts to find the best antibiotic to use or the best concentration of antiseptic to use.

**Required practical activity 3**

Investigate the effect of a range of concentrations of salt or sugar solutions on the mass of plant tissue.

Apparatus and techniques

* use appropriate apparatus to record mass and time.
* use appropriate apparatus and techniques to observe and measure the process of osmosis.
* measure the rate of osmosis by water uptake.

**Required practical activity 4**

Use qualitative reagents to test for a range of carbohydrates, lipids and proteins. To include: Benedict’s test for sugars; iodine test for starch; and Biuret reagent for protein.

Apparatus and techniques

* safe use of a Bunsen burner and a boiling water bath.
* use of qualitative reagents to identify biological molecules.

**Required practical activity 5**

Investigate the effect of pH on the rate of reaction of amylase enzyme. Students should use a continuous sampling technique to determine the time taken to completely digest a starch solution at a range of pH values. Iodine reagent is to be used to test for starch every 30 seconds. Temperature must be controlled by use of a water bath or electric heater.

Apparatus and techniques

* use appropriate apparatus to record the volumes of liquids, time and pH.
* safe use of a water bath or electric heater.
* measure the rate of reaction by the colour change of iodine indicator.
* use of qualitative iodine reagent to identify starch by continuous sampling.

**Required practical activity 6**

Investigate the effect of light intensity on the rate of photosynthesis using an aquatic organism such as pondweed.

Apparatus and techniques

* use appropriate apparatus to record the rate of production of oxygen gas produced; and to measure and control the temperature of water in a large beaker that acts as a ‘heat shield’.
* use a thermometer to measure and control temperature of water bath.
* use appropriate apparatus and techniques to observe and measure the process of oxygen gas production.
* safe and ethical use and disposal of living pondweed to measure physiological functions and responses to light.
* measuring rate of reaction by oxygen gas production.

**Required practical activity 7**

Plan and carry out an investigation into the effect of a factor on human reaction time.

Apparatus and techniques

* use appropriate apparatus to record time.
* selecting appropriate apparatus and techniques to measure the process of reaction time.
* safe and ethical use of humans to measure physiological function of reaction time and responses to a chosen factor.

**Required practical activity 8**

Investigate the effect of light or gravity on the growth of newly germinated seedlings. Record results both as length measurements and as accurate, labelled biological drawings to show the effects.

Apparatus and techniques

* use appropriate apparatus to record length and time.
* selecting appropriate apparatus and techniques to measure the growth of shoots or roots.
* safe and ethical use of plants to measure physiological function of growth in response to light or gravity.
* observations of biological specimens to produce labelled scientific drawings.

**Required practical activity 9**

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.

Apparatus and techniques

* use appropriate apparatus to record length and area.
* use transect lines and quadrats to measure distribution of a species.
* safe and ethical use of organisms and response to a factor in the environment.
* application of appropriate sampling techniques to investigate the distribution and abundance of organisms in an ecosystem via direct use in the field.
* use of appropriate techniques in more complex contexts including continuous sampling in an investigation.

**Required practical activity 10**

Investigate the effect of temperature on the rate of decay of fresh milk by measuring pH change.

Apparatus and techniques

* use appropriate apparatus to record temperature and pH.
* the use of appropriate apparatus to measure anaerobic decay.
* safe use of microorganisms.
* measurement of rate of decay by pH change.