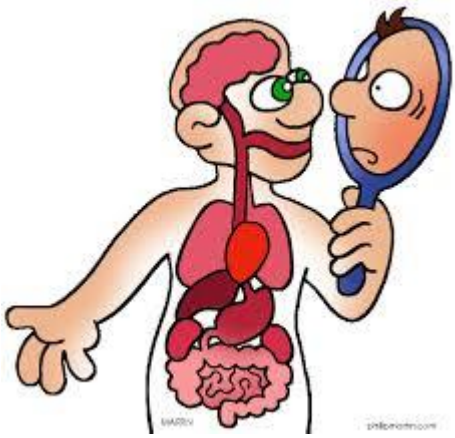
Year 10 AQA GCSE Biology Revision Checklist

Use this booklet to help you with your revision in preparation for your year 10 Biology examinations.

This is the work that you will have covered by the end of year 10 from the GCSE Syllabus Examination

How can you use this document to help you revise?

By looking at this document you can see the extent of the work that you need to fully cover and revise before you sit your GCSE examinations. This will then help you to track your progress through the year and also plan your revision for end of year examinations. Careful study and use of this document will ensure that you have sufficient time to cover all the work well before the exam. Remember to look back at the work you have done in year 9 as you will be expected to build upon this foundation. Exam questions may include some information from these topics.



BIOLOGY

Principles of organisation			
Understand that cells are the basic building blocks of all living organisms.			
A tissue is a group of cells with a similar structure and function.			
Organs are aggregations of tissues performing specific functions.			
Organs are organised into organ systems, which work together to form organisms.			
Students should be able to explain how the structures of plant tissues are related to their functions. Plant tissues include: epidermal tissues, palisade mesophyll, spongy mesophyll, xylem and phloem, meristem tissue found at the growing tips of shoots and roots. The leaf is a plant organ. Knowledge limited to epidermis, palisade and spongy mesophyll, xylem and phloem, and guard cells surrounding stomata.			
Students should be able to explain how the structure of root hair cells, xylem and phloem are adapted to their functions. Students should be able to explain the effect of changing temperature, humidity, air movement and light intensity on the rate of transpiration.			
Students should be able to understand and use simple compound measures such as the rate of transpiration.			
The roots, stem and leaves form a plant organ system for transport of substances around the plant.			
Root hair cells are adapted for the efficient uptake of water by osmosis, and mineral ions by active transport.			
Students should be able to describe the process of transpiration and translocation, including the structure and function of the stomata.			
Xylem tissue transports water and mineral ions from the roots to the stems and leaves. It is composed of hollow tubes strengthened by lignin adapted for the transport of water in the transpiration stream.			
The role of stomata and guard cells are to control gas exchange and water loss.			
Phloem tissue transports dissolved sugars from the leaves to the rest of the plant for immediate use or storage. The movement of food molecules through phloem tissue is called translocation.			
Phloem is composed of tubes of elongated cells. Cell sap can move from one phloem cell to the next through pores in the end walls. Detailed structure of phloem tissue or the mechanism of transport is not required.			

Bioenergetics			
Photosynthesis			
Photosynthesis is represented by the equation: carbon dioxide + water light glucose + oxygen Students should recognise the chemical symbols: CO_2, H_2O, O_2 and $C_6H_{12}O_6$.			
Be able to describe photosynthesis as an endothermic reaction in which			

energy is transferred from the environment to the chloroplasts by light.			
Be able to explain the effects of temperature, light intensity, carbon dioxide concentration, and the amount of chlorophyll on the rate of photosynthesis and be able to calculate rates of photosynthesis using data			
Explain how these factors interact and any one of them may be the factor that limits photosynthesis. (HT only) Students should be able to explain graphs of photosynthesis rate involving two or three factors and decide which is the limiting factor.			
Understand and use inverse proportion – the inverse square law and light intensity in the context of photosynthesis. Limiting factors are important in the economics of enhancing the conditions in greenhouses to gain the maximum rate of photosynthesis while still maintaining profit			
Investigate the effect of light intensity on the rate of photosynthesis using an aquatic organism such as pondweed			
Uses of glucose from photosynthesis			
Plant defence responses			
Be able to describe physical and chemical plant defence responses.			
Know how to detect and identify plant diseases			
Describe how plants can be infected by a range of viral, bacterial and fungal pathogens as well as by insects.			
Knowledge of plant diseases is restricted to tobacco mosaic virus as a viral disease, black spot as a fungal disease and aphids as insects.			
Plants can be damaged by a range of ion deficiency conditions:			
Respiration			
Aerobic and anaerobic respiration			
Be able to describe cellular respiration as an exothermic reaction which is continuously occurring in living cells and supplies all the energy needed for living processes.			
Respiration in cells can take place aerobically (using oxygen) or anaerobically (without oxygen), to transfer energy and should know the differences between them.			
Know the equations for aerobic and anaerobic respiration			
Anaerobic respiration in yeast cells is called fermentation and has economic importance in the manufacture of bread and alcoholic drinks.			
Response to exercise			
Describe and explain how the human body reacts to the increased demand for energy during exercise including the effects of anaerobic respiration in muscles			
Blood flowing through the muscles transports the lactic acid to the liver where it is converted back into glucose. Oxygen debt is the amount of extra oxygen the body needs after exercise to react with the accumulated			
The heart and blood vessels			
Know the structure and functioning of the human heart and lungs, including how lungs are adapted for gaseous exchange.			

Know the role of pacemaker and how artificial pacemakers are used to correct irregularities in the heart rate.			
The body contains three different types of blood vessel: Be able to explain how the structure of these vessels relates to their functions.			
Be able to use simple compound measures such as rate and carry out rate calculations for blood flow.			
Blood			
Describe and explain the structure and function of the different parts of blood tissue			
Be able to recognise different types of blood cells in a photograph or diagram, and explain how they are adapted to their functions.			
Coronary heart disease: a non-communicable disease			
Describe the main features and treatments of coronary heart disease, and evaluate their effectiveness			
Understand the consequences and treatments of faulty heart valves.			
Know artificial hearts are occasionally used to keep patients alive whilst waiting for a heart transplant, or to allow the heart to rest as an aid to recovery.			
Health issues			
Be able to describe the relationship between health and disease and the interactions between different types of disease.			
Diseases, both communicable and non-communicable, are major causes of ill health. Other factors including diet, stress and life situations may have a profound effect on both physical and mental health.			
Be able to translate disease incidence information between graphical and numerical forms, construct and interpret frequency tables and diagrams, bar charts and histograms, and use a scatter diagram to identify a correlation between two variable			
Understand the principles of sampling as applied to scientific data, including epidemiological data.			
The effect of lifestyle on some non-communicable diseases			
Discuss the human and financial cost of these non-communicable diseases to an individual, a local community, a nation or globally • explain the effect of lifestyle factors including diet, alcohol and smoking on the incidence of non-communicable diseases at local, national and global levels.			
Know various risk factors are linked to an increased rate of a disease. Many diseases are caused by the interaction of a number of factors			
Be able to understand the principles of sampling as applied to scientific data in terms of risk factors			
Be able to translate information between graphical and numerical forms; and extract and interpret information from charts, graphs and tables in terms of risk factors.			
Be able to use a scatter diagram to identify a correlation between two variables in terms of risk factors.			

Cancer			
Be able to describe cancer as the result of changes in cells that lead to uncontrolled growth and division.			
Know the features and differences of benign and malignant tumours			
There are also genetic risk factors for some cancers.			
Communicable diseases			
Be able to explain how diseases caused by viruses, bacteria, protists and fungi are spread in animals and plants. Students should be able to explain how the spread of diseases can be reduced or prevented.			
Viral diseases			
Viruses live and reproduce inside cells, causing cell damage.			
Measles HIV Tobacco mosaic virus (TMV)			
Bacterial diseases			
Bacteria may produce poisons (toxins) that damage tissues and make us feel ill.			
Salmonella Gonorrhoea			
Fungal diseases			
Rose black spot			
Protist disease			
The pathogens that cause malaria are protists.			
Human defence system			
Be able to describe the non-specific defence systems of the human body against pathogens,			
Be able to explain the role of the immune system in the defence against disease.			
Vaccination			
Be able to explain how vaccination will prevent illness in an individual, and how the spread of pathogens can be reduced by immunising a large proportion of the population.			
Describe and explain how vaccinations work to provide immunity			
Antibiotics and painkillers			
Be able to explain the use of antibiotics and other medicines in treating disease			
Antibiotics, such as penicillin, are medicines that help to cure bacterial disease by killing infective bacteria inside the body. It is important that specific bacteria should be treated by specific antibiotics			
The use of antibiotics has greatly reduced deaths from infectious bacterial diseases. However, the emergence of strains resistant to antibiotics is of great concern.			
Know that antibiotics cannot kill viral pathogens.			
Know that painkillers and other medicines are used to treat the symptoms of disease but do not kill pathogens.			
Describe how it is difficult to develop drugs that kill viruses without also damaging the body's tissues			

Discovery and development of drug			
Be able to describe the process of discovery and development of potential new medicines, including preclinical and clinical testing.			
Traditionally drugs were extracted from plants and microorganisms. • The heart drug digitalis originates from foxgloves. • The painkiller aspirin originates from willow. • Penicillin was discovered by Alexander Fleming from the Penicillium mould.			
Know that most new drugs are synthesised by chemists in the pharmaceutical industry.			
Describe how new medical drugs have to be tested and trialled before being used to check that they are safe and effective.			
Preclinical and clinical trials check the effectiveness and safety of a drug			
Monoclonal antibodies			
Be able to describe how monoclonal antibodies are produced.			
Be able to describe some of the ways in which monoclonal antibodies can be used e.g. in pregnancy test and treating cancer			
Homeostasis and response			
Be able to explain that homeostasis is the regulation of the internal conditions of a cell or organism to maintain optimum conditions for function in response to internal and external changes.			
In the human body, these include control of: • blood glucose concentration • body temperature • water levels.			
All control systems include: • cells called receptors, which detect stimuli (changes in the environment) • coordination centres (such as the brain, spinal cord and pancreas) that receive and process information from receptors • effectors, muscles or glands, which bring about responses which restore optimum levels.			
The human nervous system			
Be able to explain how the structure of the nervous system is adapted to its functions.			
Information from receptors passes along cells (neurones) as electrical impulses to the central nervous system (CNS).			
The CNS is the brain and spinal cord.			
Be able to explain how the various structures in a reflex arc – including the sensory neurone, synapse, relay neurone and motor neurone – relate to their function.			
Understand why reflex actions are important.			
Be able to extract and interpret data from graphs, charts and tables, about the functioning of the nervous system			
Be able to translate information about reaction times between numerical and graphical forms.			
The brain			
Be able to identify the cerebral cortex, cerebellum and medulla on a diagram			

of the brain, and describe their functions.			
Be able to explain some of the difficulties of investigating brain function and treating brain damage and disease.			
Know how neuroscientists have been able to map the regions of the brain			
The eye			
Be able to relate the structures of the eye to their functions.			
Be able to identify the following structures on a diagram of the eye and explain how their structure is related to their function: • retina • optic nerve • sclera • cornea • iris • ciliary muscles • suspensory ligaments.			
Know that accommodation is the process of changing the shape of the lens to focus on near or distant objects.			
Describe how two common defects of the eyes are myopia (short sightedness) and hyperopia (long sightedness) in which rays of light do not focus on the retina, how they are treated			
Be able to interpret ray diagrams, showing these two common defects of the eye and demonstrate how spectacle lenses correct them.			
Control of body temperature			
Describe how body temperature is monitored and controlled by the thermoregulatory centre in the brain.			
Describe how the skin contains temperature receptors and sends nervous impulses to the thermoregulatory centre.			
Be able to explain how mechanisms lower or raise body temperature in a given context			
Plant hormones			
Be able to explain plants produce hormones to coordinate and control growth and responses to light (phototropism) and gravity (gravitropism or geotropism).			
Describe how unequal distributions of auxin cause unequal growth rates in plant roots and shoots.			
Know that gibberellins are important in initiating seed germination.			
Know that ethene controls cell division and ripening of fruits			
Use of plant hormones			
Be able to describe the effects of some plant hormones and the different ways people use them to control plant growth. Plant growth hormones are used in agriculture and horticulture.			
Hormonal coordination in humans			
Human endocrine system			
Be able to describe the principles of hormonal coordination and control by the human endocrine system			
Describe that the endocrine system is composed of glands which secrete chemicals called hormones directly into the bloodstream. The blood carries the hormone to a target organ where it produces an effect.			
Compared to the nervous system the effects are slower but act for longer.			
The pituitary gland in the brain is a ‘master gland’ which secretes several hormones into the blood in response to body conditions. These hormones in			

turn act on other glands to stimulate other hormones to be released to bring about effects			
Be able to identify the position of the following on a diagram of the human body: • pituitary gland • pancreas • thyroid • adrenal gland • ovary • testes.			
Control of blood glucose concentration			
Blood glucose concentration is monitored and controlled by the pancreas. If the blood glucose concentration is too high, the pancreas produces the hormone insulin that causes glucose to move from the blood into the cells.			
Be able to explain how insulin controls blood glucose (sugar) levels in the body.			
Describe the causes and effects of Type 1 and Type 2 diabetes and how to treat them			
Be able to extract information and interpret data from graphs that show the effect of insulin in blood glucose levels in both people with diabetes and people without diabetes			
Describe the role of glucagon when blood glucose concentration is too low, which causes glycogen to be converted into glucose and released into the blood.			
Be able to explain how glucagon interacts with insulin in a negative feedback cycle to control blood glucose (sugar) levels in the body.			
Maintaining water and nitrogen balance in the body			
Be able to explain the effect on cells of osmotic changes in body fluids.			
Describe where and how water is lost from the body			
There is no control over water, ion or urea loss by the lungs or skin.			
Excess water, ions and urea are removed via the kidneys in the urine. If body cells loose or gain too much water by osmosis they do not function efficiently			
The digestion of proteins from the diet results in excess amino acids which need to be excreted safely.			
In the liver these amino acids are deaminated to form ammonia. Ammonia is toxic and so it is immediately converted to urea for safe excretion.			
Be able to describe the function of kidneys in maintaining the water balance of the body. The kidneys produce urine by filtration of the blood and selective reabsorption of useful substances such as glucose, some ions and water.			
Be able to translate tables and bar charts of glucose, ions and urea before and after filtration.			
Be able to describe the effect of ADH on the permeability of the kidney tubules.			
The water level in the body is controlled by the hormone ADH which acts on the kidney tubules.			
This is controlled by negative feedback.			
People who suffer from kidney failure may be treated by organ transplant or by using kidney dialysis.			
Know the basic principles of dialysis.			
Be able to explain the roles of thyroxine and adrenaline in the body.			