Year 12 transition - Key knowledge self-audit – GCSE to A-Level Biology			
TASK: Rate your confidence on the key knowledge points from GCSE required for A-Level Biology			
Section 1 Biological molecules – what you know from GCSE	Not confident	Semi-confident	Very confident
Glucose produced by plants during photosynthesis may be converted into insoluble starch for storage			
During aerobic respiration chemical reactions occur that use glucose and Oxygen to release energy			
Some glucose in plants and algae is used to produce fat for storage, and cellulose which strengthens the cell wall and protein.			
Protein molecules are made up of long chains of amino acids. These are folded to produce a specific shape that enables other molecules to fit into the protein			
Proteins act as structural components of tissues such a muscles, hormones, antibodies and catalysts			
Catalysts increase the rate of chemical reactions – biological catalysts are called enzymes			
The shape of the enzyme is vital for its function. High temperatures change the shape of the enzyme.			
Different enzymes work best at different pH values			
Some enzymes work outside the body cells			
Proteins, starch, lipids and reducing sugars can be identified by the biuret test, iodine test, ethanol emulsion test and Benedicts test respectively			
Section 2 - Cells			
Most human, animal cells have a nucleus, cytoplasm, cell membrane, mitochondria and ribosomes.			
Plant and algal cells also have a cell wall made of cellulose which strengthens the cell, chloroplasts which are the sire of photosynthesis and a permanent vacuole filed with cell sap to give support to the cell.			
A bacterial cell consists of cytoplasm and a membrane surrounded by a cell wall – the genes are not in a distinct nucleus.			
In body cells, chromosomes exist as pairs and divide by mitosis which forms two genetically identical daughter cells from one parent cell. Mitosis occurs during growth, repair and asexual reproduction.			
Diffusion is the net movement of molecules from a region of high concentration to low concentration			
Osmosis is the movement of water molecules across a selectively permeable membrane			
Some substances are absorbed against a concentration gradient using ATP. This process of active transport enables cells to absorb ions from very dilute solutions			
Microorganisms that cause infections diseases are called pathogens. White blood cells called lymphocytes defend against them by producing antibodies and antitoxins. Phagocytes engulf and digest pathogens.			
Antibodies produced by the immune system are specific to the antigens on particular pathogens leading to immunity by memory lymphocytes remaining.			
People can be immunised against an infectious disease by introducing dead or inactive forms of the pathogen into the body (vaccination)			
Section 3 – Organisms exchange substances with their environment			
The effectiveness of gas exchange surfaces is increased by having a large surface area, being thin, having a high concentration gradient (blood supply) and being ventilated.			
In humans, the surface area of the lungs is increased by alveoli and that of the small intestine by villi. The villi provide a large surface area with an extensive network of capillaries to absorb the products of digestion by active transport and diffusion.			
Inhalation involves the rib cage moving up and out and the diaphragm contracting, flattening and lowering to change the volume and pressure in the chest cavity. Exhalation, the reverse occurs.			
In plants, water and mineral ions are absorbed by roots, the surface area of which is increased by root hairs			

Plants have stomata in their leaves through which carbon dioxide and oxygen are exchanged with the atmosphere by diffusion. The size of the stomata is controlled by guard cells, in response to light intensity, and help control water loss.			
In flowering plants, xylem tissue transports water and mineral ions from the roots to the stem and leaves in a transpiration stream.			
Phloem tissue transports dissolved sugars from the leaves to the rest of the plant			
In animals, a circulatory system transports substances using a heart, which is a muscular organ with four chambers – left and right atria and ventricles.			
Blood flows from the heart to the organs through arteries and returns through veins. Arteries have thick walls containing elastic and muscle fibres. Veins have thinner walls and often valves to prevent back-flow of blood			
Blood is a tissue and consists of plasma in which red blood cells, white blood cells and platelets are suspended.			
Red blood cells have no nucleus and are packed with haemoglobin which binds to Oxygen to transport it.			
White blood cells have a nucleus and form part of the body's defence system against pathogens			
Section 4 – Genetic information, variation and relationships between organisms			
Petri dishes and culture media should be sterilised before use to kill unwanted microorganisms			
Inoculating loops are used to transfer microorganisms to culture media and they must be sterilised by passing them through a flame			
The lid of the Petri dish should be secured with adhesive tape to prevent micro-organisms from the air contaminating the culture.			
The type of cell division in which a cell divides to form gametes is called meiosis			
Sexual reproduction gives rise to variation because, when the gametes fuse, one of each pair of alleles comes from each parent.			
Chromosomes are made up of large molecules of DNA which has a double helix structure.			
A gene is a small section of DNA			
Each gene codes for a particular combination of amino acids that make a specific protein			
Genetic variation is due to a population having a wide range of alleles that control their characteristics			
In each population, the alleles that control the characteristics which help the organism to survive are selected			
Quantitative data on the distribution of organisms can be obtained by random sampling with quadrats and sampling along a transect.			
Section 5 – Energy transfer in and between organisms			
Photosynthesis uses light energy to combine carbon dioxide and water to form glucose and Oxygen			
Light energy is absorbed by chlorophyll, which is found in chloroplasts in some plant cells and algae			
The rate of photosynthesis may be limited by a shortage of light, low temperature or a shortage of carbon dioxide.			
Aerobic respiration takes place continuously in plants and animals during which oxygen is used to release energy from glucose.			
Aerobic respiration can be summarised as: glucose + oxygen ➔ carbon dioxide + water			
Energy released during respiration is used by organisms to build larger molecules from smaller ones			
Radiation from the Sun is the source of energy for most communities of living organisms.			
The mass of living material (biomass) at each stage in a food chain is less than it was at the previous stage.			
The amounts of material and energy contained in the biomass of organisms is reduced at each successive stage in a food chain is less than it was at the previous stage			

The amounts of material and energy contained in the biomass of organisms is reduced at each successive stage in a food chain			
Living things remove materials from the environment for growth and other processes and these materials are returned to the environment either in waste materials or when living things die and decay			
Materials decay because they are broken down by microorganisms. The decay process releases subsatnces that plants need to grow.			
Anaerobic respiration is the incomplete breakdown of glucose and produces lactic acid and it releases much less energy than during aerobic respiration			
Section 6 – Organisms respond to changes in their environment			
Cells called receptors detect stimuli (changes in the environment). Information from receptors passes along cells (neurones) in nerves to the brain. The brain coordinates the response. Reflex actions are automatic and rapid by passing through the spinal cord, not the brain.			
In a simple reflex action impulses from a receptor pass along a sensory neurone to the central nervous system. At a junction (synapse) between a sensory neurone and a relay neurone in the central nervous system, a chemical neurotransmitter is released from the sensory neurone that diffuses to cause an impulse to be sent along the relay neurone.			
Many processes in the body are co-ordinated by chemical substances called hormones. Hormones are secreted by glands and are usually transported to their target organ via the blood stream.			
Plants are sensitive to light, moisture and gravity; their shoots grow towards light and against the force of gravity while their roots grow towards moisture and in the direction of the force of gravity.			
Plants produce hormones to co-ordinate and control growth. Auxin controls phototropism and gravitropism (geotropism).			
Waste products to be removed from the body include urea, produced in the liver by the breakdown of amino acids and removed by the kidneys in the urine.			
A healthy kidney produces urine by filtering the blood then reabsorbing all the sugar, dissolved ions and water needed by the body and finally releasing urea, excess ions and water as urine.			
The blood glucose concentration of the body is monitored and controlled by the pancreas through the production of the hormone insulin.			
A second hormone, glucagon, is produced in the pancreas when the blood glucose levels fall. This causes glycogen to be converted into glucose.			
Type 1 diabetes is a disease in which a person's blood glucose concentration may rise to a high level because the pancreas does not produce enough of the hormone insulin.			
Section 7 - Genetics, populations, evolution and ecosystems			
When a cell divides by meiosis to form gametes copies of the genetic information are made and the cell divides twice to form 4 gametes, each with a single set of chromosomes.			
When gametes join at fertilisation, a single body cell with new pairs of chromsomes is formed			
In human body cells, one of the 23 pairs of chromosomes carries the genes that determine sex. In females the sex chromsomes are XX; in males the sex chromosomes are XY.			
Some characteristics are controlled by a single gene. Each gene may have different variants called alleles.			
An allele that control the development of characteristics, only if the dominant allele is not present, is called a recessive allele.			
A gene is a small section of DNA and each gene codes for a particular combination of amino acids which make a specific protein.			
How to interpret genetic diagrams, including family tress and how to construct genetic diagrams of monohybrid crosses and predict the outcomes of monohybrid crosses.			
Understand the meaning of the terms heterozygous, homozygous, phenotype and genotype.			

Individuals with characteristics most suited to the environment are more likely to survive to breed. The genes that have enabled these individuals to survive are then passed on to the next generation.			
New species arise as a result of isolation, genetic variation, natural selection and speciation.			
Quantitative data on the distribution of organisms can be obtained by random sampling with quadrats and sampling along a transect.			
Section 8 The control of gene expression			
Different genes control the development of different characteristics of an organism Differences in the characteristics of different individuals of the same kind may be due to differences in: The genes they have inherited (genetic causes); The conditions in which they have developed (environmental causes); A combination of both			
The differences between Darwin's theory of evolution and conflicting theories such as that of Lamark.			
In genetic engineering, genes from the chromosomes of organisms can be 'cut out' using enzymes and transferred to cells of other organisms.			
Each person (apart from identical twins) has unique DNA which can be used to identify individuals in a process known as DNA fingerprinting.			
Embryos can be screened for the alleles that cause genetic disorders.			
Genes can also be transferred to the cells of animals, plants or microorganisms at an early stage in their development so that they develop with desired characteristics.			
New genes can be transferred to the crop plants and crops that have had their genes modified in this way are called genetically modified crops (GM crops). Examples of genetically modified crops include ones that are resistant to insect attack or to herbicides			
Genetically modified crops generally show increased yields			
Concerns about GM crops include the effect on populations of wild flowers and insects, and uncertainty about the effects of eating GM crops on human health.			
Interpreting information about cloning techniques and genetic engineering techniques			
Making informed judgements about the economic, social and ethical issues concerning cloning and genetic engineering, including genetically modified (GM) crops)			