










|   |                               |  |  |  |  |
|---|-------------------------------|--|--|--|--|
| <b>Subject: Biology</b>   |                               |  |  |  |  |
| <b>Examination Board: AQA</b>   |                               |  |  |  |  |
| <b>Specification Code: 7402</b>   |                               |  |  |  |  |
| <b>Section: 5 Energy transfer in and between organisms</b>  |                               |  |  |  |  |
| <b>Key:</b><br><b>Secure at Target Grade</b> <br><b>Insecure at Target Grade</b> <br><b>No Knowledge at Target Grade</b> <br><br><b>Students' Target ALPS + 1 Fine Levelled Grades</b> | <b>Date you have reviewed</b> |  |  |  |  |
|   |                               |  |  |  |  |
| <b>Photosynthesis</b>   |                               |  |  |  |  |
| Explain how the plant leaf is adapted to carry out photosynthesis   |                               |  |  |  |  |
| Describe the main stages of photosynthesis  |                               |  |  |  |  |
| Explain the process of oxidation and reduction  |                               |  |  |  |  |
| Explain how ATP is made during the light-dependent reaction   |                               |  |  |  |  |
| Describe the role of photolysis in the light-dependent reaction   |                               |  |  |  |  |
| Explain how chloroplasts are adapted to carry out the light-dependent reaction  |                               |  |  |  |  |
| Explain how carbon dioxide absorbed by plants is incorporated into organic molecules  |                               |  |  |  |  |
| Describe the roles of ATP and reduced NADP in the light-independent reaction  |                               |  |  |  |  |
| Describe the events in the Calvin cycle   |                               |  |  |  |  |
| <b>Respiration</b>  |                               |  |  |  |  |
| Outline where glycolysis fits into the overall process of respiration   |                               |  |  |  |  |
| Describe the main stages of glycolysis and its products   |                               |  |  |  |  |
| Outline the nature of the link reaction   |                               |  |  |  |  |
| Explain what happens during the Krebs cycle   |                               |  |  |  |  |
| Describe the nature of hydrogen carrier molecules and explain their role in the Krebs cycle   |                               |  |  |  |  |
| Describe where oxidative phosphorylation takes place  |                               |  |  |  |  |
| Explain how ATP is synthesised during oxidative phosphorylation   |                               |  |  |  |  |
| Explain the role of oxygen in aerobic respiration   |                               |  |  |  |  |
| Explain how energy is released by respiration in the absence of oxygen  |                               |  |  |  |  |
| Explain how lactate is produced by anaerobic respiration  |                               |  |  |  |  |
| <b>Energy and Ecosystems</b>  |                               |  |  |  |  |
| Explain how energy enters an ecosystem  |                               |  |  |  |  |
| Explain how energy is transferred between the organisms in the ecosystem  |                               |  |  |  |  |
| Define the terms: trophic level, food chain, food web, producer, consumer and decomposer  |                               |  |  |  |  |
| Define biomass and explain how it is measured   |                               |  |  |  |  |
| Calculate the percentage of energy that is transferred from one trophic level to the next   |                               |  |  |  |  |
| Explain how energy is lost along a food chain   |                               |  |  |  |  |
| Explain what is meant by gross primary productivity and net primary productivity  |                               |  |  |  |  |
| Summarise the common features of all nutrient cycles  |                               |  |  |  |  |
| Describe the features of the phosphorus cycle   |                               |  |  |  |  |
| Describe the features of the nitrogen cycle   |                               |  |  |  |  |
| Define the terms ammonification, nitrification, nitrogen fixation and denitrification   |                               |  |  |  |  |
| Explain the roles of saprobial organisms in nutrient recycling  |                               |  |  |  |  |
| Explain why fertilisers are needed in agricultural ecosystems   |                               |  |  |  |  |
| Distinguish between natural and artificial fertilisers  |                               |  |  |  |  |
| Explain how fertilisers increase productivity   |                               |  |  |  |  |
| Describe the main environmental effects of using nitrogen-containing fertilisers  |                               |  |  |  |  |
| State the meanings of leaching and eutrophication   |                               |  |  |  |  |
| Explain how leaching and eutrophication affect the environment  |                               |  |  |  |  |




|   |
|---|
| <b>Subject: Biology</b>   |
| <b>Examination Board: AQA</b>                                       |
| <b>Specification Code: 7402</b>                                     |
| <b>Section: 6 Organisms respond to changes in their environment</b> |

|  | Date you have reviewed  |  |  |  |  |
|--|---|--|--|--|--|
|  |   |  |  |  |  |
| <b>Key:</b><br><b>Target Grade</b><br><b>Grade</b><br><b>Grade</b>   | <br><br> | <b>Secure at</b><br><b>Insecure at Target</b><br><b>No Knowledge at Target</b> |  |  |  |
| <b>Students' Target ALPS + 1 Fine Levelled Grades</b>  |   |  |  |  |  |
| <b>Response to stimuli</b>   |   |  |  |  |  |
| Define a stimulus and a response   |   |  |  |  |  |
| Examine the advantage to organisms of being able to respond to a stimulus  |   |  |  |  |  |
| Describe taxes, kineses and tropisms   |   |  |  |  |  |
| Explain how each type of response increases an organism's chances of survival                                      |   |  |  |  |  |
| Describe the stimuli that plants respond to  |   |  |  |  |  |
| Describe plant growth factors such as IAA  |   |  |  |  |  |
| Explain phototropism in flowering plants   |   |  |  |  |  |
| Explain gravitropism in flowering plants   |   |  |  |  |  |
| Explain how a simple reflex arc works  |   |  |  |  |  |
| Explain the roles sensory, intermediate and motor neurones play in a reflex arc                                    |   |  |  |  |  |
| Outline the importance of reflex arcs  |   |  |  |  |  |
| Describe the main features of a sensory receptor   |   |  |  |  |  |
| Describe the structure of a Pacinian corpuscle and explain how it works  |   |  |  |  |  |
| Explain how receptors work together in the eye   |   |  |  |  |  |
| Describe the autonomic nervous system  |   |  |  |  |  |
| Explain how the autonomic nervous system controls heart rate   |   |  |  |  |  |
| Explain the role chemical and pressure receptors play in the processes controlling the heart rate                  |   |  |  |  |  |
| <b>Nervous coordination and muscles</b>  |   |  |  |  |  |
| Distinguish between nervous and hormonal coordination  |   |  |  |  |  |
| Describe the structure of a myelinated motor neurone   |   |  |  |  |  |
| Describe the different types of neurone  |   |  |  |  |  |
| Describe the nature of the resting potential   |   |  |  |  |  |
| Explain how the resting potential is established in a neurone  |   |  |  |  |  |
| Explain what an action potential is  |   |  |  |  |  |
| Explain how an action potential passes along an unmyelinated axon  |   |  |  |  |  |
| Explain how an action potential passes along a myelinated axon   |   |  |  |  |  |
| Describe the factors that affect the speed of conduction of an action potential                                    |   |  |  |  |  |
| Explain what is meant by the refractory period   |   |  |  |  |  |
| Explain the role of the refractory period in separating one impulse from the next                                  |   |  |  |  |  |
| Explain the meaning of the all-or-nothing principle  |   |  |  |  |  |
| Describe the structure of a synapse  |   |  |  |  |  |
| Describe the functions that a synapse performs   |   |  |  |  |  |
| Explain how information is transmitted across a synapse  |   |  |  |  |  |
| Describe the gross and microscopic structure of skeletal muscle  |   |  |  |  |  |
| Describe the ultrastructure of a myofibril   |   |  |  |  |  |
| Explain how actin and myosin are arranged within a myofibril   |   |  |  |  |  |
| Explain what is meant by antagonistic muscles and how they operate   |   |  |  |  |  |
| Summarise the evidence that supports the sliding filament mechanisms of muscle contraction                         |   |  |  |  |  |
| Explain how the sliding filament mechanism causes a muscle to contract and relax                                   |   |  |  |  |  |
| State where the energy for muscle contraction comes from   |   |  |  |  |  |
| <b>Homeostasis</b>   |   |  |  |  |  |
| Describe the nature of homeostasis   |   |  |  |  |  |
| Explain the importance of homeostasis  |   |  |  |  |  |
| Explain how control mechanisms work  |   |  |  |  |  |
| Explain how control mechanisms are coordinated   |   |  |  |  |  |
| Explain what negative feedback is  |   |  |  |  |  |
| Explain how negative feedback helps to control homeostatic processes   |   |  |  |  |  |
| Distinguish between negative and positive feedback   |   |  |  |  |  |
| Explain how hormones work  |   |  |  |  |  |
| Explain the roles of the pancreas and liver in regulating blood glucose  |   |  |  |  |  |
| Outline the factors which influence blood glucose concentration  |   |  |  |  |  |
| Explain the roles of insulin, glucagon and adrenaline in regulating blood glucose                                  |   |  |  |  |  |
| Describe the two main types of diabetes and how they differ  |   |  |  |  |  |
| Explain how each type of diabetes can be controlled  |   |  |  |  |  |
| Describe the structure of the mammalian kidney   |   |  |  |  |  |
| Describe the structure of a nephron  |   |  |  |  |  |
| Describe ultrafiltration and the production of glomerular filtrate   |   |  |  |  |  |
| Explain reabsorption of water by the proximal convoluted tubule  |   |  |  |  |  |
| Explain how a gradient of sodium ions in the medulla of the loop of Henle is maintained                            |   |  |  |  |  |
| Explain the role of the distal convoluted tubule and collecting duct in the reabsorption of water                  |   |  |  |  |  |
| Explain how the water potential of the blood is regulated  |   |  |  |  |  |
| Describe the roles of the hypothalamus, posterior pituitary gland and antidiuretic hormone (ADH) in osmoregulation |   |  |  |  |  |



|   |
|---|
| <b>Subject: Biology</b>   |
| <b>Examination Board: AQA</b>                                     |
| <b>Specification Code: 7402</b>                                   |
| <b>Section: 7 Genetics, populations, evolution and ecosystems</b> |

|  | Date you have reviewed  |   |  |  |  |
|--|---|---|--|--|--|
|  |   |   |  |  |  |
| <p><b>Key:</b></p> <p><b>Grade</b></p> <p><b>No Knowledge at Target Grade</b></p>                    | <br><br> | <p><b>Secure at Target</b></p> <p><b>Insecure at Target Grade</b></p> |  |  |  |
| <b>Students' Target ALPS + 1 Fine Levelled Grades</b>  |   |   |  |  |  |
| <b>Inherited change</b>  |   |   |  |  |  |
| Define the meaning of the terms genotype and phenotype   |   |   |  |  |  |
| Define the terms dominant, recessive and codominant alleles  |   |   |  |  |  |
| Explain the nature of multiple alleles   |   |   |  |  |  |
| Explain how to make labelled genetic diagrams  |   |   |  |  |  |
| Explain how a single gene is inherited   |   |   |  |  |  |
| Explain why results of genetic crosses often differ from predicted results                           |   |   |  |  |  |
| Explain dihybrid inheritance   |   |   |  |  |  |
| Explain how codominance affects the inheritance of characteristics                                   |   |   |  |  |  |
| Explain how multiple alleles affect inheritance  |   |   |  |  |  |
| Explain how blood groups are inherited   |   |   |  |  |  |
| Explain how sex is determined genetically  |   |   |  |  |  |
| State what is meant by sex-linkage   |   |   |  |  |  |
| Explain how sex-linked diseases such as haemophilia are inherited                                    |   |   |  |  |  |
| Describe autosomal linkage   |   |   |  |  |  |
| Explain how autosomal affects the combinations of alleles in gametes                                 |   |   |  |  |  |
| Explain what is meant by epistasis   |   |   |  |  |  |
| Explain the effects of epistasis   |   |   |  |  |  |
| Explain what the chi-squared test is   |   |   |  |  |  |
| Calculate values for chi-squared   |   |   |  |  |  |
| Demonstrate how the chi-squared test is used in genetics   |   |   |  |  |  |
| <b>Populations and evolution</b>   |   |   |  |  |  |
| Define the terms gene pool and allelic frequency   |   |   |  |  |  |
| Define the Hardy-Weinberg principle  |   |   |  |  |  |
| Using the Hardy-Weinberg principle calculate allele, genotype and phenotype frequencies              |   |   |  |  |  |
| Describe variation due to genetic factors  |   |   |  |  |  |
| Describe variation due to environmental influences   |   |   |  |  |  |
| Define a gene pool   |   |   |  |  |  |
| Explain the role of overproduction of offspring in natural selection                                 |   |   |  |  |  |
| Explain the role of variation in natural selection   |   |   |  |  |  |
| Describe stabilising selection   |   |   |  |  |  |
| Describe directional selection   |   |   |  |  |  |
| Describe disruptive selection  |   |   |  |  |  |
| Explain the effects of each form of selection on evolution   |   |   |  |  |  |
| Explain how selection affects allelic frequencies  |   |   |  |  |  |
| Explain how new species are formed   |   |   |  |  |  |
| Explain how populations can become geographically isolated   |   |   |  |  |  |
| Describe allopatric and sympatric speciation   |   |   |  |  |  |
| <b>Populations in ecosystems</b>   |   |   |  |  |  |
| Define the terms environment, biotic, abiotic and biosphere  |   |   |  |  |  |
| Explain what is meant by an ecosystem  |   |   |  |  |  |
| Explain what is meant by the terms population, community and habitat                                 |   |   |  |  |  |
| Explain what a niche is  |   |   |  |  |  |
| Describe the factors that determine the size of a population   |   |   |  |  |  |
| Describe the abiotic factors that affect the size of a population                                    |   |   |  |  |  |
| Explain how each of these factors influence population size  |   |   |  |  |  |
| Describe what is meant by intraspecific competition  |   |   |  |  |  |
| Summarise the factors that different species compete for   |   |   |  |  |  |
| Describe what is meant by interspecific competition  |   |   |  |  |  |
| Explain how interspecific competition influences population size                                     |   |   |  |  |  |
| Explain what is meant by predation   |   |   |  |  |  |
| Explain how the predator-prey relationship affects the population size of a predator and prey        |   |   |  |  |  |
| Name the factors to be considered when using a quadrat   |   |   |  |  |  |
| Explain how a transect is used to obtain quantitative data about changes in communities along a line |   |   |  |  |  |
| Describe how the abundance of different species is measured  |   |   |  |  |  |
| Explain how the mark-release-recapture method can be used to measure the abundance of motile species |   |   |  |  |  |
| Describe changes that occur in the variety of species that occupy an area over time                  |   |   |  |  |  |
| Define the terms succession and climax community   |   |   |  |  |  |
| Explain how managing succession can help to conserve habitats  |   |   |  |  |  |
| Describe what is meant by conservation   |   |   |  |  |  |

|  |
|--|
| <b>Subject: Biology</b>                          |
| <b>Examination Board: AQA</b>                    |
| <b>Specification Code: 7402</b>                  |
| <b>Section: 8 The control of gene expression</b> |

|  | Date you have reviewed |  |  |  |  |
|--|------------------------|--|--|--|--|
|  |                        |  |  |  |  |
| <p><b>Key:</b></p> <p><b>Target Grade</b> </p> <p><b>No Knowledge at Target Grade</b>  </p> <p style="text-align: right;"><b>Secure at</b><br/><b>Insecure at Target Grade</b></p> <p style="text-align: center;"><b>Students' Target ALPS + 1 Fine Levelled Grades</b></p> |                        |  |  |  |  |
| <b>Gene expression</b>   |                        |  |  |  |  |
| Describe the types of gene mutation  |                        |  |  |  |  |
| Explain how the different types of gene mutation result in different amino acid sequences in polypeptides  |                        |  |  |  |  |
| Explain why some mutations do not result in a changed amino acid sequence  |                        |  |  |  |  |
| Discuss the causes of gene mutations   |                        |  |  |  |  |
| State what totipotent cells are  |                        |  |  |  |  |
| Explain how cells lose their totipotency and become specialised  |                        |  |  |  |  |
| Describe cell differentiation and cell specialisation  |                        |  |  |  |  |
| Describe the origins and types of stem cells   |                        |  |  |  |  |
| Explain how pluripotent stem cells can be used to treat human disorders  |                        |  |  |  |  |
| Explain how oestrogen affects gene transcription   |                        |  |  |  |  |
| State what small interfering RNA is  |                        |  |  |  |  |
| Explain how small interfering RNA affects gene expression  |                        |  |  |  |  |
| State what is meant by epigenetics   |                        |  |  |  |  |
| Describe the nature of epigenetics   |                        |  |  |  |  |
| Explain the effect of epigenetic factors on DNA and histones   |                        |  |  |  |  |
| Explain the effects of decreased acetylation of histones   |                        |  |  |  |  |
| Explain the effects of increased methylation of DNA  |                        |  |  |  |  |
| Distinguish between benign and malignant tumours   |                        |  |  |  |  |
| Explain the role of oncogenes and tumour suppressor genes in the development of tumours  |                        |  |  |  |  |
| Explain the effects of abnormal methylation of tumour suppressor genes and oncogenes   |                        |  |  |  |  |
| Explain how increased oestrogen levels can cause breast cancer   |                        |  |  |  |  |
| Outline the importance of genome sequencing projects   |                        |  |  |  |  |
| Describe the nature of the proteome  |                        |  |  |  |  |
| Describe how to determine the genome and proteome of simple organisms  |                        |  |  |  |  |
| Describe how to determine the genome and proteome of complex organisms   |                        |  |  |  |  |
| <b>Recombinant DNA technology</b>  |                        |  |  |  |  |
| Explain how complementary DNA is made using reverse transcriptase  |                        |  |  |  |  |
| Explain how restriction endonucleases are used to cut DNA fragments  |                        |  |  |  |  |
| Explain the importance of sticky ends  |                        |  |  |  |  |
| Explain how a DNA fragment can be inserted into a vector   |                        |  |  |  |  |
| Explain how the DNA of a vector is introduced into host cells  |                        |  |  |  |  |
| Describe the nature of gene markers and explain how they work  |                        |  |  |  |  |
| Describe the polymerase chain reaction (PCR)   |                        |  |  |  |  |
| Explain how the PCR is carried out   |                        |  |  |  |  |
| Summarise the advantages and disadvantages of in vitro and in vivo cloning   |                        |  |  |  |  |
| Describe what DNA probes are and explain how they work   |                        |  |  |  |  |
| Explain how DNA hybridisation is used to locate specific alleles of genes  |                        |  |  |  |  |
| Describe the use of labelled DNA probes to screen for heritable conditions or health risks   |                        |  |  |  |  |
| Consider the use of genetic screening in genetic counselling   |                        |  |  |  |  |
| Describe what genetic fingerprinting is  |                        |  |  |  |  |
| Explain the technique of gel electrophoresis   |                        |  |  |  |  |
| Explain how genetic fingerprinting is carried out  |                        |  |  |  |  |
| Explain how the results of genetic fingerprinting are interpreted  |                        |  |  |  |  |
| Consider the uses of genetic fingerprinting  |                        |  |  |  |  |

|   |
|---|
| <b>Subject: Biology</b>                     |
| <b>Examination Board: AQA</b>               |
| <b>Specification Code: 7402</b>             |
| <b>Section: 9 Skills in A level Biology</b> |

|  | Date you have reviewed |  |  |  |  |
|--|------------------------|--|--|--|--|
|  |                        |  |  |  |  |
| <p><b>Key:</b></p> <p><b>Target Grade</b> </p> <p><b>No Knowledge at Target Grade</b>  </p> <p><b>Secure at</b></p> <p><b>Insecure at Target Grade</b></p> <p><b>Students' Target ALPS + 1 Fine Levelled Grades</b></p> |                        |  |  |  |  |
| <b>Mathematical skills</b>   |                        |  |  |  |  |
| I know when I am using the correct units   |                        |  |  |  |  |
| I understand how to use and convert to standard form   |                        |  |  |  |  |
| I can convert to significant figures   |                        |  |  |  |  |
| I can calculate a mean   |                        |  |  |  |  |
| I can work out the median  |                        |  |  |  |  |
| I can work out the mode  |                        |  |  |  |  |
| I can calculate percentages  |                        |  |  |  |  |
| I can substitute into equations  |                        |  |  |  |  |
| I can rearrange equations  |                        |  |  |  |  |
| I can estimate results   |                        |  |  |  |  |
| I can calculate standard deviations  |                        |  |  |  |  |
| I can calculate percentage error   |                        |  |  |  |  |
| I know when to use a certain type of graph   |                        |  |  |  |  |
| I know how to draw graphs correctly  |                        |  |  |  |  |
| I can add error bars to plotted points   |                        |  |  |  |  |
| I can calculate rates from a graph   |                        |  |  |  |  |
| I can interpret scatter diagrams   |                        |  |  |  |  |
| I can calculate probability  |                        |  |  |  |  |
| I am confident I can choose the correct statistical test for my data   |                        |  |  |  |  |
| I can calculate the circumference of a circle  |                        |  |  |  |  |
| I can calculate the surface area of a sphere, a cylinder, a cube   |                        |  |  |  |  |
| I can calculate the volume of a sphere, cylinder and a cube  |                        |  |  |  |  |
| I can calculate pH   |                        |  |  |  |  |
| I can calculate magnification  |                        |  |  |  |  |
| I can calculate pulmonary ventilation rate   |                        |  |  |  |  |
| I can calculate cardiac output   |                        |  |  |  |  |
| I can calculate the species diversity index  |                        |  |  |  |  |
| I can calculate the efficiency of energy transfer  |                        |  |  |  |  |
| I can calculate Net Primary Production (NPP)   |                        |  |  |  |  |
| I can calculate Net production by consumers, N   |                        |  |  |  |  |
| I can use the chi squared test   |                        |  |  |  |  |
| I can use the t test   |                        |  |  |  |  |
| I can calculate variance   |                        |  |  |  |  |
| I can calculate the correlation coefficient  |                        |  |  |  |  |
| I can use the Hardy-Weinberg formula   |                        |  |  |  |  |