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| **AQA Biology (8461) from 2016 Topic B4.5 Homeostasis and response** | | | | |
| **Topic** | **Student Checklist** | **R** | **A** | **G** |
| **4.5.1 Homeostasis** | Describe what homeostasis is and why it is important stating specific examples from the human body |  |  |  |
| Describe the common features of all control systems |  |  |  |
| **4.5.2 The human nervous system** | State the function of the nervous system and name its important components |  |  |  |
| Describe how information passes through the nervous system |  |  |  |
| Describe what happens in a reflex action and why reflex actions are important |  |  |  |
| Explain how features of the nervous system are adapted to their function, including a reflex arc (inc all types of neurone and the synapse) |  |  |  |
| *Required practical 7: plan and carry out an investigation into the effect of a factor on human reaction time* |  |  |  |
| *Bio ONLY: State the function of the brain and how it is structured, including identifying he cerebral cortex, cerebellum and medulla on a diagram of the brain* |  |  |  |
| *Bio ONLY: Describe the functions of different regions of the brain* |  |  |  |
| ***Bio & HT ONLY: Explain how neuroscientists have been able to map regions of the brain to particular functions*** |  |  |  |
| *Bio ONLY: State the function of the eye and how it is structured, including names of specific parts* |  |  |  |
| *Bio ONLY: Describe the functions of different parts of the eye, including relating structure to function* |  |  |  |
| *Bio ONLY: Describe what accommodation is, and how it is carried out* |  |  |  |
| *Bio ONLY: Explain what myopia and hyperopia are and how they are treated, including interpreting ray diagrams* |  |  |  |
| *Bio ONLY: Describe how body temperature is monitored and controlled* |  |  |  |
| ***Bio & HT ONLY: Explain how the body's responses act to raise or lower temperature in a given context*** |  |  |  |
| **4.5.3 Hormonal coordination in humans** | Describe the endocrine system, including the location of the pituitary, pancreas, thyroid, adrenal gland, ovary and testis and the role of hormones |  |  |  |
| State that blood glucose concentration is monitored and controlled by the pancreas |  |  |  |
| Describe the body's response when blood glucose concentration is too high |  |  |  |
| Explain what type 1 and type 2 diabetes are and how they are treated |  |  |  |
| **HT ONLY: Describe the body's response when blood glucose concentration is too low** |  |  |  |
| **HT ONLY: Explain how glucagon interacts with insulin to control blood glucose levels in the body** |  |  |  |
| Describe how water, ions and urea are lost from the body |  |  |  |
| Describe the consequences of losing or gaining too much water for body cells |  |  |  |
| **HT ONLY: Recall that protein digestion leads to excess amino acids inside the body and describe what happens to these** |  |  |  |
| Describe how the kidneys produce urine |  |  |  |
| **HT ONLY: Describe the effect of ADH on the permeability of the kidney tubules and explain how the water level in the body is controlled by ADH** |  |  |  |
| Describe how kidney failure can be treated by organ transplant or dialysis and recall the basic principles of dialysis |  |  |  |
| Describe what happens at puberty in males and females, inc knowledge of reproductive hormones |  |  |  |
| Describe the roles of the hormones involved in the menstrual cycle (FSH, LH and oestrogen) |  |  |  |
| **HT ONLY: Explain how the different hormones interact to control the menstrual cycle and ovulation** |  |  |  |
| Describe how fertility can be controlled by hormonal and non-hormonal methods of contraception (giving specific examples from the spec) |  |  |  |
| **HT ONLY: Explain how hormones are used to treat infertility, inc the steps in IVF** |  |  |  |
| **HT ONLY: Evaluate the risks and benefits of fertility treatments** |  |  |  |
| **HT ONLY: Describe the functions of adrenaline and thyroxine in the body, and recall where they are produced** |  |  |  |
| **HT ONLY: Explain the roles of thyroxine and adrenaline in the body as negative feedback systems** |  |  |  |

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| **4.5.4 Plant hormones** | *Bio ONLY: Describe hormone-linked plant responses, to include phototropism and gravitropism and the role of auxin* |  |  |  |
| ***Bio & HT ONLY: Describe the functions of gibberellins and ethene in plants*** |  |  |  |
| *Required practical 8: investigate the effect of light or gravity on the growth of newly germinated seedling* |  |  |  |
| **HT ONLY: Explain the use of plant growth hormones are used in agriculture and horticulture (auxins, ethene and gibberellins)** |  |  |  |

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| **AQA Biology (8461) from 2016 Topic B4.6 Inheritance, variation and evolution** | | | | |
| **Topic** | **Student Checklist** | **R** | **A** | **G** |
| **4.6.1 Reproduction** | Describe features of sexual and asexual reproduction |  |  |  |
| Describe what happens during meiosis and compare to mitosis |  |  |  |
| Describe what happens at fertilisation |  |  |  |
| *Bio ONLY: Explain advantages of sexual and asexual reproduction* |  |  |  |
| *Bio ONLY: Describe examples of organisms that reproduce both sexually and asexually (malarial parasites, fungi, strawberry plants and daffodils)* |  |  |  |
| Describe the structure of DNA and its role in storing genetic information inside the cell |  |  |  |
| Explain the term 'genome' and the importance of the human genome (specific examples from spec only) |  |  |  |
| *Bio ONLY: Describe the structure of DNA, including knowledge of nucleotide units* |  |  |  |
| ***Bio & HT ONLY: Explain complementary base pairing in DNA*** |  |  |  |
| ***Bio & HT ONLY: Explain the relationship between DNA bases (ATCG), amino acids and proteins*** |  |  |  |
| ***Bio & HT ONLY: Describe how proteins are synthesised on ribosomes, including protein folding and its importance for protein function*** |  |  |  |
| ***Bio & HT ONLY: Explain what mutations are, and the possible effects of mutations*** |  |  |  |
| ***Bio & HT ONLY: Explain what non-coding parts of DNA are, and why they are important*** |  |  |  |
| Describe how characteristics are controlled by one or more genes, including examples |  |  |  |
| Explain important genetic terms: gamete, chromosome, gene, allele, genotype, phenotype, dominant, recessive, homozygous and heterozygous |  |  |  |
| Explain and use Punnet square diagrams, genetic crosses and family trees |  |  |  |
| **HT ONLY: Construct Punnet square diagrams to predict the outcomes of a monohybrid cross** |  |  |  |
| Describe cystic fibrosis and polydactyly as examples of inherited disorders |  |  |  |
| Evaluate social, economic and ethical issues concerning embryo screening when given appropriate information |  |  |  |
| Describe how the chromosomes are arranged in human body cells, including the function of the sex chromosomes |  |  |  |
| Explain how sex is determined and carry out a genetic cross to show sex inheritance |  |  |  |
| **4.6.2 Variation and evolution** | Describe what variation is and how it can be caused within a population |  |  |  |
| Describe mutations and explain their influence on phenotype and changes in a species |  |  |  |
| Explain the theory of evolution by natural selection |  |  |  |
| Describe how new species can be formed |  |  |  |
| Describe what selective breeding is |  |  |  |
| Explain the process of selective breeding, including examples of desired characteristics and risks associated with selective breeding |  |  |  |
| Describe what genetic engineering is, including examples, and how it is carried out |  |  |  |
| Explain some benefits, risks and concerns related to genetic engineering |  |  |  |
| **HT ONLY: Explain the process of genetic engineering, to include knowledge of enzymes and vectors** |  |  |  |
| *Bio ONLY: Describe different cloning techniques, to include: tissue culture, cuttings, embryo transplants and adult cell cloning* |  |  |  |
| **4.6.3 The development of understanding of genetics and evolution** | *Bio ONLY: Describe the ideas proposed by Darwin in his theory of natural selection and explain why this theory was only gradually accepted* |  |  |  |
| *Bio ONLY: Describe other inheritance-based theories that existed (apart from the theory of natural selection), and the problems with these theories* |  |  |  |
| *Bio ONLY: Describe the work of Alfred Russel Wallace* |  |  |  |
| *Bio ONLY: Explain how new species can be formed* |  |  |  |
| *Bio ONLY: Describe how our understanding of genetics has developed over time, to include knowledge of Mendel* |  |  |  |
| Describe some sources of evidence for evolution |  |  |  |
| Describe what fossils are, how they are formed and what we can learn from them |  |  |  |
| Explain why there are few traces of the early life forms, and the consequences of this in terms of our understanding of how life began |  |  |  |
| Describe some of the causes of extinction |  |  |  |
| Describe how antibiotic-resistant strains of bacteria can arise and spread (inc MRSA) |  |  |  |
| Describe how the emergence of antibiotic-resistant bacteria can be reduced and controlled, to include the limitations of antibiotic development |  |  |  |
| **4.6.4 Classification** | Describe how organisms are named and classified in the Linnaean system |  |  |  |
| Explain how scientific advances have led to the proposal of new models of classification, inc three-domain system |  |  |  |
| Describe and interpret evolutionary trees |  |  |  |

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| **AQA Biology (8461) from 2016 Topic B4.7 Ecology** | | | | |
| **Topic** | **Student Checklist** | **R** | **A** | **G** |
| **4.7.1 Adaptations, interdependence and competition** | Recall what an ecosystem is |  |  |  |
| Describe which resources animals and plants compete for, and why they do this |  |  |  |
| Explain the terms 'interdependence' and 'stable community' |  |  |  |
| Name some abiotic and biotic factors that affect communities |  |  |  |
| Explain how a change in an abiotic or biotic factor might affect a community |  |  |  |
| Describe structural, behavioural and functional adaptations of organisms |  |  |  |
| Describe what an extremophile is |  |  |  |
| **4.7.2 Organisation of an ecosystem** | Represent the feeding relationships within a community using a food chain and describe these relationships |  |  |  |
| Explain how and why ecologists use quadrats and transects |  |  |  |
| Describe and interpret predator-prey cycles |  |  |  |
| *Required practical 9: measure the population size of a common species in a habitat. Use sampling to investigate the effect of one factor on distribution* |  |  |  |
| Describe the processes involved in the carbon cycle |  |  |  |
| Describe the processes involved in the water cycle |  |  |  |
| *Bio ONLY: Explain how temperature, water and availability of oxygen affect the rate of decay of biological material* |  |  |  |
| *Bio ONLY: Explain how the conditions for decay are optimised by farmers and gardeners, and the reasons for this* |  |  |  |
| *Bio ONLY: Describe how methane gas can be produced from decaying materials for use as a fuel* |  |  |  |
| *Bio ONLY: Required practical 10: investigate the effect of temperature on the rate of decay of fresh milk by measuring pH change* |  |  |  |
| *Bio ONLY: Explain how environmental changes can affect the distribution of species in an ecosystem (temperature, water and atmospheric gases)* |  |  |  |
| **4.7.3 Biodiversity and the effect of human interaction on ecosystems** | Describe what biodiversity is, why it is important, and how human activities affect it |  |  |  |
| Describe the impact of human population growth and increased living standards on resource use and waste production |  |  |  |
| Explain how pollution can occur, and the impacts of pollution |  |  |  |
| Describe how humans reduce the amount of land available for other animals and plants |  |  |  |
| Explain the consequences of peat bog destruction |  |  |  |
| Describe what deforestation is and why it has occurred in tropical areas |  |  |  |
| Explain the consequences of deforestation |  |  |  |
| Describe how the composition of the atmosphere is changing, and the impact of this on global warming |  |  |  |
| Describe some biological consequences of global warming |  |  |  |
| Describe both positive and negative human interactions in an ecosystem and explain their impact on biodiversity |  |  |  |
| Describe programmes that aim to reduce the negative effects of humans on ecosystems and biodiversity |  |  |  |
| **4.7.4 Trophic levels in an ecosystem** | *Bio ONLY: Describe the different trophic levels and use numbers and names to represent them* |  |  |  |
| *Bio ONLY: Describe what decomposers are and what they do* |  |  |  |
| *Bio ONLY: Construct pyramids of biomass accurately from data and explain what they represent* |  |  |  |
| *Bio ONLY: State how much energy producers absorb from the Sun and how much biomass is transferred* |  |  |  |
| *Bio ONLY: Explain how biomass is lost between trophic levels, including the consequences of this and calculate efficiency between trophic levels* |  |  |  |
| **4.7.5 Food production** | *Bio ONLY: Explain the term 'food security' and describe biological factors that threaten it* |  |  |  |
| *Bio ONLY: Explain how the efficiency of food production can be improved* |  |  |  |
| *Bio ONLY: Explain the term 'factory farming', including examples, and ethical objections* |  |  |  |
| *Bio ONLY: Explain the importance of maintaining fish stocks at a level where breeding continues* |  |  |  |
| *Bio ONLY: Explain some methods that can help to conserve fish stocks* |  |  |  |
| *Bio ONLY: Describe how modern biotechnology is used in food production, including the fungus Fusarium as an example* |  |  |  |
| *Bio ONLY: Describe the uses of genetically modified organisms in insulin and food production* |  |  |  |