Biology 2	Separate Biology		
Red	Amber	Green	
B10. The Human Nervous System	Describe what homeostasis is and why it is important stating specific examples from the human body		
	Describe the common features of all control systems		
	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: 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 the cerebral cortex, cerebellum and medulla on a diagram of the brain		
	Bio 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 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		
B11. Hormonal Control	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		
	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		
	Explain what type 1 and type 2 diabetes are and how they are treated		
	HT ONLY: Explain the roles of thyroxine and adrenaline in the body as negative feedback systems		
	Describe what happens at puberty in males and females, inc knowledge of reproductive hormones		

B11. Hormonal Control	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	
	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	
	Describe how fertility can be controlled by hormonal and non-hormonal methods of contraception (giving specific examples)	
	Bio only: Describe hormone-linked plant responses, to include phototropism and gravitropism and the role of auxin	
	Bio only: Describe the functions of gibberellins and ethene in plants	
	Bio only: Required practical: investigate the effect of light or gravity on the growth of newly germinated seedling	
	Bio only: Explain the use of plant growth hormones are used in agriculture and horticulture (auxins, ethene and gibberellins)	
B12. Homeostasis in Action (Biology only)	**Describe how body temperature is monitored and controlled**	
	Describe how water, ions and urea are lost from the body	
	Describe the consequences of losing or gaining too much water for body cells	
	Describe how the kidneys produce urine	
	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	

Biology 2	**Separate Biology**	
Red	**Amber**	**Green**

B13. Reproduction	Describe features of sexual and asexual reproduction	
	Describe what happens during meiosis and compare to mitosis	
	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 what happens at fertilisation	
	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	
	Bio only: Describe the structure of DNA, including knowledge of nucleotide units	
	Bio only: Explain complementary base pairing in DNA	
	Bio only: Explain the relationship between DNA bases (ATCG), amino acids and proteins	
	Bio only: Describe how proteins are synthesised on ribosomes, including protein folding and its importance for protein function	
	Bio only: Explain what mutations are, and the possible effects of mutations	
	Bio 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 and use Punnet square diagrams, genetic crosses and family trees	
	Explain important genetic terms: gamete, chromosome, gene, allele, genotype, phenotype, dominant, recessive, homozygous and heterozygous	
	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	

Biology 2	Separate Biology		
Red	Amber	Green	
B14. Variation & 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 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		
	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		
	Explain some benefits, risks and concerns related to genetic engineering		

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B15. Genetics & 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		
	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		
B16. Adaptations, Interdependence & 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		
	Explain how and why ecologists use quadrats and transects		
	Required practical: measure the population size of a common species in a habitat. Use sampling to investigate the effect of one factor on distribution		

Biology 2	Separate		
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B17. Organising an Ecosystem	Represent the feeding relationships within a community using a food chain and describe these relationships		
	Describe and interpret predator-prey cycles		
	Describe the processes involved in the carbon cycle		
	Describe the processes involved in the water cycle		
	Describe the processes involved in the decay 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: Required practical: investigate the effect of temperature on the rate of decay of fresh milk by measuring pH change		
	Bio only: Describe how methane gas can be produced from decaying materials for use as a fuel		
B18. Biodiversity & 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		
	Bio ONLY: Explain how environmental changes can affect the distribution of species in an ecosystem (temperature, water and atmospheric gases)		
	Describe programmes that aim to reduce the negative effects of humans on ecosystems and biodiversity		
	Describe how human activities pollute water.		

Biology 2	Separate		
Red	Amber	Green	
B18. Biodiversity & Ecosystems	Describe how air pollution causes acid rain, global dimming and smog.		
	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		
	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: 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		