Caroline Chisholm School
Ambition Confidence Success
Everyone Every Lesson Every Opportunity

Year 10 Biology Curriculum

Unit:	Core knowledge/skill development:	Sequence:	Assessment:	Literacy, numeracy, PSHE, FBV, other links	ACP and VAA development:	Home learning and enrichment
SB3/CB3	Content which is only in Separate Biology is Highlighted in Bold **3.1B Explain some of the advantages and disadvantages of asexual reproduction, including the lack of need to find a mate, a rapid reproductive cycle, but no variation in the population** 3.2B Explain some of the advantages and disadvantages of sexual reproduction, including variation in the population, but the requirement to find a mate 3.3 Explain the role of meiotic cell division, including the production of four daughter cells, each	Content which is only in Separate Biology is Highlighted in Bold 1. ***Sexual and Asexual reproduction*** 2. Meiosis 3. DNA 4. DNA Extraction 5. **Protein Synthesis** 6. **Genetic Variants and Phenotypes** 7. **Mendel** 8. Alleles 9. Inheritance	**Separate Science**: End of Unit Assessment for SB3 Census Assessment 1 will assess learning in Topic SB3 and content from Topics SB1 and 2. **Combined**: End of Unit Assessment for CB3. Census Assessment 1 will assess learning in Topic CB3	Use of mathematics ● Use estimations and explain when they should be used (1d). ● Translate information between numerical and graphical forms (4a). ● Extract and interpret information from graphs, charts and tables (2c and 4a). ● Extract and interpret data from graphs, charts, and tables (2c).	**VVAs** **Hard Working: Practice** – Self-regulate and revise practice schedules in line with improvements. Set own goals and monitor progress towards them. Actively seek ways to improve. **Agile - Enquiring** Independently identify questions and problems, justify their interest in them, and critically consider whether they are worth asking and solving. Use connections from across the curriculum to develop their enquiry, answering questions that are of real value to	**Homework**: retrieval quizzing which will assess both current learning and learning from previous years. Homework will be set on Educake, Century Tech, Isaac Physics or Seneca Premium. Exam questions may also be set as homework. There will be revision homework before each Census Assessment and Topic Test.

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	with half the number of chromosomes, and that this results in the formation of genetically different haploid gametes The stages of meiosis are not required 3.4 Describe DNA as a polymer made up of: a two strands coiled to form a double helix b strands linked by a series of complementary base pairs joined together by weak hydrogen bonds c nucleotides that consist of a sugar and phosphate group with one of the four different bases attached to the sugar 3.5 Describe the genome as the entire DNA of an organism and a gene as a	10. Multiple and Missing Alleles 11. Gene Mutation 12. Variation 13. End of Unit Assessment 14. Revision and Therapy		● Understand and use direct proportions and simple ratios in genetic crosses (1c). ● Understand and use the concept of probability in predicting the outcome of genetic crosses (2e). ● Calculate arithmetic means (2b).	society both in and outside. ACP Analysing: Precision – Select appropriate skills and conventions and use effectively to reach strong outcomes. Realising: Automaticity – Effortlessly use key facts, concepts and ideas relevant to the stage of learning. Draw upon a range of skills without the need to think or process.	

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	section of a DNA molecule that codes for a specific protein 3.6 Explain how DNA can be extracted from fruit 3.7B Explain how the order of bases in a section of DNA decides the order of amino acids in the protein and that these fold to produce specifically shaped proteins such as enzymes 3.8B Describe the stages of protein synthesis, including transcription and translation: a RNA polymerase binds to non-coding DNA located in front of a gene b RNA polymerase produces					

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	a complementary mRNA strand from the coding DNA of the gene c the attachment of the mRNA to the ribosome d the coding by triplets of bases (codons) in the mRNA for specific amino acids e the transfer of amino acids to the ribosome by tRNA f the linking of amino acids to form polypeptides 3.9B Describe how genetic variants in the non-coding DNA of a gene can affect phenotype by influencing the binding of RNA polymerase and altering the quantity of protein produced					

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	3.10B Describe how genetic variants in the coding DNA of a gene can affect phenotype by altering the sequence of amino acids and therefore the activity of the protein produced **3.11B Describe the work of Mendel in discovering the basis of genetics and recognise the difficulties of understanding inheritance before the mechanism was discovered 1c 2c, 2e** 3.12 Explain why there are differences in the inherited characteristics as a result of alleles					

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	3.13 Explain the terms: chromosome, gene, allele, dominant, recessive, homozygous, heterozygous, genotype, phenotype, gamete and zygote 3.14 Explain monohybrid inheritance using genetic diagrams, Punnett squares and family pedigrees 1c 2c, 2e 4a 3.15 Describe how the sex of offspring is determined at fertilisation, using genetic diagrams 1c 2c, 2e 4a 3.16 Calculate and analyse outcomes (using probabilities, ratios and percentages) from monohybrid					

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	crosses and pedigree analysis for dominant and recessive traits 1c 2c, 2e 4a 3.17B **Describe the inheritance of the ABO blood groups with reference to codominance and multiple alleles 1c 2c, 2e 4a 3.18B** Explain how sex-linked genetic disorders are inherited 1c 2c, 2e 4a 3.19 State that most phenotypic features are the result of multiple genes rather than single gene inheritance 3.20 Describe the causes of variation that influence					

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	phenotype, including: a genetic variation – different characteristics as a result of mutation and sexual reproduction b environmental variation – different characteristics caused by an organism's environment (acquired characteristics) 3.21 Discuss the outcomes of the Human Genome Project and its potential applications within medicine 3.22 State that there is usually extensive genetic variation within a population of a species and that these arise through mutations					

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	3.23 State that most genetic mutations have no effect on the phenotype, some mutations have a small effect on the phenotype and, rarely, a single mutation will significantly affect the phenotype					
SB4/CB4	4.1B Describe the work of Darwin and Wallace in the development of the theory of evolution by natural selection and explain the impact of these ideas on modern biology **4.2 Explain Darwin's theory of evolution by natural selection** 4.3 Explain how the emergence of	**Separate Science** 1. Evidence for Human Evolution 2. Darwin's Theory 3. **Developmen t of Darwin's Theory** 4. Classification	**Separate Science** End of Unit Assessment for SB4 **Combined Science** End of Unit Assessment for CB4	**Use of mathematics** ● Translate information between numerical and graphical forms (4a). ● Construct and interpret frequency tables and diagrams, bar charts and histograms (2c).	**VVAs** **Empathetic: Concerned for society** – analyse how different circumstances, belief systems and emotions influence events and act independently according to their own belief systems. Challenge injustice and take the needs of future generations into account.	**Homework**: retrieval quizzing which will assess both current learning and learning from previous years. Homework will be set on Educake, Century Tech, Isaac Physics or Seneca Premium. Exam questions may also be set as homework. There will be revision homework before each

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	resistant organisms supports Darwin's theory of evolution including antibiotic resistance in bacteria 2c 4a 4.4 Describe the evidence for human evolution, based on fossils, including: a Ardi from 4.4 million years ago b Lucy from 3.2 million years ago c Leakey's discovery of fossils from 1.6 million years ago 1a, 1b, 1c 4a 4.5 Describe the evidence for human evolution based on stone tools, including: a the development of stone tools over time b how these can be dated from their environment	5. Breeds and varieties 6. **Tissue Culture** 7. Genes Agriculture and Medicine 8. **GM and Agriculture** 9. **Fertilisers and Biological Control** 10. End of Unit Assessment 11. Revision and Therapy		● Plot and draw appropriate graphs, selecting appropriate scales for axes (4a and 4c). ● Extract and interpret information from graphs, charts and tables (2c and 4a). ● Extract and interpret data from graphs, charts, and tables (2c). ● Understand and use direct proportions and simple ratios in genetic crosses (1c). ● Understand and use the concept of probability in	**Empathetic: Confident** – critically reflect on their knowledge, understanding and ideas in light of new experiences and interaction with others. Know when to modify their knowledge, understanding and ideas based on their critical reflection. Seek new challenges and situations. **ACP** **Linking: Abstraction** – Evaluate a range of ideas, issues, problems or events, develop and combine them and apply them to complex imagined or theoretical situations. **Meta-thinking: Intellectual confidence** –	Census Assessment and Topic Test.

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	4.6B Describe how the anatomy of the pentadactyl limb provides scientists with evidence for evolution 4.7 Describe how genetic analysis has led to the suggestion of the three domains rather than the five kingdoms classification method 4.8 Explain selective breeding and its impact on food plants and domesticated animals **4.9B Describe the process of tissue culture and its advantages in medical research and plant breeding programmes**			predicting the outcome of genetic crosses (2e).	synthesise a wide range of viewpoints and evidence to make a coherent and compelling personal argument.	

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	4.10 Describe genetic engineering as a process which involves modifying the genome of an organism to introduce desirable characteristics 4.11 Describe the main stages of genetic engineering including the use of: a restriction enzymes b ligase c sticky ends d vectors 4.12B Explain the advantages and disadvantages of genetic engineering to produce GM organisms including the modification of crop plants, including the introduction of genes for insect resistance from					

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	Bacillus thuringiensis into crop plants 4.13B Explain the advantages and disadvantages of agricultural solutions to the demands of a growing human population, including use of fertilisers and biological control 2c 4a, 4c 4.14 Evaluate the benefits and risks of genetic engineering and selective breeding in modern agriculture and medicine, including practical and ethical implications 2c 4a, 4c					
SB5/CB5	5.1 Describe health as a state of complete physical, mental and social well-being and not merely the	1. Health and Disease	**Separate Science:** End of Unit Assessment for SB5	**Use of mathematics** ● Plot, draw and interpret	**VAA** Hard working: Perseverance – recognise that making	**Homework**: retrieval quizzing which will assess both current learning and learning from previous years.

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	absence of disease or infirmity, as defined by the World Health Organization (WHO) 5.2 Describe the difference between communicable and non-communicable diseases 5.3 Explain why the presence of one disease can lead to a higher susceptibility to other diseases 2c, 2d, 2g 4a, 4c 5.4 Describe a pathogen as a disease-causing organism, including viruses, bacteria, fungi and protists 5.5 Describe some common infections, including: a cholera (bacteria) causes	2. Non-Communicable Diseases 3. Cardiovascular Disease 4. Pathogens 5. Spreading Pathogens **6. Virus Life Cycle** **7. Plant Defences** **8. Plant Diseases** 9. Physics and Chemical Barriers 10. The Immune System 11. Antibiotics	**Combined Science**: End of Unit Assessment CB5	appropriate graphs (4a, 4b, 4c and 4d). ● Construct and interpret frequency tables and diagrams, bar charts and histograms (2c). ● Understand the principles of sampling as applied to scientific data (2d). ● Use a scatter diagram to identify a correlation between two variables (2g). ● Calculate cross-sectional areas of bacterial cultures and clear	mistakes is a natural part of learning and can explain this to others. Have enough self-awareness and confidence to accept that some tasks cannot be completed. **ACP** **Meta-thinking: Strategy Planning** – Use Strategy-planning independently as a way of solving problems or issues. Linking: Connection Finding – Make Connections not only within the given subject area, but also between and beyond subjects in innovative way. Make novel, insightful and innovative	Homework will be set on Educake, Century Tech, Isaac Physics or Seneca Premium. Exam questions may also be set as homework. There will be revision homework before each Census Assessment and Topic Test.

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	diarrhoea b tuberculosis (bacteria) causes lung damage c Chalara ash dieback (fungi) causes leaf loss and bark lesions d malaria (protists) causes damage to blood and liver e HIV (virus) destroys white blood cells, leading to the onset of AIDS fB stomach ulcers caused by Helicobacter (bacteria) gB Ebola (virus) causes haemorrhagic fever 5.6 Explain how pathogens are spread and how this spread can be reduced or prevented, including: a cholera (bacteria) – water b tuberculosis (bacteria) – airborne c Chalara ash dieback (fungi) – airborne d	12. **Core Practical – Antibiotics** 13. **Monoclonal Antibodies** 14. End of Unit Assessment 15. Revision and Therapy		agar jelly using πr2 (5c).	connections which help to reconceptualise.	

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	malaria (protists) – animal vectors eB stomach ulcers caused by Helicobacter (bacteria) – oral transmission fB Ebola (virus) – body fluids 5.7B Describe the lifecycle of a virus, including lysogenic and lytic pathways 5.8 Explain how sexually transmitted infections (STIs) are spread and how this spread can be reduced or prevented, including: a Chlamydia (bacteria) b HIV (virus) 5.9B Describe how some plants defend themselves against attack from pests and					

Unit:	Core knowledge/skill development:	Sequence:	Assessment:	Literacy, numeracy, PSHE, FBV, other links	ACP and VAA development:	Home learning and enrichment
	pathogens by physical barriers, including the leaf cuticle and cell wall 5.10B Describe how plants defend themselves against attack from pests and pathogens by producing chemicals, some of which can be used to treat human diseases or relieve symptoms 5c 5.11B Describe different ways plant diseases can be detected and identified, in the lab and in the field including the elimination of possible environmental causes, distribution analysis of affected plants, observation of					

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	visible symptoms and diagnostic testing to identify pathogens 2d 4c 5c 5.12 Describe how the physical barriers and chemical defences of the human body provide protection from pathogens, including: a physical barriers, including mucus, cilia and skin b chemical defence, including lysozymes and hydrochloric acid 5c 5.13 Explain the role of the specific immune system of the human body in defence against disease, including: a exposure to pathogen b the antigens trigger an immune response					

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	which causes the production of antibodies c the antigens also trigger production of memory lymphocytes d the role of memory lymphocytes in the secondary response to the antigen 5.14 Explain the body's response to immunisation using an inactive form of a pathogen 2c, 2g 4a, 4c 5.15B Discuss the advantages and disadvantages of immunisation, including the concept of herd immunity 2d, 2g 4a, 4c 5.16 Explain that antibiotics can only be used to treat					

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	bacterial infections because they inhibit cell processes in the bacterium but not the host organism 5c 5.17B Explain the aseptic techniques used in culturing microorganisms in the laboratory, including the use of an autoclave to prepare sterile growth medium and petri dishes, the use of sterile inoculating loops to transfer microorganisms and the need to keep petri dishes and culture vials covered 5.18B Core Practical: Investigate the effects of antiseptics, antibiotics or plant extracts on microbial cultures 1a 2c, 2f 5c					

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	5.19B Calculate cross-sectional areas of bacterial cultures and clear agar jelly using πr2 1a 2c 5c 5.20 Describe that the process of developing new medicines, including antibiotics, has many stages, including discovery, development, preclinical and clinical testing 5c Maths skills 5.21B Describe the production of monoclonal antibodies, including: a use of lymphocytes which produce desired antibodies but do not divide b production of hybridoma cells c hybridoma cells					

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	produce antibodies as they divide 5.22B Explain the use of monoclonal antibodies, including: a in pregnancy testing b in diagnosis including locating the position of blood clots and cancer cells and in treatment of diseases including cancer c the advantages of using monoclonal antibodies to target specific cells compared to drug and radiotherapy treatments 5.23 Describe that many non-communicable human diseases are caused by the interaction of a number of factors,					

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	including cardiovascular diseases, many forms of cancer, some lung and liver diseases and diseases influenced by nutrition 5.24 Explain the effect of lifestyle factors on non-communicable diseases at local, national and global levels, including: a exercise and diet on obesity and malnutrition, including BMI and waist : hip calculations, using the BMI equation: ( ) 2 mass (kg) BMI = height (m) b alcohol on liver diseases c smoking on cardiovascular diseases 1a, 1c 2c, 2d, 2g 4a, 4c 5.25					

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	Evaluate some different treatments for cardiovascular disease, including: a life-long medication b surgical procedures c lifestyle changes 1c, 1d 2c 4a, 4c					
SB6/CB6	6.1 Describe photosynthetic organisms as the main producers of food and therefore biomass 6.2 Describe photosynthesis in plants and algae as an endothermic reaction that uses light energy to react carbon dioxide and water to produce glucose and oxygen 6.3 Explain the effect of temperature, light intensity and carbon dioxide concentration	1. Photosynthesis 2. Factors that Affect Photosynthesis 3. Core Practical – Light Intensity and Photosynthesis 4. Absorbing Water and Mineral Ions 5. Transpiration and	**Separate Science**: End of Unit Assessment SB5 Census Assessment 2 will assess learning from SB3-SB4 and some learning in SB1-2. **Combined Science**: End of Unit Assessment SB5	**Use of mathematics** ● Carry out rate calculations for chemical reactions (1a and 1c). ● Use simple compound measures such as rate (1a, 1c) ● Plot, draw and interpret appropriate graphs (4a, 4b, 4c and 4d).		**Homework**: retrieval quizzing which will assess both current learning and learning from previous years. Homework will be set on Educake, Century Tech, Isaac Physics or Seneca Premium. Exam questions may also be set as homework. There will be revision homework before each Census Assessment and Topic Test.

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	as limiting factors on the rate of photosynthesis 2c, 2d, 2g 4a, 4c 6.4 Explain the interactions of temperature, light intensity and carbon dioxide concentration in limiting the rate of photosynthesis 4b, 4c, 4d 6.5 Core Practical: Investigate the effect of light intensity on the rate of photosynthesis 2c, 2f, 2g 4a, 4c 6.6 Explain how the rate of photosynthesis is directly proportional to light intensity and inversely proportional to the distance from a light source, including the	Translocation 6. **Plant Adaptations** 7. **Plant Hormones** 8. **Uses of Plant Hormones** 9. End of Unit Assessment 10. Revision and Therapy		● Construct and interpret frequency tables and diagrams, bar charts and histograms (2c). ● Understand the principles of sampling as applied to scientific data (2d). ● Use a scatter diagram to identify a correlation between two variables (2g). ● Understand and use simple compound measures such as the rate of a reaction (1a and 1c).		

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	use of the inverse square law calculation 2g 3a 4a, 4b, 4c, 4d 6.7 Explain how the structure of the root hair cells is adapted to absorb water and mineral ions 6.8 Explain how the structures of the xylem and phloem are adapted to their function in the plant, including: a lignified dead cells in xylem transporting water and minerals through the plant b living cells in phloem using energy to transport sucrose around the plant 6.9 Explain how water and mineral ions are transported through the plant by			● Understand and use inverse proportion – the inverse square law and light intensity in the context of factors affecting photosynthesis. ● Use percentiles and calculate the percentage gain and loss of mass (1c). ● Use fractions and percentages (1c). ● Calculate arithmetic means (2b). ● Calculate cross-sectional areas of bacterial cultures and clear		

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	transpiration, including the structure and function of the stomata 6.10 Describe how sucrose is transported around the plant by translocation 6.11B Explain how the structure of a leaf is adapted for photosynthesis and gas exchange 2d 5c 6.12 Explain the effect of environmental factors on the rate of water uptake by a plant, to include light intensity, air movement and temperature 1a, 1c 2b, 2c 4a, 4b, 4c, 4d **6.13 Demonstrate an understanding of rate calculations for**			agar jelly using πr2 (5c). ● Carry out rate calculations (1a and 1c).		

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	transpiration 1a, 1c 2b, 2c 4a, 4b, 4c, 4d 6.14B Explain how plants are adapted to survive in extreme environments including the effect of leaf size and shape, the cuticle and stomata 2d 5c 6.15B Explain how plant hormones control and coordinate plant growth and development, including the role of auxins in phototropisms and gravitropisms 5a 6.16B Describe the commercial uses of auxins, gibberellins and ethene in plants, including: a auxins in weedkillers and					

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	rooting powders b gibberellins in germination, fruit and flower formation and the production of seedless fruit c ethene in fruit ripening 4a, 4c					
SB7/CB7	7.1 Describe where hormones are produced and how they are transported from endocrine glands to their target organs, including the pituitary gland, thyroid gland, pancreas, adrenal glands, ovaries and testes 7.2 Explain that adrenalin is produced by the adrenal glands to prepare the body for fight or flight, including: a increased heart rate b increased blood pressure c	1. Hormones 2. Hormone Control of Metabolic Rate 3. The Menstrual Cycle 4. Hormones and the Menstrual Cycle 5. Control of Blood Glucose 6. Type 2 Diabetes 7. Thermoregulation 8. Osmoregulation 9. The Kidneys		Use of mathematics ● Use simple compound measures such as rate (1a, 1c). ● Plot, draw and interpret appropriate graphs (4a, 4b, 4c and 4d). ● Translate information between numerical and graphical forms (4a).	VAA Hard Working: Resilience – Select and self-manage extended and complex tasks consistently to completion. Are deliberately unwilling to allow adversity to precent them from reaching their goal and are unswerving in their focus and their eventual success. ACP Linking: Big Picture Thinking – Explore the complexities and	Homework: retrieval quizzing which will assess both current learning and learning from previous years. Homework will be set on Educake, Century Tech, Isaac Physics or Seneca Premium. Exam questions may also be set as homework. There will be revision homework before each Census Assessment and Topic Test.

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	increased blood flow to the muscles d raised blood sugar levels by stimulating the liver to change glycogen into glucose 2c 4a, 4c 7.3 Explain how thyroxine controls metabolic rate as an example of negative feedback, including: a low levels of thyroxine stimulates production of TRH in hypothalamus b this causes release of TSH from the pituitary gland c TSH acts on the thyroid to produce thyroxine d when thyroxine levels are normal thyroxine inhibits the release of TRH and the production of TSH 2c 4a, 4c	11. End of Unit Assessment 12. Therapy and Revision		● Construct and interpret frequency tables and diagrams, bar charts and histograms (2c). ● Understand and use percentiles (1c). ● Extract and interpret data from graphs, charts and tables (1c).	uncertainties in big ideas and holistic concepts and accept that they have limitations. Analysing: Critical or Logical Thinking – Ask perceptive and insightful questions and develop relevant hypotheses. Critically analyse and synthesise evidence and assess it for validity. Use robust evidence to develop compelling new ideas and hypotheses.	

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	7.4 Describe the stages of the menstrual cycle, including the roles of the hormones oestrogen and progesterone, in the control of the menstrual cycle 4a 7.5 Explain the interactions of oestrogen, progesterone, FSH and LH in the control of the menstrual cycle, including the repair and maintenance of the uterus wall, ovulation and menstruation 4a, 4c 7.6 Explain how hormonal contraception influences the menstrual cycle and prevents pregnancy					

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	7.7 Evaluate hormonal and barrier methods of contraception 2c, 2d 4a 7.8 Explain the use of hormones in Assisted Reproductive Technology (ART) including IVF and clomifene therapy 7.9 Explain the importance of maintaining a constant internal environment in response to internal and external change 7.10B Explain the importance of homeostasis, including: a thermoregulation – the effect on enzyme activity b					

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	osmoregulation – the effect on animal cells 7.11B Explain how thermoregulation takes place, with reference to the function of the skin, including: a the role of the dermis b the role of the epidermis c the role of the hypothalamus 7.12B Explain how thermoregulation takes place, with reference to: a shivering b vasoconstriction c vasodilation 7.13 Explain how the hormone insulin controls blood glucose concentration 7.14 Explain how blood glucose					

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	concentration is regulated by glucagon 7.15 Explain the cause of type 1 diabetes and how it is controlled 7.16 Explain the cause of type 2 diabetes and how it is controlled 7.17 Evaluate the correlation between body mass and type 2 diabetes including waist:hip calculations and BMI, using the BMI equation: ( ) 2 mass (kg) BMI = height (m) 1a, 1c, 2c 2e, 3a 7.18B Describe the structure of the urinary system					

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	7.19B Explain how the structure of the nephron is related to its function in filtering the blood and forming urine including: a filtration in the glomerulus and Bowman's capsule b selective reabsorption of glucose c reabsorption of water 7.20B Explain the effect of ADH on the permeability of the collecting duct in regulating the water content of the blood 7.21B Describe the treatments for kidney failure, including kidney dialysis and organ donation 7.22B State that urea is produced from the breakdown of excess					

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	amino acids in the liver					