

½ TERM TOPIC	TAUGHT CURRICULUM	TAUGHT SKILLS	SUMMATIVE ASSESSMENT TITLE/TYPE	ASSESSMENT CRITERIA	LEARNED CURRICULUM
1-3	<p><u>Homeostasis</u></p> <ul style="list-style-type: none"> ● Explain what homeostasis is and why it is important. ● Apply reflex arc to unfamiliar examples. ● Evaluate the benefits and risks of procedures carried out on the brain and nervous system. ● explain the importance of being able to respond to environmental changes and coordinate behaviour. ● explain how the nervous system is adapted for its functions ● Describe how the eye changes to focus on near and distant objects. ● Complete simple ray diagrams to show normal vision, long-sightedness and short-sightedness. ● explain how body temperature is monitored and controlled. ● Describe and explain the changes that happen when body temperature is too high or too low. 	<p><u>Homeostasis</u></p> <ul style="list-style-type: none"> ● Required practical: Plan and carry out an investigation into the effect of a factor on human reaction time ● Describe and use different methods to measure reaction time. ● Required practical: Make a plan to investigate a factor on human reaction time. ● Investigate how exercise affects body temperature and / or sweating and report on the findings. ● Research and produce a report to explain the cause, effects, treatment and problems associated with Type 1 diabetes. ● Interpret data on glucose tolerance tests in healthy people and diabetics. ● Interpret glucose tolerance test results. ● Evaluate modern methods of treating diabetes. ● Evaluate the use of kidney transplants and 	20 Marks of exam style questions in the final week of each half term. Full topic/progress lists available in pupils' exercise books.	<p>AO1: Demonstrate knowledge and understanding of: scientific ideas; scientific techniques and procedures.</p> <p>AO2: Apply knowledge and understanding of: scientific ideas; scientific enquiry, techniques and procedures.</p> <p>AO3: Analyse information and ideas to: interpret and evaluate; make judgments and draw conclusions; develop and improve experimental procedures.</p>	<p><u>Homeostasis</u></p> <ul style="list-style-type: none"> ● Describe examples of conditions that need to be controlled. ● Nervous System - structure & function ● Structure: the CNS is made up of the brain and spinal cord; receptors, different types of neurones, coordinator as brain or spinal cord, effectors, synapses. ● Stages of reflex arc. ● Describe the differences between voluntary and reflex actions ● .Identify the cerebral cortex, cerebellum and medulla on a diagram and describe the function of each. ● HT: Describe the techniques used to map areas of the brain to their functions ● Label a diagram of the eye and describe the function of each structure. ● Describe how

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	<ul style="list-style-type: none"> • explain why we drink more fluid during hot weather. • Relate hormone release and hormone action to the control system model introduced in. • Explain why the pituitary gland is often called the master gland. • Compare the actions of the nervous and endocrine systems. • explain when insulin is produced and how it helps to control blood glucose levels. • HT: explain when glucagon is produced by the pancreas and its effect on blood glucose levels. • explain how insulin and glucagon work together to control blood glucose levels. • explain the cause, effects, treatment and problems associated with Type 1 diabetes • explain the cause, treatment and problems associated with Type 2 diabetes. • Compare the causes, and treatments of Type 1 and Type 2 diabetes. • explain why there is no control over water, ion 	<p>dialysis to treat kidney failure.</p> <ul style="list-style-type: none"> • Evaluate the use of contraceptives and hormones. • Evaluate the use of fertility treatments. • Required practical: plan and carry out an investigation into the effect of light on plant shoots. Observe, present and analyse the results in a later lesson. Interpret results of plant hormone experiments using secondary sources. • Investigate the effect of rooting hormones on the growth of cuttings and write a short report. • Investigate the effect of weed killer on an area of lawn. • Research the uses of auxins, gibberellins and ethene and produce a poster or PowerPoint presentation. • 			<p>common eye sight problems (myopia and hyperopia) can be corrected .</p> <ul style="list-style-type: none"> • Describe different methods to measure body temperature. • Describe the endocrine system and define the term hormone. • Label a diagram of the organs in the endocrine system. • Describe how blood glucose concentration is monitored and controlled. • Describe glycogen as a stored carbohydrate. • Describe where water, ions and urea are lost from the body. • Label a diagram. Link each organ to the condition it helps to control in the body. • Describe the effect of too much or too little water on cells. • Describe how amino acids are deaminated in the liver to form ammonia, which is converted to urea for excretion. • Label a diagram of the excretory system.
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	<p>and urea loss by the lungs and skin.</p> <ul style="list-style-type: none">● explain when cells might gain or lose too much water, in terms of osmosis● explain how the body responds to different temperature and osmotic challenges in terms of sweat and urine release.● HT: Explain, with the aid of a diagram, how ADH controls the concentration of the blood using a negative feedback mechanism.● Explain why dialysis fluid contains sugar and ions at the same concentration as normal blood, but no urea.● Explain how a kidney machine works.● explain the cause of these changes in boys and girls and their relevance in reproduction● HT: explain the interaction between these hormones in the control of the menstrual cycle.● explain how hormonal and non-hormonal contraceptives work.● Use a model, eg a flow diagram to explain the				<ul style="list-style-type: none">● Describe how urine is produced.● Describe the absorption of glucose and ions by diffusion and active transport● HT: Identify the site of production and target organs for ADH.● HT: Describe the effects of ADH on kidney tubules.● Describe the advantages and disadvantages of a kidney transplant.● Describe secondary sexual characteristics of boys and girls.● Describe the menstrual cycle and fertility including the role of hormones● Know the glands which produce Oestrogen, Progesterone, FSH and LH, their target organs & effects.● Describe the menstrual cycle and fertility including the role of hormones● Describe hormonal and non-hormonal methods of contraception.● Describe the use of fertility drugs in
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	<p>process of In Vitro Fertilisation (IVF).</p> <ul style="list-style-type: none">• Draw a diagram to explain how levels of adrenaline are controlled by a negative feedback system• Draw a diagram to explain how its release is stimulated by thyroid stimulating hormone and the levels of these two hormones are controlled by a negative feedback system• Draw diagrams to explain the role of auxin in plant responses in terms of unequal distribution in shoots and roots				<p>women with low FSH levels.</p> <ul style="list-style-type: none">• Learn advantages and disadvantages of contraception + fertility.• Describe where and when adrenaline is released and its target organs.• Describe the effects of adrenaline on the body.• Describe where thyroxine is produced and its effects on the body.• Describe how plant shoots and roots respond to light and gravity.• HT: Describe the functions of gibberellins and ethene in plants.• Describe how auxins are used as weedkillers and rooting powders, and to promote growth in tissue culture.• Describe the use of ethene to control the ripening of fruit during storage and transport.• Describe the use of gibberellins to end seed dormancy, promote flowering
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<p>4-6</p>	<p><u>Inheritance and Evolution.</u></p> <ul style="list-style-type: none"> ● Explain why sexual reproduction produces variation in the offspring, but asexual reproduction does not. ● explain the term gametes and describe their genetic material. ● explain why sexual reproduction results in variety. ● Draw diagrams to explain how gametes are formed in meiosis. explain the number of chromosomes in the gametes during meiosis and fertilisation. ● explain how knowledge of the human genome will help medicine in the future, eg identifying genes linked to cancers, understanding and treating inherited disorders. It will also help trace human migration patterns ● explain the ethical issues related to DNA sequencing. ● explain how the bases on the two strands link together. ● explain the importance of the shape of a protein for enzyme action ● explain that most mutations have little 	<ul style="list-style-type: none"> ● Debate: research and discuss 'DNA profiling' for health. ● Research roles of Franklin, Watson and Crick in the discovery of the structure of DNA. ● Demo or practical to extract DNA ● Be able to draw punnet squares and cross diagrams. ● Be able to calculate ratios of phenotypes. ● Be able to interpret family trees. ● Students should be able to evaluate the benefits of embryo screening when presented with appropriate information. ● Evaluate genetic modification to treat cystic fibrosis. ● Interpret evolutionary trees ● Evaluate the advantages and risks of selective breeding in plants and animals. ● Produce a leaflet for a doctor's surgery to explain how human insulin is produced by bacteria and discuss the advantages of this over porcine insulin 	<p>20 Marks of exam style questions in the final week of each half term. Full topic/progress lists available in pupils' exercise books.</p>	<p>AO1: Demonstrate knowledge and understanding of: scientific ideas; scientific techniques and procedures.</p> <p>AO2: Apply knowledge and understanding of: scientific ideas; scientific enquiry, techniques and procedures.</p> <p>AO3: Analyse information and ideas to: interpret and evaluate; make judgments and draw conclusions; develop and improve experimental procedures.</p>	<p><u>Inheritance and Evolution.</u></p> <ul style="list-style-type: none"> ● Describe the structure of chromosomes, DNA and genes. explain that a gene is a small section of DNA that codes for a particular sequence of amino acids to make a specific protein. ● Describe what the genome is. ● Describe the structure of DNA using diagrams and models. ● Describe in simple terms how a protein is synthesised ● Describe what a mutation is and how a mutation could affect the formation of a protein. ● Describe the function of non-coding parts of DNA and the possible effect of a mutation in a non-coding section of DNA. ● Describe the difference between genes, alleles and chromosomes. ● Learn the terms, genotype, phenotype, dominant, recessive, heterozygous, homozygous.
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	<p>effect but a few have more serious effects on the function of the protein.</p> <ul style="list-style-type: none"> ● Be able to use genetic cross diagrams to predict the phenotypes of offspring. ● explain why mutation may lead to more rapid change in a species. ● explain the importance of cloning to plant growers. ● Interpret information about plant cloning techniques. ● explain advantages and disadvantages of plant cloning techniques. ● explain why identical twins are clones. ● Explain why Darwin did not publish his theory straight away and why it was only gradually accepted. ● explain how new species arise using the terms: isolation, genetic variation, natural selection, speciation ● explain why Mendel proposed the idea of separately inherited factors and why the importance of this discovery was not recognised until after his death. 	<ul style="list-style-type: none"> ● Interpret information about genetic engineering techniques. ● Research advantages and disadvantages of GM crops. What characteristics may be modified? Produce a web page or a table of benefits versus concerns for homework. ● Produce short, headline paragraphs to represent the views of organic farmers, Food-Aid organisers, GM Research scientists and students. ● Research the use of genetic engineering in medicine. ● Evaluate the use of genetic engineering in medicine, eg in gene therapy and production of hormones and some vaccines. Interpret information about genetic engineering techniques. Make informed judgements about the economic, social and ethical issues concerning genetic engineering and GM crops. explain advantages and disadvantages of genetic engineering 			<ul style="list-style-type: none"> ● Students should be able to describe the basic symptoms of both polydactyl and CF. ● Describe the causes of variation. Be able to identify variation as genetic, environmental or both. ● describe the effects of mutations on the genotypes and phenotypes. ● Describe Darwin's theory of evolution by natural selection. ● Describe the main stages of natural selection. ● Define the term mutation. ● Define the term species. ● Identify organisms that are of different species. ● Describe the process of selective breeding. ● give examples of desirable characteristic ● Define the term genetic engineering. ● Describe the process of genetic engineering and its advantages.
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	<ul style="list-style-type: none"> • Explain how fossils provide evidence for evolution • explain how extinction may be caused. • explain how bacteria can become resistant to antibiotics. • explain what we should do to slow down the rate of development of resistant strains of bacteria. • Explain why the importance of the binomial system to name organisms. • Explain how modern technologies have affected how organisms are classified today. • 	<ul style="list-style-type: none"> • Present arguments for and against human cloning. Make informed judgements about the economic, social and ethical issues concerning cloning. • Interpret evidence relating to evolutionary theory. • Predict and explain the outcome of crosses using genetic diagrams based on Mendel's experiments and using unfamiliar information. • Interpret data about antibiotic resistance. • Research MRSA and C. difficile infections and treatment. • 			<ul style="list-style-type: none"> • HT: describe in detail the process of genetic engineering • Define the term clone. • Describe plant cloning techniques to include: taking plant cuttings, tissue culture • Describe animal cloning techniques to include: embryo transplants, adult cell cloning. • Describe the work of Alfred Russel Wallace • Describe some of the experiments carried out by Mendel using pea plants. • Describe a timeline showing the main developments in the understanding of inheritance • Describe the evidence for the theory of evolution by natural selection • Define the term 'fossil'. • Describe how fossils may be formed. • Define the term extinction • Describe the impact of antibiotic resistance
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					<ul style="list-style-type: none">Describe Carl Woese's system of classification and classify organisms into the three mains. <p>Useful links</p> <p><u>SENECA Learning</u></p> <p>https://senecalearning.com/en-GB/</p> <p><u>BBC Bitesize</u></p> <p>https://www.bbc.co.uk/bitesize/examspecs/z8r997h (Combined)</p> <p>https://www.bbc.co.uk/bitesize/examspecs/zpgcbk7 (GCSE Biology)</p>
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1-3	<p><u>Ecology</u></p> <p>Describe the importance of interdependence and competition in a community.</p> <p>Understand the factors for which organisms are competing in a habitat. Evaluate how organisms are adapted to their environment.</p> <p>Describe how changes in abiotic and biotic factors affect a community.</p> <p>Describe and explain how structural, behavioural and functional adaptations, in a range of organisms, help them to survive in their habitat.</p> <p>State the relationship between feeding relationships and food chains. Describe predator/prey cycle</p> <p>Describe the factors which affect the rate of decay as:</p> <ul style="list-style-type: none"> ● temperature ● availability of oxygen ● availability of moisture ● availability of microorganisms to carry out decay ● pH 	<p>Investigate competition in radish or cress seedlings</p> <p>Interpret data relating to the effect of abiotic factors.</p> <p>Recall mean, mode and median.</p> <p>Interpret population curves.</p> <p>Research producers that are not green plants.</p> <p>Required Practical: Measure the population of a common species in a habitat. Use sampling techniques to investigate the effect of a factor on the distribution of a species.</p> <p>Estimate percentage cover using diagrams/ photographs and plastic squares as 'mini quadrats'.</p> <p>Investigate patterns of grass growth under trees and see if it is linked to abiotic factor(s).</p> <p>Use transect lines and quadrats to collect data.</p> <p>Interpret data showing how factors affect the rate of decay.</p> <p>Calculate the rate of decay using data.</p>	Mock exam (90 minutes in formal conditions) - Paper 1	<p>AO1: Demonstrate knowledge and understanding of: scientific ideas; scientific techniques and procedures.</p> <p>AO2: Apply knowledge and understanding of: scientific ideas; scientific enquiry, techniques and procedures.</p> <p>AO3: Analyse information and ideas to: interpret and evaluate; make judgments and draw conclusions; develop and improve experimental procedures.</p>	<p>State the levels of organisation in an ecosystem.</p> <p>Name abiotic factors in a habitat:</p> <ul style="list-style-type: none"> ● light intensity ● temperature ● moisture levels ● soil pH and mineral content ● wind intensity and direction ● carbon dioxide levels for plants ● oxygen levels for aquatic animals. ● <p>Name biotic factors in a habitat:</p> <ul style="list-style-type: none"> ● availability of food ● new predators arriving ● new disease organisms ● one species out-competing another so the numbers are no longer sufficient to breed <p>Define the term extremophile and give general examples.</p> <p>Construct food chains and identify the producer and consumers.</p> <p>Discuss how the rate of decay can be controlled by considering food</p>

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<ul style="list-style-type: none"> • build-up of toxic substances. <p>Describe how gardeners and farmers try to provide optimum conditions for rapid decay of wastes.</p> <p>Explain the difference between aerobic and anaerobic decay.</p> <p>Describe how environmental changes, such as water availability, temperature and atmospheric gases may be seasonal, geographic or caused by human interaction.</p> <p>Explain the possible impact of each environmental change on the distribution of species in an ecosystem.</p> <p>Describe the problems associated with an increasing human population.</p> <p>Interpret graphs showing human population growth.</p> <p>Describe how water can be polluted with sewage, fertiliser or toxic chemicals.</p> <p>Define the term biodiversity. Describe how biodiversity ensures the stability of an ecosystem. Evaluate the impact of waste, deforestation and global warming on biodiversity</p> <p>Describe examples of air pollutants and where they come from.</p> <p>Describe the effects of smoke on buildings, humans and plant photosynthesis.</p>	<p>Required practical: plan and carry out a controlled investigation. Identify variables; record, present and analyse result; calculate rates of decay.</p> <p>Explain how decay is useful to plants</p> <p>Evaluate the necessity and effectiveness of recycling organic kitchen or garden wastes.</p> <p>Analyse and interpret data about water pollution.</p> <p>Measure the pH of rainwater samples.</p> <p>Demonstrate how a black object absorbs and re-radiates heat using sensors or hold near the skin.</p> <p>Evaluate the advantages and disadvantages of modern farming techniques. Analyse ethical objections to modern farming methods.</p> <p>Describe the importance of maintaining the levels of fish stock in oceans. Explain the effects of over fishing certain species and the importance of fishing quotas</p> <p>Describe biotechnical and agricultural solutions to the demands of human population growth. Explain the role of microorganisms such as the <i>Fusarium</i> on producing meat substitutes. Evaluate the positive and negative aspects of GM crops.</p>				<p>preservation, bodies preserved in bogs, compost heaps.</p> <p>Classify items as biodegradable and non-biodegradable and agree criteria for classification</p> <p>Define the term biogas</p> <p>Watch BBC video showing different biogas generators (see resources).</p> <p>Prepare a newspaper article for either:</p> <ul style="list-style-type: none"> • a scientific journal • tabloid newspaper • environmental news • burger chain. <p>Discuss why it is difficult to make changes that will maintain biodiversity.</p> <p>Compare the adaptations of herbivores, carnivores and omnivores and relate these to the food they eat.</p> <p>Produce a poster to explain how biomass is lost from a food chain.</p> <p>Consider whether anything can be done to address each problem.</p> <p>Present their findings to the class.</p>
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<p>Describe how acid rain is formed and the effects of acid rain on living organisms.</p> <p>Analyse and interpret data about air pollution.</p> <p>Evaluate the use of fertiliser on plant growth and oxygen levels.</p> <p>Describe what herbicides and pesticides are used for</p> <p>Evaluate the environmental implications of deforestation.</p> <p>Define the term deforestation.</p> <p>Explain why vast tropical areas have been cleared of trees.</p> <p>Explain how deforestation increases the amount of carbon dioxide in the atmosphere and leads to a reduction in biodiversity</p> <p>Recall the process of global warming. Describe the biological effects of global warming. Evaluate evidence for and against global warming.</p> <p>Describe the positive and negative effects of human interactions in an ecosystem. Explain the impact of humans on biodiversity. Evaluate the effectiveness of methods used to decrease the human impact on biodiversity.</p>	<p>Research how foods such as Quorn are produced and describe in a flow diagram.</p>			<p>List each factor with possible solutions.</p> <p>Research the work of Oxfam and other charities.</p> <p>Research fishing quotas for different types of fish and display the information.</p> <p>Research what has happened to bluefin tuna and what we could do to increase fish stocks.</p> <p>Useful links</p> <p><u>SENECA Learning</u></p> <p>https://senecalearning.com/en-GB/</p> <p><u>BBC Bitesize</u></p> <p>https://www.bbc.co.uk/bitesize/examspecs/z8r997h (Combined)</p> <p>https://www.bbc.co.uk/bitesize/examspecs/zpgcbk7 (GCSE Biology)</p>
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	<p>Analyse the differences between the trophic levels of organisms within an ecosystem. Explain the link between the different trophic levels.</p> <p>Construct pyramids of biomass for different food chains. Label the different levels.</p> <p>Describe biological factors affecting food security. Interpret statistics on population and production. Evaluate the effect of population increase and food production on food security</p>				
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4-6	Revision of all Year 9 and 10 content.		Mock exam (90 minutes in formal conditions) - Paper 2	AO1: Demonstrate knowledge and understanding of: scientific ideas; scientific techniques and procedures. AO2: Apply knowledge and understanding of: scientific ideas; scientific enquiry, techniques and procedures. AO3: Analyse information and ideas to: interpret and evaluate; make judgments and draw conclusions; develop and improve experimental procedures.	
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