

GCSE Biology Sequence of Learning (SoL)

Biology

Chapter 1: Cell structure and transport

Lesson Number	Key Question/ Lesson Title	Learning Objective(s)	Key Words/ Concepts	Homework
1	Lesson 1 – The world of the microscope	- Describe the difference between a light microscope and an electron microscope. - Describe the difference between magnification and resolution. - Use the formula: Magnification = size of image / size of real object.	Magnification, Resolution, Electron Microscope, Nanometer (nm), Image Size	KS3 educake
2	Lesson 2 – Microscope RP	- Describe the structures and functions of the main parts of cells. - Compare the structure of plant and animal cells. - Use a light microscope to observe, draw, and label one example of animal cells and one example of plant cells, including a magnification scale on each.	Organelle, Slide preparation, Iodine stain, Field of view, Scale bar	
3	Lesson 3 – Eukaryotic and prokaryotic cells	- Describe the functions of the parts of a prokaryotic cell. - Compare prokaryotic and eukaryotic cells. - Use orders of magnitude to compare the sizes of organisms.	Prokaryotic, Plasmid, Nucleoid, Order of Magnitude, Binary Fission	
4	Lesson 4 – Specialisation in animal cells	- Understand that cell differentiation in animals usually occurs when they are young and developing. As a cell differentiates, it becomes specialised to carry out particular functions. - Compare the structure of a specialised and a generalised animal cell. - Describe the structural adaptations of three types of specialised animal cells.	Differentiation, Specialised Cell, Mitochondria density, Sperm cell, Nerve cell	
5	Lesson 5 – Specialisation in plant cells	- Understand that many types of plant cells continue to differentiate throughout the life of the plant. - Compare the structure of a specialised and a generalised plant cell. - Describe the structural adaptations of three types of specialised plant cells. - Observe, draw, and label a root hair cell using a light microscope, including a magnification scale.	Root Hair Cell, Xylem, Phloem, Lignin, Meristem	Educake Retrieval Homework
6	Lesson 6 – Diffusion	- Describe diffusion as a net movement of particles in a solution or a gas from an area of higher concentration to an area of lower concentration. - Describe how concentration gradients and diffusion are involved in gas exchange of oxygen and carbon dioxide across cell membranes. - Explain why surface area affects the rate of diffusion. - Write a hypothesis to explain an example of diffusion using scientific knowledge.	Concentration Gradient, Net movement, Surface Area (SA), Passive Transport, Gas Exchange	
7	Lesson 7 – Osmosis	- State the differences between osmosis and diffusion. - Describe the effect of osmosis on animal cells if the external solution is more dilute or more concentrated than the cell contents. - Write a prediction about the effect of a given change in circumstances on the cells of the body using scientific knowledge of osmosis.	Partially permeable, Water potential, Isotonic, Hypertonic, Hypotonic	
8	Lesson 8 – Osmosis in plants	- Use osmosis to explain the effect on plant cells of changing the concentration of a salt or sugar solution surrounding them. - Write a simple plan to investigate the effect of different concentrations of salt or sugar solutions on the mass of a sample of plant tissue. - Calculate percentage change and use this to plot a line graph with negative numbers and draw a line of best fit.	Turgid, Flaccid, Plasmolysis, Percentage Change, Mass change	Revision Flash cards HW
9	Lesson 9- Osmosis RP	- Use osmosis to explain the effect on plant cells of changing the concentration of a salt or sugar solution surrounding them. - Write a simple plan to investigate the effect of different concentrations of salt or sugar solutions on the mass of a sample of plant tissue.	Independent variable, Dependent variable, Control variables, Line of best fit, Calibration curve	

		- Calculate percentage change and use this to plot a line graph with negative numbers and draw a line of best fit.		
10	Lesson 9 – Active transport	Describe active transport and explain why it requires energy from cellular respiration. Explain why active transport is important for living organisms.	Active Transport, ATP / Energy, Carrier Proteins, Against gradient, Mineral ions	
11	Lesson 10 – Exchanging materials	- Calculate the surface area to volume ratio of a cube and compare different sized cubes. - Use ideas about surface area to volume ratio to describe why multicellular organisms need exchange surfaces. - Describe how the structure of the exchange surfaces in mammals, fish, and plants are adapted for their functions.	SA:V Ratio, Alveoli, Villi, Gills / Lamellae, Stomata	
	REVISION LESSON			Revision HW due
10	ASSESSMENT LESSON			
7	FEEDBACK LESSON			

Chapter 2: Cell division				
Lesson Number	Key Question/ Lesson Title	Learning Objective(s)	Key Words/ Concepts	Homework
1	Lesson 1 – Cell division	- Describe the structure of chromosomes as made up of DNA and containing a large number of genes. - Describe the inheritance of the chromosome pairs from the male and female parents. - Describe the stages of the cell cycle, including the process of mitosis. Describe how this produces two identical cells and identify when cell division occurs in the life of an organism. - Use key scientific terms to describe the process of mitosis. - Describe each gene as containing the information controlling a characteristic or part of a characteristic.	Chromosome, DNA, Gene, Mitosis, Cell Cycle	Educake Retrieval Homework
2	Lesson 2 – Growth and differentiation	Describe the function of stem cells in embryos, adult animals, and plants. Describe the production of a plant cell clone.	Stem Cell, Differentiation, Embryo, Meristem, Clone	
3	Lesson 3 – Stem cells	- Describe differences between embryonic and adult stem cells. - Describe how plant clones are used. Describe how stem cells may be used to treat different medical conditions.	Potency, Bone Marrow, Specialized, Diabetes, Paralysis	
4	Lesson 4 – Stem cell dilemmas	- Describe what therapeutic cloning may be used for. - Describe one ethical, one religious, and one medical issue with the use of stem cells in medicine. Verbally communicate well-constructed arguments.	Therapeutic Cloning, Ethics, Zygote, Rejection, Moral status	
	REVISION LESSON			
	ASSESSMENT LESSON			Revision HW due
	FEEDBACK LESSON			

Chapter 3: The human digestive system				
Lesson Number	Key Question/ Lesson Title	Learning Objective(s)	Key Words/ Concepts	Homework
1	Lesson 1 – Principles of organisation	- Define the terms tissue, organ, and organ system. - Identify tissues that make up organs. Describe the function of named organs and organ systems.	Tissue, Organ, Organ System, Organism, Specialization	
2	Lesson 2 – The human digestive system	- Identify all of the main organs of the human digestive system. - Describe the functions of the organs of the human digestive system. Summarise the process of digestion.	Oesophagus, Stomach, Small Intestine, Large Intestine, Absorption	Educake Retrieval Homework
3	Lesson 3 – The chemistry of food	- Describe the structure of simple sugars, complex carbohydrates, lipids, and proteins. - Describe how carbohydrates, proteins, and lipids are used in the body.	Carbohydrate, Lipid, Protein, Amino Acid, Glucose	

		- Describe the food tests for starch, sugars, protein, and lipids. - Suggest what a food contains using results from food tests, evaluating the observed data collected.		
4	Lesson 4 – Food tests	- Describe the structure of simple sugars, complex carbohydrates, lipids, and proteins. - Describe how carbohydrates, proteins, and lipids are used in the body. - Describe the food tests for starch, sugars, protein, and lipids. - Suggest what a food contains using results from food tests, evaluating the observed data collected.	Benedict's test, Iodine test, Biuret test, Ethanol, Emulsion	
5	Lesson 5 – Catalysts and enzymes	- Define metabolism and describe the role of enzymes in three different types of metabolic reactions. - Use the lock and key theory to explain why the shape of an enzyme is vital for it to function as a catalyst. Identify the key variables in a given investigation.	Enzyme, Catalyst, Active Site, Substrate, Lock and Key	
6	Lesson 6 – Catalysts and enzymes RP	- Define metabolism and describe the role of enzymes in three different types of metabolic reactions. - Use the lock and key theory to explain why the shape of an enzyme is vital for it to function as a catalyst. Identify the key variables in a given investigation.	Metabolism, Independent Variable, Dependent Variable, Control, Rate	Educake Retrieval Homework
7	Lesson 7 – Factors affecting enzyme action	- Describe how changes in temperature and pH affect the way enzymes catalyse reactions and explain why high temperatures stop enzymes working. - Determine the gradient of a graph and calculate the rate of a reaction with guidance. Plot a line graph and use it to draw conclusions about how temperature and pH affect the rate of an enzyme-catalysed reaction.	Denatured, Optimum pH, Kinetic Energy, Gradient, Collision Theory	
8	Lesson 8 – How the digestive system works	- Explain why enzymes are needed for digestion. - For each food molecule, name the enzyme that acts on it, where it is produced, and which products are formed. Plan and carry out an investigation in order to gather accurate results.	Amylase, Protease, Lipase, Fatty Acids, Glycerol	
9	Lesson 9 – Making digestion efficient	- State that the hydrochloric acid in the stomach results in a low pH. - Describe the functions of bile. Carry out an investigation into the effect of pH on the rate of the reaction of the enzyme amylase on starch using a continuous sampling technique.	Bile, Emulsification, Alkaline, Hydrochloric Acid, Neutralisation	
	REVISION LESSON			
	ASSESSMENT LESSON			Revision HW due
	FEEDBACK LESSON			

Chapter 4: Organisation in animals and plants				
Lesson Number	Key Question/ Lesson Title	Learning Objective(s)	Key Words/ Concepts	Homework
1	Lesson 1 – The blood	- Describe the functions of each of the main components of blood. - View blood under a light microscope and recognise components. - Explain how white blood cells are adapted to their functions.	Plasma, Red Blood Cell, White Blood Cell, Platelets, Haemoglobin	
2	Lesson 2 – The blood vessels	- Describe the structure of arteries, capillaries, and veins. - Describe how the valves function in veins to prevent backflow of blood. - Describe the two main elements of a double circulatory system. Comment on how accurate estimations are.	Artery, Vein, Capillary, Valve, Double Circulation	

3	Lesson 3 – The heart	- Describe the main structures of the human heart. - Describe the flow of blood around the heart. - Describe how coronary heart disease develops. Suggest advantages and disadvantages of using stents and statins.	Ventricle, Atrium, Vena Cava, Aorta, Coronary Artery	
4	Lesson 4 – Helping the heart	- Explain why an irregular heartbeat causes health problems. - Describe the two main types of replacement heart valves. - Describe an artificial heart and give two reasons why they may be used. - Summarise the advantages and disadvantages of the three main methods of treating cardiovascular diseases.	Pacemaker, Stent, Statin, Bypass surgery, Transplant	Educake Retrieval Homework
5	Lesson 5 – Breathing and gas exchange	- Describe the function of the main structures of the human gas exchange system. - Describe the structure of an alveolus and how gas exchange takes place. Describe and differentiate between the processes of ventilation and gas exchange.	Trachea, Alveoli, Bronchi, Diaphragm, Ventilation	
	Lesson 6 – Tissues and organs in plants	- Explain how the structures of different plant tissues are related to their functions. - Describe the arrangement of tissues in the cross-section of a plant leaf and the arrangement of transport tissues in the roots, stems, and leaves. Use a microscope to draw and identify the different tissues in a cross-section of a leaf, with a magnification scale.	Epidermis, Palisade Mesophyll, Spongy Mesophyll, Guard Cells, Stomata	
	Lesson 7 – Transport systems in plants	- Describe the structure of xylem and phloem tissue. - Explain why transport in plants is important.	Xylem, Phloem, Translocation, Lignin, Sieve Plates	
	Lesson 8 – Evaporation and transpiration	- Describe how transpiration maintains the movement of water from root hair cells in the roots to leaves. - Describe how the opening and closing of stomata is controlled by guard cells. - Use sampling to estimate the number of stomata on a leaf.	Transpiration, Evaporation, Humidity, Cohesion, Turgor	Educake Retrieval Homework
	Lesson 9 – Factors affecting transpiration	- Explain why temperature, humidity, light intensity, and air movement affect the rate of transpiration. - Describe the differences between a moving bubble potometer and a mass potometer. - Predict, using scientific knowledge, the impact of changing an environmental factor on the rate of transpiration and use data from a practical investigation to test your prediction.	Potometer, Light Intensity, Air Movement, Water Vapor, Concentration Gradient	
6	REVISION LESSON			
7	ASSESSMENT LESSON			Revision HW due
8	FEEDBACK LESSON			

Chapter 5: Communicable diseases				
Lesson Number	Key Question/ Lesson Title	Learning Objective(s)	Key Words/ Concepts	Homework
1	Lesson 1 – Health and disease	- Describe the difference between communicable and non-communicable diseases. - Describe the cause of communicable diseases, and some causes of non-communicable diseases. - Use a scatter diagram to identify a correlation between two variables. - Construct and interpret bar charts, frequency tables, frequency diagrams, and histograms.	Communicable, Non-communicable, Correlation, Risk Factor, Pathogen	
2	Lesson 2 – Pathogens and disease	- Describe how bacteria and viruses cause disease. - Explain why human communicable diseases often spread rapidly following a natural disaster.	Toxin, Viral replication, Infection, Transmission, Disaster relief	
3	Lesson 3 – Growing bacteria in the lab	- Describe the importance of providing a suitable culture medium when growing bacteria in the laboratory. - Explain why it is important to use an uncontaminated culture to investigate bacterial growth. - Describe and explain why each safety rule is needed in order to safely prepare, incubate, and dispose of a culture.	Agar, Aseptic technique, Inoculating loop, Incubation, Colony	
4	Lesson 4a – Preventing bacterial growth	- Describe the difference between antiseptics, disinfectants, and antibiotics. - Plan an investigation to investigate the impact of a disinfectant, antiseptic, or antibiotic on the growth of a bacterial culture by measuring zones of inhibition.	Zone of Inhibition, Antibiotic, Disinfectant, Antiseptic, Mean Division Time	Educake Retrieval Homework

		- Calculate the number of bacteria in a population after a certain time if given the mean division time. - Calculate the zone of inhibition around antimicrobial discs or wells on bacterial agar plates.		
5	Lesson 4b – Preventing bacterial growth RP	- Describe the difference between antiseptics, disinfectants, and antibiotics. - Plan an investigation to investigate the impact of a disinfectant, antiseptic, or antibiotic on the growth of a bacterial culture by measuring zones of inhibition. - Calculate the number of bacteria in a population after a certain time if given the mean division time. - Calculate the zone of inhibition around antimicrobial discs or wells on bacterial agar plates.	Zone of Inhibition, Antibiotic, Disinfectant, Antiseptic, Mean Division Time	
6	Lesson 5 – Preventing infections	- Describe how the spread of diseases can be reduced or prevented. - Produce a communication to inform the general public about how to stop the spread of a disease.	Sterilisation, Hygiene, Quarantine, Vector, Handwashing	
7	Lesson 6 – Viral diseases	- Describe the main problem with treating viral diseases. - Describe how measles, HIV, and tobacco mosaic virus affect the infected organism, including the progression of HIV infection to AIDS if untreated, and the economic and social impact of these diseases. - Interpret data to describe how the number of people infected with specific viral diseases has changed over time.	Measles, HIV, AIDS, Tobacco Mosaic Virus, Antiretroviral	
8	Lesson 7 –Bacterial diseases	- Describe similarities and differences between <i>Salmonella</i> and gonorrhoea. - Describe how the spread of <i>Salmonella</i> and gonorrhoea is controlled.	Salmonella, Gonorrhoea, STD, Fever, Food poisoning	Educake Retrieval Homework
9	Lesson 8 –Diseases caused by fungi and protists	- Describe how rose black spot affects a plant and how it is treated. - Describe how the main ways of controlling malaria have their effects	Rose Black Spot, Fungicide, Malaria, Protist, Vector control	
10	Lesson 9 –Human defence responses	- Describe how the skin, nose, trachea and bronchi, and the stomach act as non-specific defence systems against pathogens. - Describe three ways in which the white blood cells help protect the body against disease causing pathogens.	Phagocytosis, Antibody, Antitoxin, Cilia, Mucus	
11	Lesson 10 – More about plant diseases	- Explain that plant diseases have a major impact on global food security and economies and describe seven symptoms used to detect disease in plants. - Describe how aphids attack plants and how they may be controlled. Match signs of plant disease to ion deficiency and explain how nitrate and iron concentrations affect plant growth.	Food Security, Aphids, Chlorosis, Nitrate deficiency, Stunted growth	
12	Lesson 11 – Plant defence responses	- Classify plant defences as physical, chemical, or mechanical. - Describe four physical defences against pathogens and explain how each one works. - Carry out research using secondary resources of personal choice to present examples of plant defence responses	Cellulose, Bark, Antibacterial, Thorns, Mimicry	Educake Retrieval Homework
	REVISION LESSON			
	ASSESSMENT LESSON			Revision HW due
	FEEDBACK LESSON			

Chapter 6: Preventing and treating disease				
Lesson Number	Key Question/ Lesson Title	Learning Objective(s)	Key Words/ Concepts	Homework
1	Lesson 1 – Vaccination	- Describe, with reference to the human immune system, how vaccination works. - Describe effective immunity to a disease in terms of antibodies and white blood cell memory. Interpret data on behaviour and vaccination patterns on the incidence of disease.	Vaccine, Immunity, Memory Cells, Herd Immunity, Primary Response	
2	Lesson 2 – Antibiotics and painkillers	- Describe how antibiotics work. - Describe what is meant by antibiotic resistance in bacteria and explain why it matters. - Describe how painkillers and other over-the-counter drugs are used. Explain why it is difficult to develop drugs to treat viral infections.	Antibiotic Resistance, Painkiller, Symptom, Superbug, Mutation	

3	Lesson 3 – Discovering drugs	- Describe the origin and uses of the heart drug digitalis and the painkiller and anti-coagulant aspirin. - Describe the sequence of events in the discovery of penicillin from discovery to industrial production and explain why the latter step was so important. - State that most new drugs are synthesised in the pharmaceutical industry and explain that this enables patients to take carefully measured doses of pure active compounds.	Digitalis, Aspirin, Penicillin, Alexander Fleming, Synthesis	
4	Lesson 4 – Developing drugs	- Describe the characteristics which a new drug is tested for. - Explain why each procedure in drugs testing and trialling is used. - Describe how a double-blind trial is carried out. - Explain why a placebo is used during drug trialling.	Toxicity, Efficacy, Double-blind trial, Placebo, Clinical trials	Educake Retrieval Homework
5	Lesson 5 – Making monoclonal antibodies (higher tier only)	- Describe a monoclonal antibody. - Outline the procedure used to produce monoclonal antibodies. - Describe some ways in which monoclonal antibodies are used.	Monoclonal, Hybridoma, B-lymphocyte, Myeloma, Clone	
6	Lesson 6 – Uses of monoclonal antibodies (higher tier only)	- Describe the three main ways in which monoclonal antibodies are used to treat cancer. - Outline the advantages and disadvantages of using monoclonal antibodies.	Cancer, Targeting, Side effects, Diagnosis, Pregnancy test	
	REVISION LESSON			
	ASSESSMENT LESSON			Revision HW due
	FEEDBACK LESSON			

Chapter 7: Non-communicable diseases				
Lesson Number	Key Question/ Lesson Title	Learning Objective(s)	Key Words/ Concepts	Homework
1	Lesson 1 – Non-communicable diseases	- Classify a range of diseases as communicable or non-communicable and describe some impacts of non-communicable diseases on individuals. - Define sampling and explain why it is necessary in the scientific investigation of risk factors for non-communicable diseases. - Describe the difference between a correlation and a causal mechanism.	Non-communicable, Risk Factor, Sampling, Correlation, Causal Mechanism	
2	Lesson 2 – Cancer	- Describe the difference between benign and malignant tumours. - Describe why chemical carcinogens and ionising radiation increase the risk of tumours forming. - Describe how radiotherapy and chemotherapy act to treat cancers.	Malignant, Benign, Carcinogen, Mutation, Chemotherapy	Educake Retrieval Homework
3	Lesson 3 – Smoking and the risk of disease	- Describe the effects of the harmful substances found in tobacco smoke on the cardiovascular system, the lungs, and on unborn babies. - Analyse data to describe evidence for the link between smoking and lung disease, smoking and low birth weight babies, and smoking and cardiovascular disease.	Nicotine, Carbon Monoxide, Tar, Carcinogen, Cilia	
4	Lesson 4 – Diet, exercise, and disease	- Describe causal mechanisms for the link between exercise and health. - Suggest measures to prevent a further rise in the number of people with type 2 diabetes. - Translate information about the impacts of diet and exercise on health between graphical and numerical forms.	Obesity, Type 2 Diabetes, Metabolism, Correlation, Exercise	
5	Lesson 5 – Alcohol and other carcinogens	- Describe the short-term and long-term effects of drinking alcohol on the liver and the brain. - Describe the effects of alcohol on unborn babies. - Describe the link between ionising radiation and cancer.	Cirrhosis, Ethanol, Fetal Alcohol Syndrome, Ionising Radiation, Neural Damage	Educake Retrieval Homework
	REVISION LESSON			

	ASSESSMENT LESSON			Revision HW due
	FEEDBACK LESSON			

Chapter 8: Photosynthesis				
Lesson Number	Key Question/ Lesson Title	Learning Objective(s)	Key Words/ Concepts	Homework
1	Lesson 1 – Photosynthesis	- Describe how the leaf is adapted for photosynthesis. - Describe photosynthesis as an endothermic reaction in which energy is transferred from the environment to the chloroplasts by light and recognise the chemical symbols for the molecules involved in photosynthesis. - Describe a method to demonstrate that plants need light to carry out photosynthesis.	Endothermic, Chloroplast, Chlorophyll, Glucose, Stomata	
2	Lesson 2 – The rate of photosynthesis	- Describe the effect of changes in temperature, carbon dioxide concentration, light intensity, and shortage of chlorophyll on the rate of photosynthesis. - Describe how a particular factor limits the rate of photosynthesis in a given situation. - Plan and carry out an investigation into the effect of light intensity on photosynthesis. - Interpret and explain graphs of the rate of photosynthesis involving one limiting factor.	Limiting Factor, Light Intensity, Concentration, Rate, Yield	
3	Lesson 3 – How plants use glucose	- Describe five ways in which plants use glucose, including how they make proteins. - Give reasons for the different steps when testing a leaf for starch, including the safety precautions.	Cellulose, Starch, Amino Acids, Lipids, Insoluble	
4	Lesson 4 – Making the most of photosynthesis (Higher tier only)	- Describe how two limiting factors may interact to affect the rate of photosynthesis. - Interpret and explain graphs of photosynthesis rate involving two limiting factors. - Explain how changing factors such as carbon dioxide concentration and temperature in greenhouses increases the rate of photosynthesis. - Comment on the cost-effectiveness of adding heat, light, or carbon dioxide to greenhouses.	Greenhouse, Economics, Inverse Square Law, Enrichment, Paraffin Heaters	Educake Retrieval Homework
	REVISION LESSON			
	ASSESSMENT LESSON			Revision HW due
	FEEDBACK LESSON			

Chapter 9: Respiration				
Lesson Number	Key Question/ Lesson Title	Learning Objective(s)	Key Words/ Concepts	Homework
1	Lesson 1 – Aerobic respiration	- Describe cellular respiration as an exothermic reaction occurring continuously in the mitochondria of cells, transferring the energy needed for living processes. Recognise the chemical symbols for the molecules involved in respiration. - Describe four ways the energy transferred during aerobic respiration is used in organisms. - Describe two ways of indicating that aerobic respiration is taking place. - Describe an investigation into aerobic respiration in a named organism, including a control.	Aerobic, Mitochondria, Exothermic, ATP, Energy Transfer	Educake Retrieval Homework
2	Lesson 2 – The response to exercise	- Explain why heart rate, breathing rate, and breath volume change with exercise. - Choose the best way to display given data and calculate percentage changes.	Heart Rate, Breathing Rate, Glycogen, Oxygen Debt, Recovery Rate	
3	Lesson 3 – Anaerobic respiration	- State the word equation for anaerobic respiration in animals and give examples of when and where anaerobic respiration occurs. - State the word equation for anaerobic respiration in plant and yeast cells and describe the economic and social importance of fermentation by yeast. - Describe what happens in the muscles during prolonged exercise.	Anaerobic, Lactic Acid, Fermentation, Ethanol, Fatigue	

4	Lesson 4 – Metabolism and the liver	- Describe the role of enzymes in synthesis and breakdown reactions in metabolism. - Describe a range of metabolic reactions including both breakdown and synthesis reactions.	Metabolism, Synthesis, Breakdown, Urea, Glycogen	
	REVISION LESSON			
	ASSESSMENT LESSON			Revision HW due
	FEEDBACK LESSON			

Chapter 10: The human nervous system				
Lesson Number	Key Question/ Lesson Title	Learning Objective(s)	Key Words/ Concepts	Homework
1	Lesson 1 – Principles of homeostasis	- Describe the internal body conditions that need to be controlled for cells to work effectively. - Describe the basic principles of homeostasis. - Identify some of the key conditions that must be controlled for effective homeostasis and identify some of the receptors, coordination centres, and effectors involved in the process.	Homeostasis, Receptor, Coordination Centre, Effector, Stimulus	Educake Retrieval Homework
2	Lesson 2 – The structure and function of the human nervous system	- Identify and describe the main features of the nervous system, defining the terms neuron and nerve, and give a word summary of the main sequence of events in a nervous response. - Describe the main sense organs and link each to the stimulus/stimuli it responds to. - Display data on the impact of different factors on reaction times in an appropriate form.	Central Nervous System (CNS), Neuron, Impulse, Sensory, Motor	
3	Lesson 3 – Reflex actions	- Describe the importance of reflex actions. - Describe the events of a reflex arc. - Describe how an impulse crosses from one neuron to another across a synapse.	Reflex Arc, Relay Neuron, Synapse, Neurotransmitter, Automatic	
4	Lesson 4 – The brain	- Describe the brain as made up of billions of interconnected neurons, with different regions that carry out different functions. - Describe the functions of the cerebral cortex, cerebellum, and medulla. - Describe some of the difficulties of investigating and treating brain disorders. (HT)	Cerebral Cortex, Cerebellum, Medulla, MRI, Neurology	
5	Lesson 5 – The eye	- Describe the main structures of the eye and their functions. - Describe how the eye focuses light.	Retina, Optic Nerve, Iris, Pupil, Cornea	Educake Retrieval Homework
6	Lesson 6 – Common problems of the eye	- Describe how the lens changes shape to focus on near or distant objects. - Describe several common causes for myopia (short-sightedness) and hyperopia (long-sightedness) and interpret ray diagrams of these conditions. - Describe the use of spectacle and contact lenses, laser surgery, and lens replacement surgery to correct long- and short-sightedness, and interpret ray diagrams to show how spectacle lenses work.	Accommodation, Myopia, Hyperopia, Concave Lens, Convex Lens	
	REVISION LESSON			
	ASSESSMENT LESSON			Revision HW due
	FEEDBACK LESSON			

Chapter 11: Hormonal coordination				
Lesson Number	Key Question/ Lesson Title	Learning Objective(s)	Key Words/ Concepts	Homework
1	Lesson 1 – Principles of hormonal control	- Describe the principles of hormonal coordination and control, and compare coordination and control by the endocrine system and the nervous system. - Describe the main roles of the hormones released by named endocrine glands.	Endocrine, Hormone, Target Organ, Pituitary Gland, Adrenaline	Educake Retrieval Homework

2	Lesson 2 – The control of blood glucose levels	- Describe how insulin produced by the pancreas controls blood glucose levels in the body. - Describe the difference in the causes of Type 1 and Type 2 diabetes.	Insulin, Pancreas, Glucose, Glucagon, Glycogen	
3	Lesson 3 – Treating diabetes	- Explain why Type 1 diabetes is treated with insulin injections. - Explain how a carbohydrate-controlled diet and an exercise regime are often effective treatments for Type 2 diabetes. State that different drugs and even insulin may be needed to control type 2 diabetes in some people. - Extract information and interpret data from graphs showing the blood sugar levels in both people with diabetes and people without diabetes.	Type 1 Diabetes, Type 2 Diabetes, Blood Glucose, Obesity, Hormone Replacement	
4	Lesson 4 – The role of negative feedback (HT only)	- Describe the roles of adrenaline and thyroxine in the body. - Describe the negative feedback loop that controls the levels of thyroxine in the body.	Negative Feedback, Thyroxine, TSH, Basal Metabolic Rate, Pituitary	
5	Lesson 5 – Human reproduction	- Describe the development of female and male secondary sex characteristics during puberty, including the hormones involved and physical changes. - Describe the changes that take place in the ovaries and the uterus during the menstrual cycle and name the hormones involved at each stage in the cycle.	Puberty, Testosterone, Oestrogen, Menstrual Cycle, Ovulation	Educake Retrieval Homework
6	Lesson 6 – Hormones and the menstrual cycle (HT only)	- Name the glands that produce the hormones oestrogen, progesterone, LH, and FSH. - Describe the function of the hormones that control the menstrual cycle. - Extract data from graphs showing hormone levels during the menstrual cycle.	FSH, LH, Progesterone, Follicle, Corpus Luteum	
	Lesson 7 – The artificial control of fertility	- Describe the main categories of contraception and explain simply how the different types of non-hormonal contraception work. - Describe the main types of hormonal contraception and explain simply how they work. - Use data to help discuss the advantages and disadvantages of different methods of contraception and explain why issues around contraception cannot be answered by science alone.	Contraception, Spermicide, Intrauterine Device (IUD), Barrier Method, Progesterone pill	
	Lesson 8 – Hormones and infertility treatments (HT only)	- Describe some of the common reasons for female and male infertility and define what is meant by a fertility drug. - Describe the main steps in the IVF process. - Outline the main biological, social, and ethical issues surrounding IVF.	IVF, Fertility Drug, Embryo, LH Surge, Infertility	
	Lesson 9 – Plant hormones and their responses (Biology only)	- Use diagrams and descriptions to explain how plant shoots and roots respond to light and gravity (phototropism and geotropism). - Explain the importance of tropisms in the life of plants. - Independently plan an investigation into the effect of light or gravity on plant growth.	Auxin, Phototropism, Gravitropism (Geotropism), Shoots, Roots	Educake Retrieval Homework
	Lesson 10 – Using plant hormones (HT only, Biology only)	- Describe the effect of gibberellins and ethene in plants. - Describe some uses of plant hormones (gibberellins, ethene, and auxins) in agriculture, horticulture, and the food industry.	Gibberellins, Ethene, Weedkiller, Dormancy, Fruit Ripening	
	REVISION LESSON			
	ASSESSMENT LESSON			Revision HW due
	FEEDBACK LESSON			

Chapter 12: Maintaining balance in the body				
Lesson Number	Key Question/ Lesson Title	Learning Objective(s)	Key Words/ Concepts	Homework
	Lesson 1 – Controlling body temperature	Describe how body temperature is monitored and controlled by the thermoregulatory centre in the brain.	Vasodilation, Vasoconstriction, Thermoregulation, Hypothalamus, Sweat	

		Describe the mechanisms that cool the body down if the core temperature is getting too hot, or warm it up if the core temperature is too low.		
	Lesson 2 – Removing waste products	- Explain why the body needs to get rid of carbon dioxide, urea, excess mineral ions, and water. - Describe how carbon dioxide is removed from the body in the lungs. - Clarify the difference between urea and urine, and describe how urea is lost from the body through the skin and by the kidneys.	Urea, Excretion, Lungs, Kidneys, Deamination	
	Lesson 3 – The human kidney	- Describe the processes of filtering and selective reabsorption in the kidneys. - Suggest how the composition of the urine will change in given situations. - State that the kidneys are made up of tubules and describe the effect of ADH on the permeability of the kidney tubules. - Translate tables and bar charts of glucose, mineral ion, and urea concentration of the blood before and after filtration.	Selective Reabsorption, ADH, Tubule, Nephron, Permeability	Educake Retrieval Homework
	Lesson 4 – Dialysis – an artificial kidney	- Describe some reasons for kidney failure and why it is a threat to life. - Describe the process of kidney dialysis, using a diagram. - Describe some of the advantages and disadvantages of kidney dialysis	Dialysis, Concentration Gradient, Semi-permeable, Anticoagulant, Waste	
	Lesson 5 – Kidney transplants	- Describe a kidney transplant and list the two currently available sources of potential donors. - Compare the advantages and disadvantages of treating kidney failure using dialysis or kidney transplant.	Transplant, Rejection, Immunosuppressant, Donor, Tissue Typing	
	REVISION LESSON			
	ASSESSMENT LESSON			Revision HW due
	FEEDBACK LESSON			

Chapter 13: Reproduction and genetic inheritance				
Lesson Number	Key Question/ Lesson Title	Learning Objective(s)	Key Words/ Concepts	Homework
	Lesson 1 – Types of reproduction	- Describe the key elements in sexual and asexual reproduction, including the role of meiosis and mitosis. - Describe the effect of meiosis on the chromosome number of gametes and name the gametes found in plants and animals. - Describe why variation is produced in offspring from sexual reproduction but not from asexual reproduction.	Gamete, Zygote, Variation, Clone, Asexual	Educake Retrieval Homework
	Lesson 2 – Cell division in sexual reproduction	- Describe the processes of meiosis and mitosis. - Explain how meiosis halves the number of chromosomes in gametes and fertilisation restores the full number. - Describe what happens after the gametes fuse at fertilisation in terms of cell division.	Meiosis, Diploid, Haploid, Fertilisation, Genetic diversity	
	Lesson 3 – The best of both worlds	- Describe the advantages and disadvantages of sexual and asexual reproduction. - Describe how malarial parasites and fungi reproduce both asexually and sexually. - Describe some of the ways in which flowering plants reproduce asexually in addition to sexual reproduction.	Runner, Bulb, Spore, Malarial parasite, Flowering plants	
	Lesson 4 – DNA and the genome	- Describe the basic structure of DNA. - Describe the relationship between DNA, genes, and chromosomes. - Explain the difference between the chromosomes in the nucleus and the genome of an organism. - Describe some of the benefits of understanding the human genome.	DNA, Double Helix, Gene, Chromosome, Genome	Educake Retrieval Homework

	Lesson 5 – DNA and protein synthesis	- Describe the structure of the DNA polymer, including the repeating nucleotide units and the bases A, C, G, and T. - Describe simply how the DNA code is translated into specific proteins on the ribosomes. (HT)	Nucleotide, Ribosome, Base Pair, Protein Synthesis, Amino Acid	
	Lesson 6 – Gene expression and mutation (HT only)	- Explain how the arrangement of the DNA bases determines the order of the amino acids in a protein chain, which in turn folds to form a unique shape. (HT) - Describe mutations and how they may change the function of an enzyme or the strength of a structural protein. (HT) - Describe some of the roles of non-coding DNA. (HT)	Mutation, Non-coding DNA, Gene Expression, Protein Folding, Sequence	
	Lesson 7 – Inheritance in action	- Define and use the terms allele, dominant, recessive, homozygous, and heterozygous correctly. - Describe a phenotype when given the genotype. - Describe most characteristics as controlled by multiple genes interacting, and give examples. - Describe genetic crosses as predicting the probability of particular genotypes and phenotypes resulting from a given cross. - Complete a Punnett square diagram to predict the outcome of a monohybrid cross in terms of genotypes and phenotype ratios. (HT)	Allele, Genotype, Phenotype, Homozygous, Heterozygous	
	Lesson 8 – More about genetics	- Describe sex inheritance in humans and carry out a genetic cross using a Punnett square diagram to show the probability of a baby being female or male. - Use simple ratios to express the outcome of a genetic cross. - Extract information from a family tree to describe how people are related and how certain characteristics are inherited.	Punnett Square, XY Chromosome, Ratio, Family Tree, Inheritance	
	Lesson 9 – Inherited disorders	- Describe polydactyly as an inherited disorder caused by a dominant allele and complete a Punnett square to predict the outcome of different potential crosses. - Describe cystic fibrosis as an inherited disorder caused by a recessive allele and complete a Punnett square to predict the outcome of different potential crosses.	Polydactyly, Cystic Fibrosis, Carrier, Dominant, Recessive	Educake Retrieval Homework
	Lesson 10 – Screening for genetic disorders	- Outline the methods used to screen embryos for possible inherited disorders. - List advantages and disadvantages of embryo screening, including some social, ethical, and economic issues.	Embryo Screening, Amniocentesis, Chorionic Villus Sampling, Ethics, Termination	
	REVISION LESSON			
	ASSESSMENT LESSON			Revision HW due
	FEEDBACK LESSON			

Chapter 14: Variation and selection				
Lesson Number	Key Question/ Lesson Title	Learning Objective(s)	Key Words/ Concepts	Homework
	Lesson 1 – Variation	- Describe how variation between individuals may be due to genetic causes, environmental causes, or a combination of both. - Describe examples of characteristics that show variation due to genetic causes, environmental causes, and a combination in humans, other animals, and plants. - Give reasons why identical twins will start to show variation as they get older. - Use data to explain why studying identical twins helps scientists investigate the interaction of genetic causes and environmental causes in human variation.	Variation, Environmental, Nature vs Nurture, Continuous, Discontinuous	
	Lesson 2 – Evolution by natural selection	Explain how a mutation may lead to a new phenotype and recall that all the variants in a population arise from mutations.	Natural Selection, Evolution, Mutation, Survival, Breeding	Educake Retrieval Homework

		- Describe how some variants may be better suited to a particular environment, or better adapted after an environmental change, and these organisms are most likely to survive and breed successfully. - Describe the steps that take place during evolution by natural selection and describe the point at which a new species has evolved.		
	Lesson 3 – Selective breeding	- Describe the process of selective breeding, giving examples of the results of selective breeding in animals and plants. - Explain why humans have used selective breeding over time. - Explain what inbreeding is and give examples of the problems it causes in dog breeding and in agricultural crops.	Selective Breeding, Domesticated, Inbreeding, Genetic Diversity, Yield	
	Lesson 4 – Genetic engineering	- Describe the principle of genetic engineering to produce GM organisms. - Describe a number of different types of organisms that have been genetically modified, including microorganisms, animals, and crop plants, and explain the advantages the genetic modification brings.	Genetic Engineering, Vector, Restriction Enzyme, Ligase, Plasmids	
	Lesson 5 – Cloning	- Describe how to clone plants using cuttings and tissue culture. - Describe how embryo transplants are produced, and how embryo splitting produces offspring which are clones. - Describe the potential benefits and risks of cloning plants and animals.	Tissue Culture, Cutting, Embryo Transplant, Explant, Cloned	
	Lesson 6 – Adult cell cloning	- Describe the main steps in adult cell cloning. - Design a flow chart to describe the process of adult cell cloning. - Explain some of the potential benefits and risks of adult cell cloning.	Enucleated, Nucleus Transfer, Surrogacy, Electric Shock, Differentiation	Educake Retrieval Homework
	Lesson 7 – Ethics of genetic technology	- Summarise the potential benefits and risks of genetic engineering and compare them to those of cloning in plants. - Summarise the potential benefits and risks of genetic engineering and compare them to those of cloning in animals. - Describe the current state of gene therapy research and use in medicine. - Describe some economic and ethical issues that people may have about modern genetic technologies.	Gene Therapy, Ethics, Regulation, Biodiversity, Safety	
	REVISION LESSON			
	ASSESSMENT LESSON			Revision HW due
	FEEDBACK LESSON			

Chapter 15: Evolution and classification				
Lesson Number	Key Question/ Lesson Title	Learning Objective(s)	Key Words/ Concepts	Homework
	Lesson 1 – The history of genetics	- Describe the key elements of Mendel’s work that made it so unusual for its time. - Describe the roles played by Franklin, Wilkins, Watson, and Crick in the discovery of the double helix structure of DNA. - Describe some of the characteristics Mendel studied in peas and choose an example to describe the results from Mendel’s experiments.	Mendel, Dominance, Inheritance, Double Helix, Crystallography	Educake Retrieval Homework
	Lesson 2 – Theories of evolution	- Describe the theory of inheritance of acquired characteristics proposed by Jean-Baptiste Lamarck. - Describe the main principles of evolution through natural selection and explain how Darwin developed his ideas.	Inheritance of Acquired Characteristics, Natural Selection, Origin of Species, Darwin, Lamarck	
	Lesson 3 – Accepting Darwin’s ideas	- Explain how finches on different islands evolved different-shaped beaks by natural selection. - Describe, using an example, how modern knowledge of genetics provides a mechanism for Darwin’s theory of evolution.	Speciation, Adaptation, Beagle, Fossil Evidence, Religious objections	

		- Describe several reasons why many people did not accept Darwin's theory when it was first published. - Explain why it was important that Darwin collected a variety of evidence.		
	Lesson 4 – Evolution and speciation	- Describe the steps in the process of speciation. - Explain why Wallace's work prompted Darwin to publish The Origin of Species. - Explain why the species living on islands such as Madagascar, Borneo, the Galapagos islands, and Australia often share some similarities with species found elsewhere, but may also be unique.	Alfred Russel Wallace, Isolation, Speciation, Geographical, Genetic Drift	
	Lesson 5 – Evidence for evolution	- Describe different ways in which fossils are formed. - Describe how fossils provide evidence for evolution by natural selection. - Give reasons why the fossil record is not complete.	Fossil, Mineralisation, Amber, Cast, Incomplete record	Educake Retrieval Homework
	Lesson 6 – Fossils and extinction	- Explain why complete fossil records are rare and extract information from the evolutionary tree of the horse to demonstrate their value as evidence of evolution by natural selection. - Describe the evolution of the modern horse based on diagrams from the available fossil record. - Describe change in the environment as the key cause of extinction and give examples of the types of environmental changes that may lead to a single extinction or many species becoming extinct. - Describe how other organisms can cause an animal or plant to become extinct.	Extinction, Evolutionary Tree, Predation, Disease, Competitor	
	Lesson 7 – More about extinction	Explain how environmental change can cause extinctions. Suggest the effects of an asteroid, comet, or meteorite strike on the Earth. Identify strengths and weaknesses in two different theories for the mass extinction event that destroyed most of the dinosaurs.	Mass Extinction, Asteroid, Climate Change, Volcanic Activity, Tectonic	
	Lesson 8 – Antibiotic resistant bacteria	- Describe how antibiotic resistant bacteria evolve. - Summarise the reasons why the development of new antibiotics is unlikely to keep up with the emergence of new antibiotic resistant strains of bacteria. - Explain how the three main ways of reducing the development of antibiotic resistant bacteria have their effect. - Describe the measures put in place in hospitals and care homes to control the spread of MRSA and evaluate their effectiveness.	Antibiotic Resistance, MRSA, Mutation, Selection Pressure, Superbug	
	Lesson 9 – Classification	- Describe the importance of classifying organisms. - Describe the classification system developed by Carl Linnaeus, to include the order of the taxonomic groups and explain why a binomial naming system is useful. - Describe how developments in biology have impacted classification systems.	Linnaeus, Kingdom, Phylum, Genus, Binomial	Educake Retrieval Homework
	Lesson 10 – New systems of classification	- Describe how organisms are divided in the three-domain system developed by Carl Woese. - Describe why the three-domain system was proposed, including the advances in evidence available to scientists to help classify organisms. - Explain why evolutionary trees are built up using DNA evidence to show evolutionary relationships between living organisms but fossil evidence is used to build evolutionary relationships between extinct animals, and draw conclusions about the relationships between species from a simple evolutionary tree.	Archaea, Bacteria, Eukaryota, Domain, Molecular Phylogeny	
	REVISION LESSON			
	ASSESSMENT LESSON			Revision HW due
	FEEDBACK LESSON			

Chapter 16: Adaptations, interdependence, and competition				
Lesson Number	Key Question/ Lesson Title	Learning Objective(s)	Key Words/ Concepts	Homework
	Lesson 1 – The importance of communities	Define the terms habitat, abiotic factor, and biotic factor.	Interdependence, Community, Abiotic, Biotic, Habitat	Educake Retrieval Homework

		Describe a range of examples of how different species may interact within a community. Describe the importance of stable communities.		
	Lesson 2 – Organisms in their environment	- Describe how a range of abiotic factors might affect communities. - Describe how a range of biotic factors might affect communities.	Predation, Competition, Pathogens, Availability, Stability	
	Lesson 3 – Distribution and abundance	Explain why scientists measure the abundance and distribution of organisms in an ecosystem. Explain how a quadrat and a transect are used to estimate population sizes and distributions. Calculate the range, mean, median, and mode of a data set to calculate the population of an organism in a given area.	Quadrat, Transect, Abundance, Mean, Random Sampling	
	Lesson 4 – Competition in animals	- Use information to suggest factors that animals are competing for in a given habitat. - Describe some adaptations that help an animal compete successfully for a named resource. Describe how the distribution of a species may change because of competition.	Territory, Mate, Food, Alpha, Intraspecific	
	Lesson 5 – Competition in plants	- Describe the resources that plants compete for in a given habitat and explain why each resource is needed by the plant. - Describe the methods plants use to outcompete others or avoid competition and explain how they work. - Explain why plants disperse their seeds, and describe a range of seed dispersal methods. - Plan an investigation into the effect of overcrowding in plants and display given data appropriately.	Light, Space, Minerals, Seed Dispersal, Canopy	Educake Retrieval Homework
	Lesson 6 – Adapt and survive	- Describe some common adaptations that enable plants and animals to compete successfully in their habitat. - Explain how adaptations allow an organism to survive in its habitat. - Describe three extreme habitats and some of the adaptations that enable organisms to survive in each one.	Extremophile, Adaptation, Survival, Habitat, Environment	
	Lesson 7 – Adaptation in animals	Explain why it is important that most animals maintain the correct body temperature. Describe structural, behavioural, and functional adaptations and give examples of each. Describe how fur or feathers may keep an animal warm, camouflage it, or keep it cool. Describe ways in which animals are adapted to live in hot, dry, and cold habitats.	Structural, Behavioural, Functional, Camouflage, Insulation	
	Lesson 8 – Adaptations in plants	- Describe conditions where a plant needs to reduce water loss by transpiration. - Explain how different plant adaptations to reduce water loss enable the plants to survive in hot and/or dry environments. - Describe a range of plant adaptations to hot, dry climates and explain how they are effective.	Xerophyte, Stomata, Waxy Cuticle, Surface Area, Storage	
	REVISION LESSON			
	ASSESSMENT LESSON			Revision HW due
	FEEDBACK LESSON			

Chapter 17: Organising an ecosystem				
Lesson Number	Key Question/ Lesson Title	Learning Objective(s)	Key Words/ Concepts	Homework
	Lesson 1 – Feeding relationships	- Describe how producers synthesise glucose molecules by photosynthesis. - Identify producers, primary consumers, secondary consumers, and tertiary consumers in a food web. - Describe the relationships between predators and prey in a stable community.	Producer, Consumer, Trophic Level, Food Web, Predator-Prey	Educake Retrieval Homework

		Describe and interpret a graph showing how the numbers of predators and prey change over time.		
	Lesson 2 – Materials cycling	- Explain why decomposers are important to a stable ecosystem. - Explain the importance of recycling substances and describe the events of the decay cycle. - Describe the events in the water cycle, including the continual evaporation and precipitation of water, and explain its importance to life on the Earth.	Decomposer, Detritus, Precipitation, Evaporation, Condensation	
	Lesson 3 – The carbon cycle	- Describe the events in the carbon cycle and explain why it is important to life on Earth. - Draw and label a diagram of the carbon cycle and write word equations for photosynthesis, respiration, and combustion. Describe a number of carbon sinks.	Carbon Cycle, Combustion, Fossil Fuel, Respiration, Carbon Sink	
	Lesson 4 – Rates of decomposition	- Explain why different factors speed up or slow down the rate of decomposition. - Explain the importance of decomposition in recycling kitchen and garden waste into compost. Describe how biogas generators are used to produce methane gas as a fuel.	Decomposition, Anaerobic, Biogas, Methane, Slurry	
	REVISION LESSON			
	ASSESSMENT LESSON			Revision HW due
	FEEDBACK LESSON			

Chapter 18: Biodiversity and ecosystems				
Lesson Number	Key Question/ Lesson Title	Learning Objective(s)	Key Words/ Concepts	Homework
	Lesson 1 – The Human population explosion	- Describe the importance of a good level of biodiversity to the stability of an ecosystem. - Give reasons for the recent growth in human population. - Analyse and interpret data and information concerning human population growth. - Describe some of the effects of human population growth on land use and other resources.	Biodiversity, Population Growth, Resource Depletion, Land Use, Sustainability	Educake Retrieval Homework
	Lesson 2 – Land and water pollution	- Describe the process of eutrophication and explain how it affects biodiversity. - Describe how pesticides and herbicides pollute the land and water and reduce biodiversity.	Eutrophication, Pesticide, Bioaccumulation, Leaching, Algal Bloom	
	Lesson 3 – Air pollution	- Describe how acid rain is formed. - Describe the impact of acid rain on forests and lakes and state ways that the risk of acid rain can be reduced. - Describe the causes of global dimming and smog, and describe their effects. - Describe and interpret data on air pollution and acid rain.	Acid Rain, Sulfur Dioxide, Global Dimming, Particulates, Nitrogen Oxides	
	Lesson 4 – Deforestation and peat destruction	- Describe the main reasons for large-scale deforestation globally. - Describe the effects of deforestation and peat removal in terms of atmospheric carbon dioxide concentrations and biodiversity. - Describe reasons for and against the use of peat for food production.	Deforestation, Peat Bog, Carbon Store, Greenhouse Gas, Habitat Loss	
	Lesson 5 – Global warming	- Describe the greenhouse effect and explain its importance to life on Earth. - Describe how increased levels of carbon dioxide and methane in the atmosphere are causing global warming and climate change. - Describe in detail the biological consequences of global warming and climate change.	Greenhouse Effect, Global Warming, Climate Change, Methane, Sea Level Rise	Educake Retrieval Homework
	Lesson 6 – The impact of change (Biology only)	- Categorise environmental changes as due to seasonal changes, geographical changes, human interaction, or a combination of them all. - Explain how humans may cause environmental changes which have positive or negative impacts on the distribution of species in an ecosystem. - Analyse and interpret data linking environmental change and species distributions.	Migration, Species Distribution, Seasonal, Geographical, Human Impact	
	Lesson 7 – Maintaining biodiversity	Describe how people are working to maintain biodiversity directly.	Conservation, Breeding Program, Reforestation, Recycling, Stewardship	

		- Describe projects designed to prevent more environmental damage and so maintain biodiversity. - Use information and data to explain the conflicting pressures on maintaining biodiversity.		
	Lesson 8 – Trophic levels and biomass	- Number and describe the trophic levels in a food chain, food web, and pyramid of biomass. - Explain the shape of pyramids of biomass. - Use appropriate data to draw a pyramid of biomass and explain what it shows.	Pyramid of Biomass, Trophic Level, Primary Producer, Herbivore, Carnivore	
	Lesson 9 – Biomass transfers	- Describe the energy transfer that occurs during photosynthesis. - Describe how biomass is lost between trophic levels. - Plan an investigation to demonstrate that biomass is lost as organisms respire, transferring energy to their surroundings.	Energy Transfer, Biomass Loss, Excretion, Respiration, Inefficiency	Educake Retrieval Homework
	Lesson 10 – Factors affecting food security	- Define sustainable food production and explain how it could help increase food security. - Describe how biological factors affect food security. - Describe how environmental factors affect food security. - Interpret population and food production statistics to evaluate food security.	Food Security, Sustainable, Population Growth, Global Warming, Pests	
	Lesson 11 – Making food production efficient	- Describe three elements of artificially managed food production and explain how each helps increase the rate of growth of food animals. - Explain why there are ethical objections to some intensive farming techniques. - Compare fish farming in the sea with intensive farming of chickens or cows on the land.	Intensive Farming, Efficiency, Ethics, Restricting movement, Temperature Control	
	Lesson 12 – Sustainable food production	- Describe the reasons why fish stocks in the oceans are decreasing. - Describe the techniques used to conserve fish stocks. - Describe what mycoprotein is and how it is produced.	Mycoprotein, Fusarium, Sustainable Fishing, Quotas, Net Size	
	REVISION LESSON			
	ASSESSMENT LESSON			Revision HW due
	FEEDBACK LESSON			