

Science Year 11 – Biology Rotation

	What? When? Why?		
		Animal Coordination and Control	Exchange and Transport of Materials
Lesson 1 Learning intentions	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.	Describe the need to transport substances into and out of a range of organisms including oxygen, carbon dioxide, water, dissolved food molecules, mineral ions and urea. Explain the need for exchange surfaces and a transport system in multicellular organisms including the calculation of surface area: volume ratio.	Describe the different levels of organisation from individual organisms, populations, communities, to the whole ecosystem. Explain how to determine the number of organisms in a given area using raw data from field-work techniques, including quadrats and belt transects. Describe the importance of interdependence in a community. Explain how to determine the number of organisms in a given area using raw data from field-work techniques, including quadrats and belt transects.
Lesson 2 Learning intentions	Explain that adrenalin can be controlled by a negative feedback mechanism and is produced by the adrenal glands to prepare the body for fight or flight, including: a) increased heart rate b) increased blood pressure c) increased blood flow to the muscles d) raised blood sugar levels by stimulating the liver to change glycogen into glucose Explain how thyroxine controls metabolic rate as an example of negative feedback, including: a) low levels of thyroxine stimulates production of TRH in hypothalamus	Explain how alveoli are adapted for gas exchange by diffusion between air in the lungs and blood in capillaries.	Explain how communities can be affected by abiotic and biotic factors, including: (a) temperature, light, water, pollutants.

	<p>b) this causes release of TSH from the pituitary gland</p> <p>c) TSH acts on the thyroid to produce thyroxine</p> <p>d) when thyroxine levels are normal thyroxine inhibits the release of TRH and the production of TSH</p>		
Lesson 3 Learning intentions	<p>Describe the stages of the menstrual cycle including the roles of the hormones oestrogen and progesterone, in the control of the menstrual cycle.</p> <p>Explain how hormonal contraception influences the menstrual cycle and prevents pregnancy.</p> <p>Evaluate hormonal and barrier methods of contraception.</p>	<p>Explain how the structure of the blood is related to its function:</p> <p>a) red blood cells (erythrocytes)</p> <p>b) white blood cells (phagocytes and lymphocytes)</p> <p>c) plasma</p> <p>d) platelets</p>	Core practical: Investigate the relationship between organisms and their environment using field-work techniques, including quadrats and belt transects.
Lesson 4 Learning intentions	<p>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.</p> <p>Explain the use of hormones in Assisted Reproductive Technology (ART) including IVF and clomifene therapy.</p> <p>Explain the importance of maintaining a constant internal environment in response to internal and external change.</p> <p>Explain how the hormone insulin controls blood glucose concentration.</p> <p>Explain how blood glucose concentration is regulated by glucagon.</p>	<p>Explain how the structure of the blood vessels is related to their function.</p>	<p>Explain how communities can be affected by abiotic and biotic factors, including:...</p> <p>(b) competition, predation.</p>

	Explain the cause of type 1 diabetes and how it is controlled.		
Lesson 5 Learning intentions	Explain the cause of type 2 diabetes and how it is controlled. Evaluate the correlation between body mass and type 2 diabetes including BMI and waist:hip calculations using the BMI equation.	Explain how the structure of the heart and circulatory system is related to its function including the role of the major blood vessels, the valves and the relative thickness of chamber walls.	Describe how the survival of some organisms is dependent on other species, including parasitism and mutualism. Explain how to determine the number of organisms in a given area using raw data from field-work techniques, including quadrats and belt transects.
Lesson 6 Learning intentions		Calculate heart rate, stroke volume and cardiac output, using the equation $\text{cardiac output} = \text{stroke volume} \times \text{heart rate}$.	Explain the positive and negative human interactions within ecosystems and their impacts on biodiversity, including: a) fish farming b) introduction of non-indigenous species c) eutrophication
Lesson 7 Learning intentions		Describe cellular respiration as an exothermic reaction which occurs continuously in living cells to release energy for metabolic processes, including aerobic and anaerobic respiration.	Explain the benefits of maintaining local and global biodiversity including the conservation of animal species and the impact of reforestation.
Lesson 8 Learning intentions		Describe cellular respiration as an exothermic reaction which occurs continuously in living cells to release energy for metabolic processes, including aerobic and anaerobic respiration. Compare the process of aerobic respiration with the process of anaerobic respiration.	Describe how different materials cycle through the abiotic and biotic components of an ecosystem. Explain the importance of the water cycle including the processes involved and the production of potable water in areas of drought including desalination.
Lesson 9 Learning intentions		Core practical: Investigate the rate of respiration in living organisms.	Explain the importance of the carbon cycle including the processes involved and the role of microorganisms as decomposers.

Lesson 10 Learning intentions			Explain how nitrates are made available for plant uptake including the use of fertilisers, crop rotation and the role of bacteria in the nitrogen cycle
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