

# Y10 Biology Curriculum 2023-2024

(v)

Sept/Oct Half Term 1

## B2 Organisation

### 2.2 Animal Tissues, Organs and Organ Systems

Know the circulatory system, and the structure and function of the heart.

Name the three different types of blood vessel and explain how the structure of these vessels relates to their functions.

Explain natural and artificial pacemakers.

Describe the components of blood and how they are adapted to function.

Describe coronary heart disease: a non-communicable disease.

## B4 Bioenergetics

### 4.2 Respiration

Compare the processes of aerobic and anaerobic respiration with regard to the need for oxygen, the differing products and the relative amounts of energy transferred.

Define aerobic and anaerobic respiration.

State that reactions which transfer energy to the environment are exothermic reactions.

Name three things organisms need energy for.

Know the word and chemical equations for aerobic respiration.

State the word equation for anaerobic respiration in muscles.

State that the energy transferred supplies all the energy needed for living processes.

State the word equation for anaerobic respiration in plant and yeast cells.

State that anaerobic respiration in yeast cells is called fermentation and has economic importance in the manufacture of bread and alcoholic drinks.

Explain why anaerobic respiration takes place in muscles during exercise.

Explain muscle fatigue and oxygen debt.

Define the role of the liver in the removal of lactic acid.

Define metabolism and state five metabolic processes.

State that the energy transferred by respiration in cells is used by the organism for the continual enzyme controlled processes of metabolism that synthesise new molecules.

## HALF TERM

Nov/Dec Term 2

## B3 Infection and Response

### Non-Communicable Disease

State that health is the state of physical and mental wellbeing.

State that defects in the immune system mean individuals are more likely to suffer from infectious diseases.

State that immune reactions initially caused by a pathogen can trigger allergies such as skin rashes and

Know that severe physical ill health can lead to depression and other mental illness.

Explain the effect of lifestyle on some non-communicable diseases and that they can be caused by and increased by the interaction of several factors.

Recall that benign tumours and malignant tumours result from uncontrolled cell division. Malignant tumour cells are cancers.

Know lifestyle risk factors for various types of cancer, including smoking, obesity, common viruses and UV exposure. There are also genetic risk factors for some cancers.

Explain how diseases caused by viruses, bacteria, protists and fungi are spread in animals and plants.

Define the term pathogen.

### 3.3 Plant Disease

Know how plant disease is detected and identified.

State that plants can be infected by a range of viral, bacterial and fungal pathogens, as well as by insects.

Describe tobacco mosaic virus (TMV).

Describe rose black spot and state its cause.

	Know how rose black spot is spread in the environment and how it can be treated.	
	Know that plants can be damaged by a range of ion deficiency conditions.	
	Explain plant physical, chemical and mechanical defence responses.	
	<b>3.1 Communicable Diseases</b>	
	Explain how bacteria and viruses may reproduce in the body and why they make you feel ill.	
	Give examples of how the spread of diseases can be reduced.	
	Know that measles is a viral disease and describe the symptoms.	
	Explain the effects of HIV and how it is transmitted.	
	Know that Salmonella food poisoning is spread by bacteria ingested in food, or on food prepared in unhygienic conditions.	
	Describe the symptoms of Salmonella food poisoning.	
	Know how Gonorrhoea is a transmitted and how its spread can be reduced.	
	State the cause of Gonorrhoea, and describe the symptoms and how it is treated.	
	Describe malaria and state its cause.	
	Know how malaria is spread and how to reduce the spread of the disease.	
	<b>CHRISTMAS HOLIDAY</b>	
Jan/Feb Half Term 3	Define some of the body's natural defences to infection.	
	Explain the role of white blood cells.	
	Describe the process of vaccination.	
	Explain "herd immunity".	
	State what antibiotics can treat and explain the development of antibiotic resistance bacteria.	
	<b>Required Practical Activity 2:</b> Investigate the effect of antiseptics or antibiotics on bacterial growth using agar plates and measuring zones of inhibition	
	Define painkillers.	
	Explain why it is difficult to develop drugs that kill viruses.	
	Know that, traditionally, drugs were extracted from plants and microorganisms and give some common examples, including who discovered Penicillin and from what.	
	State that most new drugs are synthesised by chemists in the pharmaceutical industry. However, the starting point may still be a chemical extracted from a plant.	
	For new medicinal drugs, explain the stages in preclinical and clinical trials.	
	Define placebo.	
	Explain double blind trials.	
	<b>3.2 Monoclonal Antibodies</b>	
Explain how they are produced.		
Name uses of monoclonal antibodies, both diagnostic and therapeutic.		
	<b>HALF TERM</b>	
March/April Half Term 4	<b>B5 Homeostasis and Control</b>	
	<b>5.2 The Human Nervous System</b>	
	Explain how the structure of the nervous system is adapted to its functions.	
	State the main function of the nervous system.	
	Describe how information from receptors is carried to the brain to coordinate the response.	
	Describe the roles of sensory neurones, relay neurones, motor neurones, synapses and effectors in a reflex action, and state that reflex actions are automatic and rapid.	
	<b>Required Practical Activity 7:</b> Plan and carry out an investigation into the effect of a factor on human reaction time.	
	Identify the cerebral cortex, cerebellum and medulla on a diagram of the brain.	
	Describe the function of the cerebral cortex, cerebellum and medulla.	
	Describe how neuroscientists have been able to map the regions of the brain to particular functions.	
	Relate the structures of the eye to their functions, including accommodation to focus on near or distant objects and adaptation to dim light.	
	Explain the function of the retina, the optic nerve, the sclera, the iris and the ciliary muscles.	
	Describe myopia and hyperopia and how they are treated with spectacle lenses.	

	Describe how new technologies are used to treat eye defects.	
	Interpret ray diagrams demonstrating how spectacle lenses correct myopia and hyperopia.	
March/April Half Term 5	<b>EASTER HOLIDAY</b>	
	<b>5.1 Homeostasis</b>	
	Define homeostasis and name three levels maintained by homeostasis.	
	State that automatic control systems may involve nervous responses or chemical responses.	
	Define receptors, coordination centres and effectors.	
	Explain mechanisms to lower or raise body temperature in a given context.	
	<b>5.3 Hormonal Coordination in Humans</b>	
	Define hormones and their rate of effect.	
	Describe the functions and main organs of the endocrine system, including detail of the pituitary gland.	
	Identify the position of the pituitary gland, pancreas, thyroid, adrenal gland, ovaries and testes on a diagram of the human body.	
	Explain the role of the pancreas and insulin in the control of blood glucose concentration.	
	Compare Type 1 and Type 2 diabetes and explain how they can be treated.	
Recall that if the blood glucose concentration is too low, the pancreas produces glucagon that causes glycogen to be converted into glucose and released into the blood.		
Explain how glucagon interacts with insulin to control blood glucose (sugar) levels in the body.		
May/June Half Term 6	<b>HALF TERM</b>	
	Explain how the body maintains water and nitrogen balance in the body.	
	Recall that excess water, ions and urea are removed via the kidneys in the urine.	
	Explain the role of the liver in deaminating amino acids to form ammonia, and that ammonia is toxic and so it is immediately converted to urea for safe excretion.	
	State that the kidneys produce urine by filtration of the blood and selective reabsorption of useful substances such as glucose, some ions and water.	
	Describe the role of ADH in controlling the water level in the body.	
	Know how people who suffer from kidney failure may be treated.	
	State that during puberty, reproductive hormones cause secondary sex characteristics to develop.	
	State that testosterone is the main male reproductive hormone produced by the testes and it stimulates sperm production.	
	Explain the interactions of hormones in the control of the menstrual cycle.	
	Evaluate the different hormonal and non-hormonal methods of contraception.	
	Explain the use of hormones to treat infertility.	
	State some problems with fertility treatment.	
	Explain negative feedback.	
	State two hormones that are controlled by negative feedback and their function.	
	<b>5.4 Plant Hormones</b>	
	Explain how plants use hormones to coordinate and control growth in response to light and gravity.	
	Describe the role of gibberellins and ethane in plants.	
Describe some uses of plant hormones in agriculture and horticulture.		
<b>Required Practical Activity 8:</b> Investigate the effect of light or gravity on the growth of newly germinated seedlings.		
Key Skills This Year	Aseptic technique	
	Interpretation of graphs to show correlation	
	Experimental design	
	Safe use of dissection instruments	
	Presentation skills in groups	
	Understand the difference between repeatability and reproducibility	
	Begin to understand the ethical considerations within Biology	