THE HIGHFIELD SCHOOL

Curriculum Plan
Department/subject: Science Year 10
Our Vision: **We take opportunities and aspire to excellence**
Our Intent:

- All students will experience a curriculum richness, breadth and depth
- The curriculum equips every student with the knowledge and skills for the future in our local area and beyond
- The curriculum builds on prior knowledge and creates a 'web of knowledge'
- Gaps in knowledge and skills are identified and addressed quickly

Year	Autumn 1 and 2	Autumn 2 and Spring 1
Knowledge to be taught	**Unit – Cell division , Organisation and digestion** ● Describe how genetic information is stored in the nucleus of a cell (inc genes & chromosomes) ● Describe the processes that happen during the cell cycle, including mitosis (inc recognise and describe where mitosis occurs) ● Describe stem cells, including sources of stem cells in plants and animals and their roles ● Describe the use of stem cells in the production of plant clones and therapeutic cloning ● Discuss the potential risks, benefits and issues with using stem cells in medical research/treatments (inc diabetes and paralysis) ● Describe the levels of organisation within living organisms ● Describe the digestive system and how it works as an organ system (from KS3) ● Describe basic features of enzymes (inc rate calculations for chemical reactions)	**Unit – Organising animal and plant tissue** ● Describe the structure of the human heart and lungs (inc how lungs are adapted for gaseous exchange) ● Explain how the heart moves blood around the body (inc role and position of the aorta, vena cava, pulmonary artery & vein and coronary arteries) ● Explain how the natural resting heart rate is controlled and how irregularities can be corrected ● Describe the structure and function of arteries, veins and capillaries ● Use simple compound measures such as rate and carry out rate calculations for blood flow ● Describe blood and identify its different components, inc identifying blood cells from photographs/diagrams ● Describe the functions of blood components, including adaptations to function ● Describe what happens in coronary heart disease and what statins are used for

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- Describe the lock and key theory as a model of enzyme action and explain how the shape a of the active sites makes the enzyme specific
- Explain the effect of temperature and pH on enzymes
- Describe the digestive enzymes, including their names, sites of production and actions
- Describe how the products of digestion are used
- Describe the features and functions of bile and state where it is produced and released from
- Required practical 4: use qualitative reagents to test for a range of carbohydrates, lipids and proteins
- Required practical 5: investigate the effect of pH on the rate of reaction of amylase enzyme
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- Describe and evaluate treatments for coronary heart disease and heart failure (inc drugs, mechanical devices or transplant)
- Recall that heart valves can become faulty and describe the consequences of this
- Describe how patients can be treated in the case of heart failure

Keywords

active site
the site on an enzyme where the reactants bind

amino acids
molecules made up of carbon, hydrogen, oxygen, and nitrogen that are the building blocks of proteins

amylase
enzyme that speeds up the digestion of starch into sugars

bile
neutralises stomach acid to give a high pH for the enzymes from the pancreas and small intestine to work well. It is not an enzyme

Carbohydrases enzymes that speed up the breakdown of carbohydrates into simple sugars

carbohydrates

aorta
the artery that leaves the heart from the left ventricle and carries oxygenated blood to the body

arteries
blood vessels that carry blood away from the heart. They usually carry oxygenated blood and have a pulse

atria
the upper chambers of the heart

capillaries
the smallest blood vessels. They run between individual cells and have a wall that is only one cell thick

coronary arteries
the blood vessels that supply oxygenated blood to the heart muscle

double circulatory system

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molecules that contain only carbon, hydrogen, and oxygen. They provide the energy for the metabolism and are found in foods such as rice, potatoes, and bread

catalyst
a substance that speeds up the rate of another reaction but is not used up or changed itself

denatured
the breakdown of the molecular structure of a protein so it no longer functions

differentiate
the process where cells become specialised for a particular function

digestive system
organ system where food is digested and absorbed

the circulation of blood from the heart to the lungs is separate from the circulation of blood from the heart to the rest of the body

epidermal
the name given to cells that make up the epidermis or outer layer of an organism

guard cells
surround the stomata in the leaves of plants and control their opening and closing

haemoglobin
the red pigment that carries oxygen around the body in the red blood cells

palisade mesophyll
the upper layer of the mesophyll tissue in plant leaves made up of closely packed cells that contain many chloroplasts for photosynthesis

phloem
the living transport tissue in plants that carries dissolved food (sugars) around the plant

Links to prior knowledge

Key stage 3

- Structure and function of body systems
- The digestive system
- Nutrition

Key stage 3

- Structure and function of body systems
- Gas exchange
- Breathing
- Photosynthesis

How knowledge is assessed

- An end of unit test will cover the main ideas in the topic. This will be marked by the teacher and a feedback lesson will go over the assessment in detail.
- Green pens are used for self and peer assessment to build up students' understanding of their own misconceptions and ideas.
- Homework tasks via Show My Homework.

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How gaps will be addressed	• Gaps in knowledge will be identified by any of the strategies above. • Formally marked work will require a response from the student and subsequent work in lessons will link back to the areas of need. • End of unit test feedback to require one lesson dedicated to addressing gaps in knowledge and exam skills	• Gaps in knowledge will be identified by any of the strategies above. • Formally marked work will require a response from the student and subsequent work in lessons will link back to the areas of need. • End of unit test feedback to require one lesson dedicated to addressing gaps in knowledge and exam skills
Cultural capital lessons	Cultural: How ideas in Science are accepted by society. Physical: Practical techniques, health and safety, development of fine motor and dexterity skills.	Cultural: How ideas in Science are accepted by society. Physical: Practical techniques, health and safety, development of fine motor and dexterity skills.