Biology Curriculum Overview Year 9 2024-25

	B1 – Cell Biology	B2 - Organisation
Unit Title	B1 – Cell Biology _ ideas are revisited for Triple content in Y10	B2- Organisation – ideas are revisited for Triple content in Y10
Approximate Number of Lessons	13 Lessons	23 Lessons
Curriculum Content	Cells are the basic unit of life. Structural differences between types of cells enables them to perform specific functions within the organism. These differences in cells are controlled by genes in the nucleus. For an organism to grow, cells must divide by mitosis producing two new identical cells. If cells are isolated at an early stage of growth before they have become too specialised, they can retain their ability to grow into a range of different types of cells. This phenomenon has led to the development of stem cell technology. This is a new branch of medicine that allows doctors to repair damaged organs by growing new tissue from stem cells.	The human digestive system provides the body with nutrients and the respiratory system provides it with oxygen and removes carbon dioxide. In each case they provide dissolved materials that need to be moved quickly around the body in the blood by the circulatory system. Damage to any of these systems can be debilitating if not fatal. Although there has been huge progress in surgical techniques, especially with regard to coronary heart disease, many interventions would not be necessary if individuals reduced their risks through improved diet and lifestyle. We will also learn how the plant's transport system is dependent on environmental conditions to ensure that leaf cells are provided with the water and carbon dioxide that they need for photosynthesis.
Links to prior learning	All learners will be able to: Recognise a typical animal and plant cell Some learners will be able to: Identify the differences between animal and plant cells A few learners will be able to: Explain the functions of the cell organelles.	All learners will be able to: Recall the idea of cells being the basic building blocks of living things. Some learners will be able to: Identify the relationship between cells, tissues, organs and systems A few learners will be able to: Relate systems together
Cultural Capital Opportunities	Trip suggestion: - Electron Microscope University of Cambridge Article on cells going through a maze, great video too free sign up to New Scientist website needed: https://www.newscientist.com/article/2253161-watch-cells-sniff-their-way-around-the-maze-from-hampton-court-palace/	Visit to Botanical garden Cambridge https://www.botanic.cam.ac.uk/ (Children under 16 free Adult tickets £6.50) Visit to Kew Gardens (London) https://www.kew.org/ For ticket price details: https://www.kew.org/kew-gardens/visit-kew-gardens/tickets

	Article on Children who sleep less may age faster at the cellular level: https://www.newscientist.com/article/mg23531333-200-children-who-sleep-less-show-signs-of-ageing-in-their-cells/ Light Microscope Simulation: https://www.ncbionetwork.org/iet/microscope/ Best to do this following lesson on how to use a light microscope in class. Students can use skills learned in class and expand their knowledge of the light microscope looking at different cells. Also available on Apple IPADs (No android equivalent unfortunately) Scroll down on the website for the link for this.	Website: - British Heart Foundation Website and Heart Matters Magazine https://www.bhf.org.uk/informationsupport/heart-matters-magazine Article on Does sleeping too little or too much raise your risk of heart disease? https://www.bhf.org.uk/informationsupport/heart-matters-magazine/news/behind-the-headlines/sleep-and-heart-disease Website: - Guts UK https://gutscharity.org.uk/ Information on different disorders and research on the gastric system (digestive system) Website – British Lung Foundation Stories and Videos https://www.blf.org.uk/support-for-you/copd/stories-and-videos Website – NHS A-Z conditions https://www.nhs.uk/conditions/
Assessment Focus	End of topic test on cell biology	End of topic test on cell biology and organisation
Name of Knowledge Organiser/Link to Organiser	B1 Cells	B2 Organisation

B1 Cell Biology

What is a eukaryotic cell?

What is a prokaryotic cell?

Label the bacterial cell

State what happens in the different stages of the cell cycle
Stage 1 –

Stage 2 –

Stage 3 -

What is therapeutic cell cloning?

Label the animal cell

Describe the function of each of these organelles

Nucleus	
Cytoplasm	
Cell membrane	
Mitochondria	
Ribosomes	
Cell wall	
Chloroplasts	
Vacuole	

Highlight the organelles only found in plants green

Give one way in which each of the following cells is adapted to its job:
Nerve cell –

Muscle cell –

Sperm cell –

Root hair cell –

Xylem cell –

Phloem cell -

What is the job of the flagellum?

What is a plasmid?

What is the job of the slime layer?

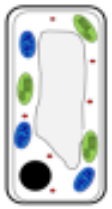
Define the following terms:
Chromosome –

Gene –

DNA –

Why is mitosis important?

Label the plant cell



What is a plant cell wall made out of?

What is the equation for magnification?

What is meant by the terms:
Resolution –

Magnification -

Define diffusion:

Give one example of diffusion in plants and one in animals

What 3 factors affect the rate of diffusion:

Define osmosis:

Define active transport:

Give an example of active transport in plants:

What is an embryonic stem cell?

What is an adult stem cell?

What is meristem tissue?

List some advantages of using stem cells:

List some disadvantages of using stem cells:

Define the following terms and give an example of each:
Cells –

Tissues –

Organs –

Organ system -

What is the role of:
Pancreas –

Liver –

Small intestine –

Large intestine –

Rectum –

Anus –

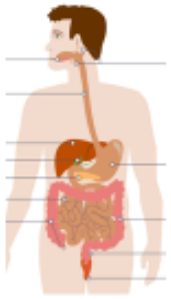
Describe how you would use:
Benedict's reagent to test for sugar –

Iodine to test for starch –

Biuret solution to test for protein –

Draw a diagram here to show how enzymes work:

Label the digestive system



Digestive enzymes

Enzyme	What it breaks down	What it breaks down into	Where it is produced	Where it works
Amylase				
Carbohydrase				
Protease				
Lipase				

Where is bile produced:

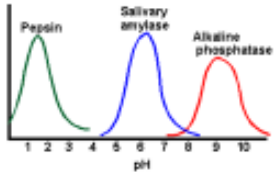
Where is bile stored:

Describe the 2 jobs of bile:

1)

2)

B2 Organisation



Using the graph

What is the optimum pH of:

Pepsin:

Salivary amylase:

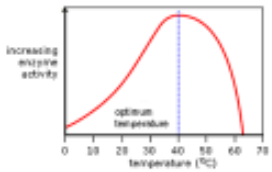
Alkaline phosphatase:

What is the role of the small intestine?

How is the small intestine adapted for it's role?

Enzymes are made of _____. These are made up of _____ _____. Enzymes are _____ _____. They _____ up reactions by lowering the _____ _____. Enzymes have an _____ _____. This is where the substrate joins. The active site is _____ and _____ to the corresponding substrate. Enzymes speed a reaction up but do not _____ it.

Words: Protein, specific, active site, change, complementary, biological catalysts, amino acids, activation energy, speed.



Describe this graph:

Explain this graph:

What is meant by the term 'optimum temperature'?

What is meant by the 'lock and key theory'?

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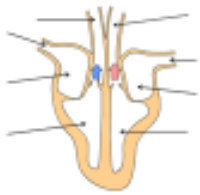
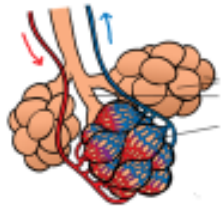
Label the left atrium, left ventricle, right atrium, right ventricle, aorta, vena cava, pulmonary artery and pulmonary vein on the diagram



Label the trachea, bronchi and alveoli

Label the capillary network



What is a coronary artery and where would you find them?

What is the job of the heart?

Where does the left ventricle pump blood to?

Where does the right ventricle pump blood to?

What is the job of the pacemaker?

Why might someone have an artificial pacemaker fitted?

What is coronary heart disease?

In what ways can a heart valve become faulty?

How can a faulty heart valve be treated?

How does smoking and alcohol consumption effect unborn babies?

What is the function of an artery?

How is an artery adapted for its function?

What is the function of a vein?

How is a vein adapted for its function?

What is the function of a capillary?

How is a capillary adapted fro its function?

What is cancer?

What is the difference between a benign and a malignant tumour?

Name some risk factors for the following diseases:

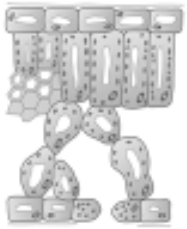
Type 2 diabetes –

Cardiovascular disease –

Cancer –

Lung cancer/ lung disease –

Label the epidermis, spongy mesophyll, palisade mesophyll, xylem, phloem, guard cells and stomata.



What is transpiration?

What factors affect the rate of transpiration?

What is translocation?

What is the function of the xylem?

What the function of the phloem?

What is the function of:
Epidermis tissue –

Palisade mesophyll –

Spongy mesophyll –

Meristem tissue –