BIOLOGY

Teacher name: Shelley Dixon

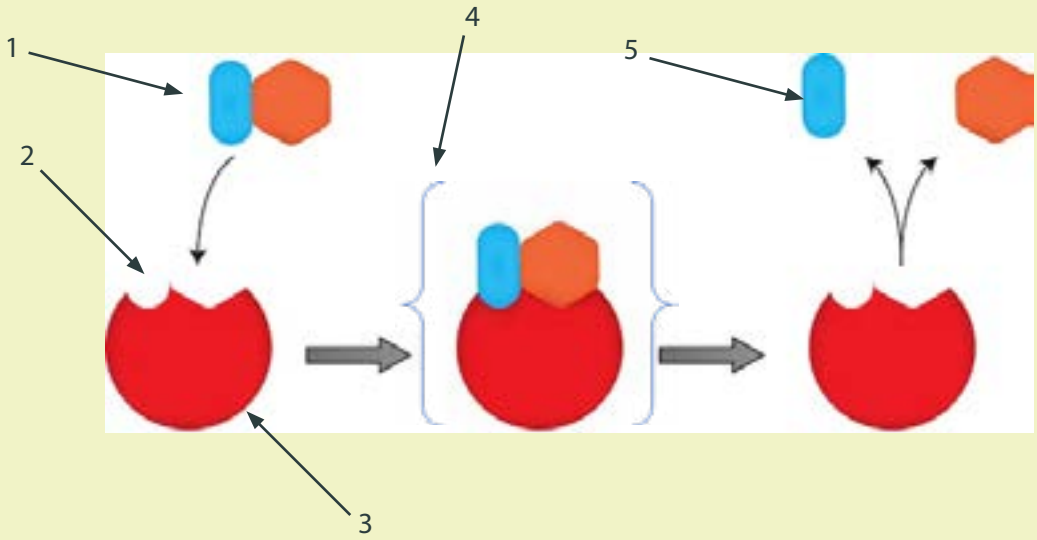
Exam board: OCR A

Email address: Shelley.Dixon@ stockton.ac.uk

The first module that you will study when taking A-level Biology is titled the Foundations of Biology. This module is designed to build directly on the work that you have completed during your GCSEs before progressing to completely new topics in October. In order to ensure that you have a strong grasp of these core biological areas we have designed this study pack for you. It will concentrate on enzymes, movement of molecules, cells and DNA. The extension tasks take you on to content that you will cover during your A levels.

Week 1: Enzymes (2-3 hours)

Task 1: Label the below diagram of the lock and key model

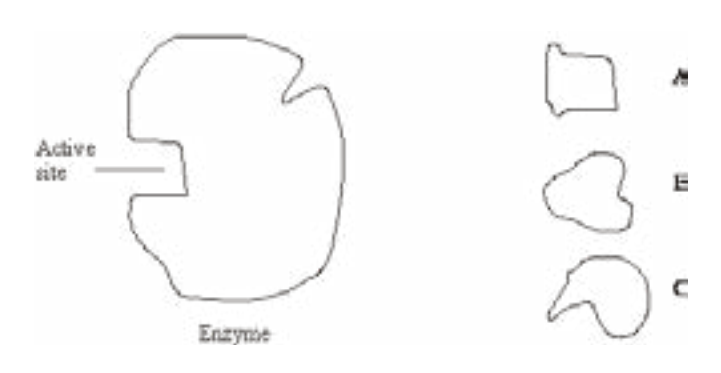


Task 2: Use the link below to explain the effect that the following factors have on enzyme activity, change the different variables and use the information to complete the table. http://www.kscience.co.uk/animations/enzyme_model.htm

Variable	Explanation
Temperature	
pH	

Number of substrates (concentration)	
Number of enzymes (concentration)	

Task 3: The diagram represents an enzyme molecule and three other molecules that could combine with it.



(a) Which molecule is the substrate for the enzyme? Give a reason for your answer.

Task 4: Scientists developed a new model called the induced fit theory which is now used instead of the lock and key theory to explain enzyme activity. Carry out some research to find out about this model and write a short paragraph to explain the similarities and differences to the lock and key theory.

Week 2: Movement of Molecules (2-3 hours)

Task 1: Write the definitions for the below terms, use the revision resources at the end of the pack to try and extend your definitions to include the depth needed at A level. – Highlight the parts that are different to what you learnt at GCSE

Diffusion	
Facilitated Diffusion	
Osmosis	
Active Transport	
Exocytosis	
Endocytosis	

Task 2: For each of the above definitions draw a diagram to show the process, include arrows to show the direction of movement. If you can give examples of molecules that use each method of movement.

Task 3: Write a paragraph explaining the movement of carbon dioxide and oxygen into and out of red blood cells, consider where in the body this movement would take place. Make sure you include the following words: Diffusion, high concentration, low concentration, partially permeable membrane, equilibrium

Week 3: Cells – Eukaryotes and Magnification (2-3 hours)

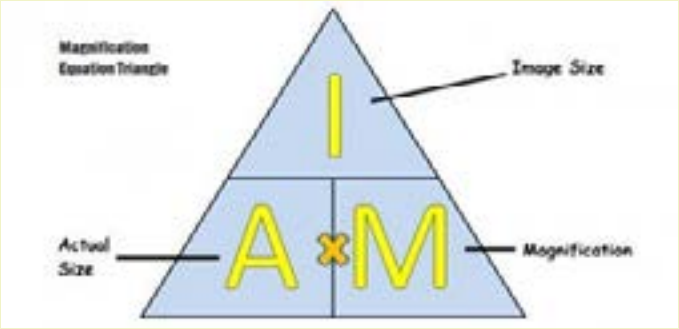
Task 1: Match the word to the definition

Resolution	A single celled organism with no membrane bound organelles
Magnification	A cell that contains membrane bound organelles
Eukaryote	The number of times bigger the image looks compared to the real object
prokaryote	The name given to a specialised structure within a living cell
organelle	The ability to distinguish between two objects that are close together

Task 2: Use the formula triangle to write the formulae for:

Magnification:

Actual size of the object:



The image of a cell in a book is 4.5cm in length. However the real cell is only 120µm. Calculate the magnification of the cell.

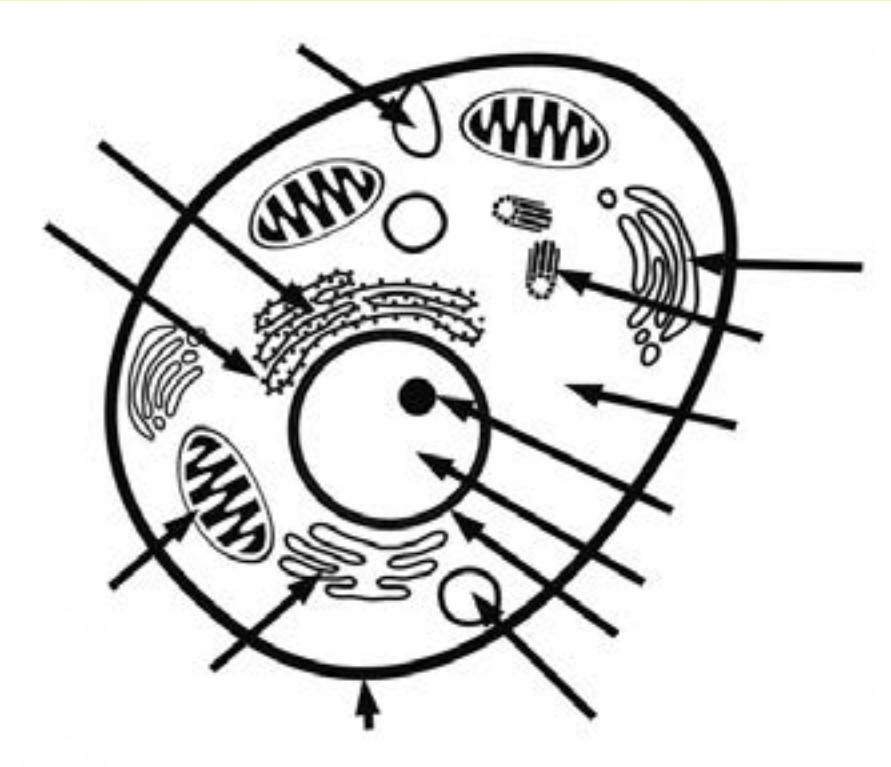
HINT: You will need to convert 4.5cm into µm so you will need to times by 10 to get it into mm and then times it by 1000 to convert it to µm.

Answer:

Task 3: Use your GCSE knowledge to label the main features of this animal cell. There are some other organelles on here that you have not yet learnt see if you can use some of the revision resources suggested to find them out.

Extension task 1 –What other organelles would you find in a plant cell?

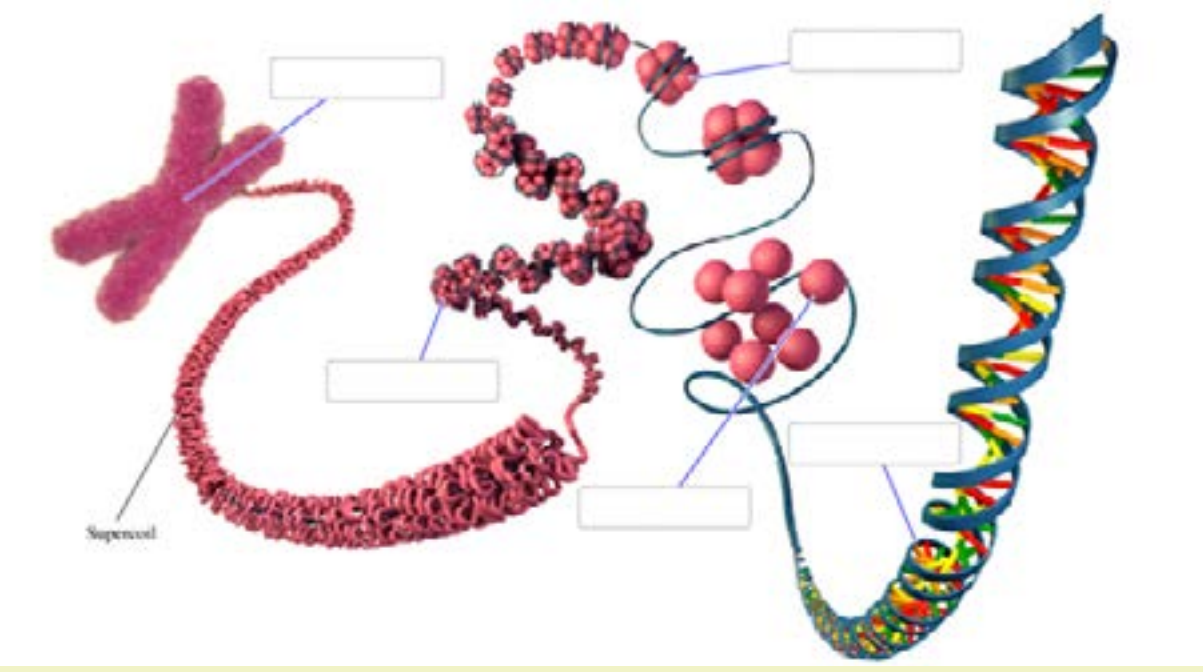
Extension task 2 – what is the function of each of these organelles?



Task 4: Find a diagram of a prokaryotic cell and produce a comparison table between eukaryotes and prokaryotes.

Week 4: DNA (2-3 hours)

Task 1: Label the diagram below with the words provided, look up any that your are unsure of and write a definition



Nucleosome DNA double helix Chromosome

Tight helical fibre Histone Protein

Task 2: Write the definitions to these key molecules

DNA	
mRNA	
tRNA	
rRNA	
Amino acid	
Triplet code	
codon	
anticodon	
gene	
protein	

Task 3: Most GCSE specifications look at the process of proteinsynthesis and this is a topic that is expanded on in great detail at A-level. Summarise what you know from GCSE into a diagram and label it. If you have not covered this topic use the revision websites at the end of the booklet to help you. You will need to include as many of the key words from task 2 as possible.

Reading list

This is a timeline showing when different species have had their genomes sequenced. Pick two of the stories at the bottom of the page to read into further depth about the sequencing of some of the species. https://www.yourgenome.org/facts/timeline-organisms-that-have-had-their-genomes-sequenced

Beating the Bugs: The Pathogen Genomics Revolution. This article provides some in depth information on genomic sequencing of Pathogens to help manage the threat of infectious diseases. https://www.phgfoundation.org/briefing/beating-the-bugs-the-pathogen-genomics-revolution

BioMan has games, activities and quizzes to learn some of the key topics https://www.biomanbio.com/HTML5GamesandLabs/Cellgames/Cells.html

McGraw Hill website has useful animations on a number of topics http://highered.mheducation.com/sites/0072495855/student_view0/chapter2/animation__how_enzymes_work.html

Useful Revision Websites

Physics and Maths Tutor –This website contains useful notes and flashcards to help you with your work https://www.physicsandmathstutor.com/biology-revision/a-level-ocr-a/module-2/

Seneca Biology - Free revision website https://www.senecalearning.com/blog/a-level-biology-revision/

Biology Guide - https://biologyguide.app/

The Student Room - https://www.thestudentroom.co.uk/a-level/subjects/biology/

S-Cool Revision - https://www.s-cool.co.uk/a-level/biology