

# Separate Biology Revision Mats

Paper 1  
Topics 1-5

Draw and label a plant cell, animal cell and bacterial cell.

Explain the advantages and disadvantages of using electron microscopes to view cells.

Explain the functions of these cell components.

Nucleus

Cell membrane

Cell wall

Cytoplasm

Ribosome

Mitochondria

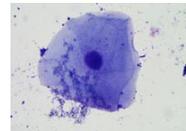
Vacuole

Plasmid DNA

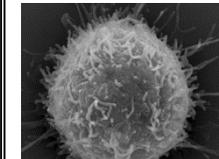
Flagellum

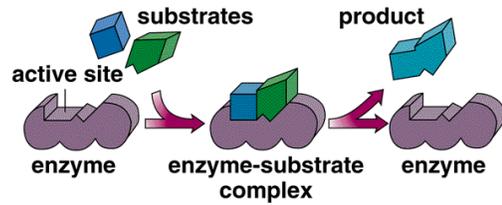
Draw and label the specialised features of a ciliated epithelial cell, sperm cell and egg cell.

.Calculate the actual size of the nucleus of this cell.  
Magnification x 400



The diameter of an egg cell is 8  $\mu\text{m}$ , calculate the magnification used in this image.

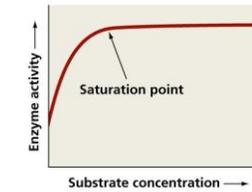
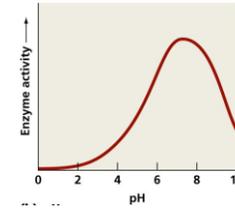
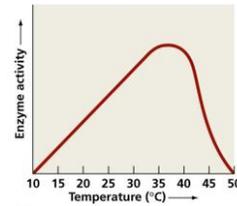




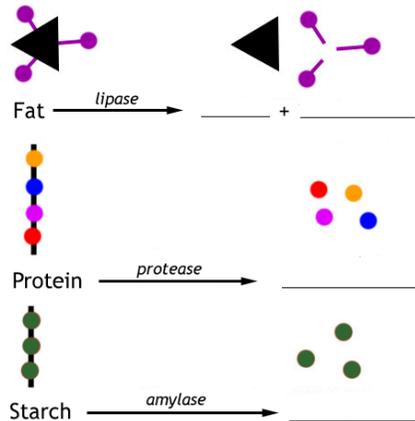
Use the diagram to explain how an enzyme works.

What happens when an enzyme gets denatured?

For the different graphs explain the shape. Why does it increase/decrease/level off and where is the optimum?

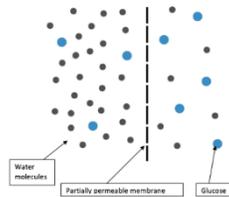


.What are the products of the following enzyme catalysed reactions?



Osmosis.

Which way will the water molecules move?



Write a definition of osmosis?

What happens to the mass of potato chip when it is placed in these solutions, can you explain why?

Pure water

Strong salt solution

How would you describe these cells?



What is diffusion?

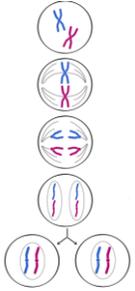
What substances diffuse into and out of cells?

What is active transport?

**Topic key words**

- |                          |               |              |               |               |           |                  |
|--------------------------|---------------|--------------|---------------|---------------|-----------|------------------|
| Eukaryotic               | prokaryotic   | organelles   | nucleus       | cell membrane | cytoplasm | mitochondria     |
| ribosomes                | cell wall     | chloroplasts | chlorophyll   | vacuole       | acrosome  | haploid          |
| Ciliated                 | magnification | resolution   | estimation    | enzyme        | substrate | active site      |
| Enzyme-substrate complex | optimum       | catalysts    | carbohydrates | proteins      | lipids    | active transport |
| Sugar                    | amino acids   | fatty acids  | glycerol      | osmosis       | diffusion |                  |

Label each stage of mitosis and describe what is happening.



What happens during interphase?

Why is mitosis important?

How many and what type of cells are produced during mitosis?

How does cancer develop?

How does growth occur in animals?

How does growth occur in plants?

What is cell differentiation?

Why are stem cells, including meristems in plants, important in the development of an organism?

Use of stem cells in medicine

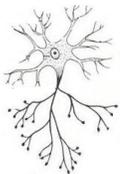
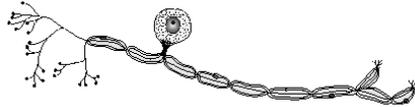
Advantages

Disadvantages

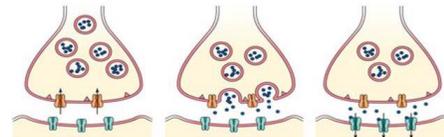
What is the sequence of neurones in a reflex arc starting from a stimulus?

What is the function of a reflex arc?

Label the different parts of the different types of neurone.



Explain what happens at a synapse.

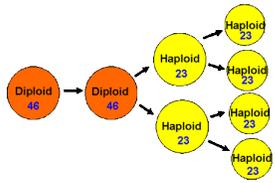


What are effectors?

What makes up the central nervous system?

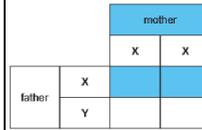
What is the function of the myelin sheath?

What are the outcomes of meiosis?



Why is meiosis important?

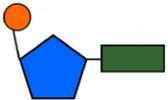
Explain how the sex of an offspring is determined at fertilisation.



Describe the structure of DNA.

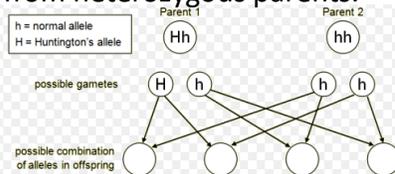


Describe the structure of a nucleotide.

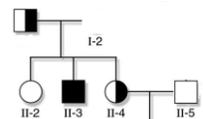


Cystic fibrosis is a recessive genetic condition. Use a Punnett square to calculate the % probability of a child suffering from cystic fibrosis if both parents are heterozygous.

Huntingdon's is caused by dominant allele. Complete the genetic diagram to explain the inheritance of the condition from heterozygous parents.



This is a cystic fibrosis pedigree (recessive). Explain the genotype of IL-2.



What are the possible offspring from the cross between IL-4 and IL-5?

What are the different causes of variation?

Key word	Definition
Genome	
Gene	
Allele	
Chromosome	
Dominant	
Recessive	
Homozygous	
Heterozygous	
Genotype	
Phenotype	
Gamete	
Zygote	
Mutation	
Genetic variation	
Environmental variation	

Discuss the outcome of the human genome project and how it could impact on our understanding of disease and future medical treatments.

Explain some advantages of asexual reproduction

Explain some disadvantages of asexual reproduction

Explain some advantages of sexual reproduction

Explain some disadvantages of sexual reproduction

How can you extract DNA from a fruit  
Write a method and draw a labelled diagram

Write a summary to describe transcription

Write a summary to describe translation

What is a mutation?

Describe how mutations in coding DNA can affect the phenotype by altering the sequence of amino acids and therefore the protein produced

Describe how mutations in the non-coding DNA can affect the phenotype by influencing the binding of RNA polymerase and alter the protein produced

What is a degenerate code?

Explain how sex-linked genetic disorders are inherited

Describe the work of Mendel in discovering the basis of genetics

Describe the inheritance of the ABO blood groups

What is codominance and multiple alleles

Key word	Definition
Ligase	
Restriction enzyme	
Sticky end	
Genetic engineering	
Selective breeding	

What are the advantages and disadvantages of genetic engineering including ethical issues?

Explain how to insert the human insulin gene into a bacteria using ligase and restriction enzymes

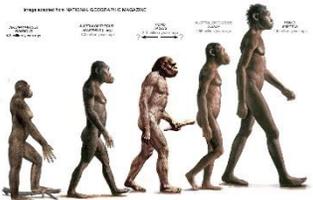
What are the advantages and disadvantages of selective breeding including ethical issues?

Explain, using Darwin's theory of evolution how the giraffe evolved from a common ancestor to the horse.



How do the emergence of bacteria resistant to heavy metals in polluted areas support Darwin's theory of evolution?

Describe the changes in structure during human evolution.



How do you selectively breed a cow to produce lots of meat and a maize plant to tolerate drought conditions?

How do stone tools help us to identify the age of fossils?

What is the difference between the 5 kingdom classification method and the three domain structure?

What other methods can be used to date fossils?

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What are the advantages and disadvantages of selective breeding including ethical issues?

Describe the advantages and disadvantages of using fertilisers on crops

What is tissue culture? What are the advantages?

Describe the advantages and disadvantages of using biological control to control organisms

How do you selectively breed a cow to produce lots of meat and a maize plant to tolerate drought conditions?

How can you use tissue culture to clone a cauliflower?

Key word	Definition

Who was Wallace? What did he believe?

What is the pentadactyl limb?

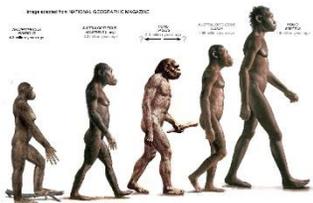
Name the different scientists involved in the theory of natural selection

Explain, using Darwin's theory of evolution how the giraffe evolved from a common ancestor to the horse.



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Other important revision points:

What is the difference between the 5 kingdom classification method and the three domain structure?

How do stone tools help us to identify the age of fossils?

What other methods can be used to date fossils?

Define the terms:  
Pathogen

Communicable

Non-communicable

Describe the features of:

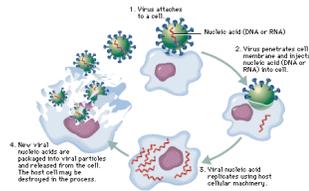
Bacteria

Fungi

Viruses

Protista

Describe the lytic and lysogenic pathway for a virus.



Disease	Type of pathogen	Name of pathogen	Symptoms	Mechanism of spread of disease
Cholera				
TB				
Chalara ash dieback				
Malaria				
HIV				
Stomach Ulcers				
Ebola				
Chlamydia				

STI	HIV	Chlamydia
Cause		
Effect		
Mechanism of spread		
Prevention /treatment		

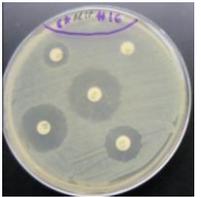
How do these prevent infection in a plant?

Cell wall

Waxy cuticle

Chemicals

What is the method to set this investigation up?



What do these results show?

Why do you do these aseptic techniques?

Keeps lids on –

Work close to a Bunsen –

Use sterile equipment –

What are the physical and chemical defences in the body?

Put these statements in the correct order to describe the specific immune response.

- Lymphocytes divide by mitosis
- Body exposed to an antigen or a pathogen
- These lymphocytes secrete antibodies specific to the antigen
- Selection of the lymphocyte that recognised that specific antigen
- Antibodies bind to the antigen and clear up the infection
- Memory lymphocytes are produced which stay in the body to prevent re-infection

Define these terms:

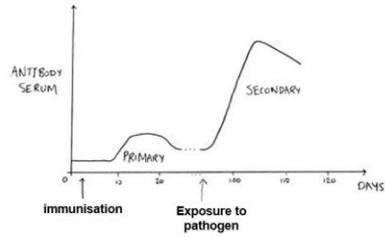
Antigen

B-Lymphocyte

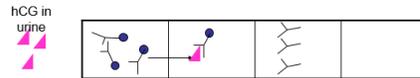
Antibody

Memory lymphocyte

Explain the difference between the primary and secondary immune response



How does a pregnancy test work?



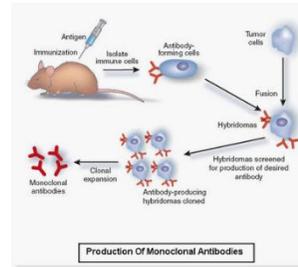
1. Antibodies to hCG with a coloured bead attached
2. Antibodies bind to hCG in urine and move up the strip
3. Antibodies to hCG stuck down in line stick to mobile antibody
4. Coloured beads accumulate in a line.

Calculate the BMI and waist:hip ratio for each person. What do they show?

Sex	Height (m)	Weight (kg)	Waist (cm)	Hip (cm)	Discussion
M	1.85	100	106	101	
F	1.64	68	79	109	

What are the long term effects of obesity?

Explain how monoclonal antibodies are produced.



How are they used for the following?

Locating blood clots	
Locating cancer cells	
Treating cancer	

What are the advantages of using monoclonal antibodies to treat cancer?

What are the long term and short term effects of smoking?

How is cardiovascular disease treated?