

# WJEC (Wales) Biology

## A-level

### Unit 1.6 - Cell division

#### Flashcards

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# What is interphase?



# What is interphase?

- Longest stage of the eukaryotic cell cycle
- Cells grow and synthesise new organelles, proteins and DNA in preparation for mitosis



# What is mitosis?



# What is mitosis?

- Form of cell division
- Produces **two genetically identical diploid** daughter cells



# Why is mitosis important?



# Why is mitosis important?

Important for the growth of tissue and repair and replacement of cells.



Name the stages of mitosis.





Name the stages of mitosis.

- Prophase
- Metaphase
- Anaphase
- Telophase



Summarise the process of mitosis.



# Summarise the process of mitosis.

- **Prophase** = nuclear envelope breaks down, chromosomes condense, centrioles move to opposite poles of the cell
- **Metaphase** = sister chromosomes line up at the equator, centromeres attach to the spindle fibres
- **Anaphase** = sister chromatids separated and pulled apart to opposite poles
- **Telophase** = nuclear envelope reforms, spindle fibres break down, chromosomes uncoil



# What are sister chromatids?



# What are sister chromatids?

A pair of identical chromatids formed by DNA replication, joined by a centromere.



# What is cytokinesis?



# What is cytokinesis?

The division of the cytoplasm at the end of mitosis to produce two new daughter cells.



# Compare mitosis in plant and animal cells.





# Compare mitosis in plant and animal cells.

<b>Animal cells</b>	<b>Plant cells</b>
Occurs in most tissues	Occurs in meristematic cells only
Before mitosis, cell becomes rounded	Cell does not change shape
Involves centrioles	No centrioles involved
Involves microfilaments	No microfilaments involved
Spindle fibres disappear prior to cytokinesis	Some spindle fibres remain during cytokinesis



# What may unrestricted mitosis lead to?



What may unrestricted mitosis lead to?

Cancerous growths.



# What is meiosis?



# What is meiosis?

- Form of cell division
- Produces **four genetically different** daughter cells (gametes) with a **haploid** number of chromosomes
- Involves **two** divisions



# What is the significance of meiosis in reproduction?



# What is the significance of meiosis in reproduction?

Gametes must be haploid so that when they combine during fertilisation, the full number of chromosomes is present within the resulting zygote. It also creates genetic variation.



# What is meiosis I?





# What is meiosis I?

- First stage of meiosis
- **Homologous chromosomes** separated to form **two haploid cells**



Draw diagrams to illustrate the stages of meiosis I.



Draw diagrams to illustrate the stages of meiosis I.

Prophase I



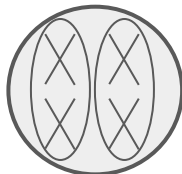
Metaphase I



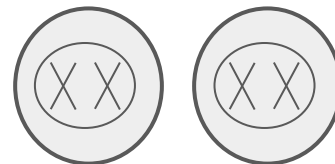
Anaphase I



Telophase I



Cytokinesis →



Describe what happens during meiosis  
I .



## Describe what happens during meiosis I .

1. Homologous chromosomes pair to form **bivalents**
2. **Crossing over** occurs at chiasmata
3. Cell divides into two; **independent segregation** of homologous chromosomes, each cell contains either a maternal or paternal copy



# What are homologous chromosomes?



# What are homologous chromosomes?

- Pair of chromosomes with genes at the same locus
- One maternal and one paternal
- Some alleles may be the same while others are different



Define crossing over.





## Define crossing over.

- Process in meiosis 1
- Homologous chromosomes pair up, their chromatids wrap around one another and their alleles are exchanged at equivalent portions of chromatids
- Creates genetic variation



# What is independent segregation?



# What is independent segregation?

The random separation of homologous chromosomes in meiosis I that produces genetic variation.



# What is meiosis II?



## What is meiosis II?

- Second stage of meiosis
- **Sister chromatids** separated to form **four haploid gametes**

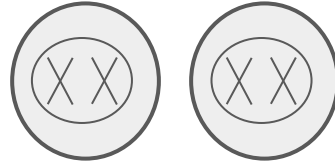


Draw diagrams to illustrate the stages of meiosis II.

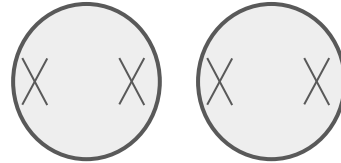


Draw diagrams to illustrate the stages of meiosis II.

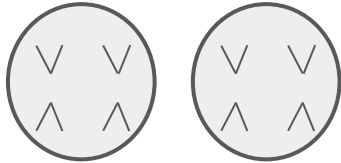
Prophase II



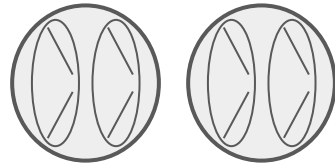
Metaphase II



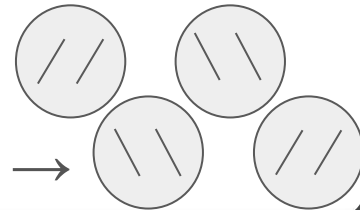
Anaphase II



Telophase II



Cytokinesis →



Describe what happens during  
meiosis II .





Describe what happens during meiosis II .

1. **Independent segregation of sister chromatids**
2. Each cell divides again, producing **four haploid cells**



# How does meiosis produce genetic variation?



# How does meiosis produce genetic variation?

- Crossing over during meiosis I
- Independent assortment of homologous chromosomes and sister chromatids

Results in **new combinations** of alleles



Draw a diagram to show cells after each stage of meiosis.

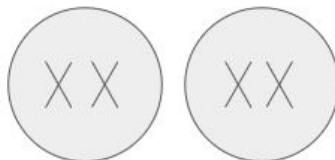


Draw a diagram to show cells after each stage of meiosis.

Parent cell



After meiosis 1



After meiosis 2

