

## Topic 10.1 Meiosis

### 10.1.U1 Chromosomes replicate in interphase before meiosis.

1. State which part of interphase chromosomes replicate in.
2. State the term used to refer to the replicated chromosomes (to avoid confusion the term chromosome is not used) and the protein complex that joins them together with their clone.

### 10.1.S1 Drawing diagrams to show chiasmata formed by crossing over.

3. Draw and label diagrams to show synapsis, chiasma formation and the separation that leads to recombination.

### 10.1.U2 Crossing over is the exchange of DNA material between non-sister homologous chromatids. 10.1.U4 Chiasmata formation between non-sister chromatids can result in an exchange of alleles.

4. Outline the process of crossing over.
  - a. Synapsis
  - b. Chiasma formation
  - c. Separation

### 10.1.U3 Crossing over produces new combinations of alleles on the chromosomes of the haploid cells.

5. Explain the effect of crossing over in terms of genetic diversity.
6. Wildtype is the term used to describe un-recombined chromatids. State the term is used to describe chromosomes that have undergone crossing over.

### 10.1.U5 Homologous chromosomes separate in meiosis I. AND 10.1.U6 Sister chromatids separate in meiosis II.

7. In each part of meiosis (I and II) the amount of DNA in the nucleus is reduced, but in different ways.
  - a. State the phase of meiosis I in which a reduction division take place, i.e. when are the number chromosomes reduced.
  - b. State what is separated by the reduction division.
  - c. State how the amount of DNA in the nucleus does lessens in Meosis II.
  - d. Explain why Meosis II is not classed as being a reduction division.

### 10.1.U7 Independent assortment of genes is due to the random orientation of pairs of homologous chromosomes in meiosis I.

8. Mendel made many advances in genetics through careful observation and statistical analysis.
  - a. State Mendel's Law of Independent Assortment
  - b. What assumption is made for this law to hold true?
  - c. Explain the link between the law of independent assortment and meiosis.

### Making careful observations—careful observation and record keeping turned up anomalous data that Mendel's law of independent assortment could not account for. Thomas Hunt Morgan developed the notion of linked genes to account for the anomalies. (1.8)

9. Morgan's experiments (1909 - 1914) with fruit flies produced results that could not be explained by Mendel's work on heredity as it stood. Explain why his findings were not described as being anomalous and discarded.
10. List the revisions to Mendelian theory made as a result of Morgan's findings.