

# 4.3 GENETIC DIVERSITY AND MEIOSIS

**Changes in the number of chromosomes**

Example - in Down's syndrome, there are three copies of chromosome 21 due to non-disjunction

Can occur in plants

**Polyploidy - having more than one set of chromosomes**

**Chromosome mutations**

Chromosome mutations often arise during meiosis due to chromosome non-disjunction

Produces 4 daughter cells

Each cell has half the number of chromosomes of the parent cell (haploid)

**Meiosis**

**Meiosis I - 1st division**

Produces gametes (egg and sperm cells)

Homologous chromosomes pair up and separate into 2 daughter cells

Independent segregation of homologous chromosomes

**Meiosis II - 2nd division**

Chromatids separate

Crossing over of alleles

New genetic combinations, increased genetic variation

**AQA**

Degenerate nature of genetic code

New codon may code for same amino acid as original codon, so no change in protein

Change to structure and folding of protein

May cause a change in one amino acid

**Base substitution**

Completely different codons and amino acids, and so a different protein is synthesised

May cause a frameshift

**Base deletion**

**Gene mutations**

A change in the base sequence of DNA

Can arise spontaneously during DNA replication in interphase

Can give rise to cancerous cells

All genetically different from each other

4 gametes with 23 chromosomes (for humans)