2.2 DNA Replication

- Cells that make up organisms are always derived from existing cells by the process of division
- Cells division occurs in 2 main stages:

1. Nuclear Division - The process by which the nucleus divides. 2 types mitosis and meiosis
2. Cytokinesis - follows nuclear division and is the process by which the whole cell divides

- Before nucleus divides DNA is copied to ensure all the daughter cells have the genetic information to produce the enzymes and other proteins that they need
- All new cells are genetically identical to mother cell
- Replicates via semi conservative replication

Semi-Conservative Replication

- 4 requirements for it to take place

1. 4 types of nucleotides must be present
2. Both strands of DNA molecule act as a template for attachment of these nucleotides
3. Enzyme DNA Polymerase
4. Source of chemical energy is required to drive the process

Stages

1. Enzyme DNA helicase breaks the hydrogen bonds linking the base pairs of DNA causing the strands of DNA to break
2. DNA helicase completes the separation of the strand meanwhile free nucleotides that have been activated bind specifically to their complementary bases
3. Once the activated nucleotides are bound they are joined together by DNA polymerase which makes a phosphodiester bond (bottom 3 nucleotides) the remaining unpaired bases continue to attract their complementary nucleotides
4. Nucleotides are joined to form a complete polynucleotide chain using DNA polymerase. So 2 identical molecules of DNA are formed. As each molecule retains half of the original DNA material