

2.1.3 Nucleotides and nucleic acids

- (a) the structure of a nucleotide as the monomer from which nucleic acids are made
- To include the differences between RNA and DNA nucleotides, the identification of the purines and pyrimidines, the type of pentose sugar.
- An opportunity to use computer modelling to investigate nucleic acid structure. **PAG10**
- (b) the synthesis and breakdown of polynucleotides by the formation and breakage of phosphodiester bonds
- (c) the structure of ADP and ATP as phosphorylated nucleotides
- Comprising a pentose sugar (ribose), a nitrogenous base (adenine) and inorganic phosphates.
- (d) (i) the structure of DNA (deoxyribonucleic acid)
(ii) practical investigations into the purification of DNA by precipitation
- To include how hydrogen bonding between complementary base pairs (A to T, G to C) on two antiparallel DNA polynucleotides leads to the formation of a DNA molecule, and how the twisting of DNA produces its 'double-helix' shape.
PAG9 HSW3, HSW4
- (e) semi-conservative DNA replication
- To include the roles of the enzymes helicase and DNA polymerase, the importance of replication in conserving genetic information with accuracy and the occurrence of random, spontaneous mutations.
- HSW8
- (f) the nature of the genetic code
- To include the triplet, non-overlapping, degenerate and universal nature of the code and how a gene determines the sequence of amino acids in a polypeptide (the primary structure of a protein).
- (g) transcription and translation of genes resulting in the synthesis of polypeptides.
- To include, the roles of RNA polymerase, messenger (m)RNA, transfer (t)RNA, ribosomal (r)RNA.
- HSW8