*This is the **Higher Combined** version — includes Higher Tier content. Some Separate-only details are omitted.*

DNA is the molecule that carries genetic information. Understanding its structure and organisation is fundamental to genetics and evolution.

- DNA (deoxyribonucleic acid) is a double helix — two strands twisted together.
- Each strand is made of nucleotides. Each nucleotide has a sugar (deoxyribose), phosphate group, and one of four bases: A, T, C, G.
- Complementary base pairing: A pairs with T; C pairs with G. This holds the two strands together.
- A gene is a section of DNA that codes for a specific protein (determines the sequence of amino acids).
- Genes are carried on chromosomes. Humans have 46 chromosomes (23 pairs) in body cells.
- The genome is the complete set of genetic information in an organism.
- The Human Genome Project (completed 2003) sequenced all human DNA — ~3 billion base pairs, ~20,000 genes.

★ **HT** Uses of genome knowledge: identifying genes associated with diseases, developing personalised medicines, understanding evolution.

Key Terms

DNA	Deoxyribonucleic acid — the double-helix molecule carrying genetic information in organisms
Gene	A section of DNA that codes for a specific protein (determines amino acid sequence)
Chromosome	A long, coiled strand of DNA carrying many genes — humans have 46 (23 pairs)
Genome	The complete set of DNA of an organism — all genes and non-coding DNA
Complementary base pairing	A pairs with T, C pairs with G — holds the two DNA strands together

■ **Exam Tip:** Always say the BASES pair: A with T, C with G. If asked how many bases pair with G in a sequence that has 30 C bases, the answer is 30 (each C pairs with one G). Know this for calculation questions.