# DNA, genes and chromosomes

**Nucleotides**

- Deoxyribose
- Phosphate group
- Organic base – guanine, adenine, thymine, cytosine

**Polynucleotide strand**

Two nucleotides join together by phosphate groups via condensation; they form a sugar-phosphate backbone.

**Base pairing**

Two nucleotides with complimentary bases join together by hydrogen bonding.

Guanine Ξ Cytosine (three hydrogen bonds)

Adenine = Thymine (two hydrogen bonds)

These make the DNA molecule stable.

**DNA has two polynucleotide strands**

One strand has a base sequence that is complimentary to the other strand; the two strands run in opposite directions – anti-parallel strands. The two polynucleotides form a double helix formation.

**DNA and the genetic code**

The genetic code is the order of bases in DNA; this sequence determines the sequence of amino acids and the nature of proteins.

A sequence of three bases (base triplet) carries the genetic code for each amino acid.



**Chromosomes**

Each DNA molecule is surrounded by proteins called histones and forms a chromosome. The code for a single polypeptide is called a gene. Non-coding DNA within a gene are called introns and coding DNA is called exons.

| DNA feature | Prokaryotic cells | Eukaryotic cells |
|---|---|---|
| Length | Short – few genes | Long – many genes |
| Shape | Circular | Linear |
| Number of different molecules per cell | One | More than one |
| Non-coding DNA | Absent | Present |

**Meiosis**