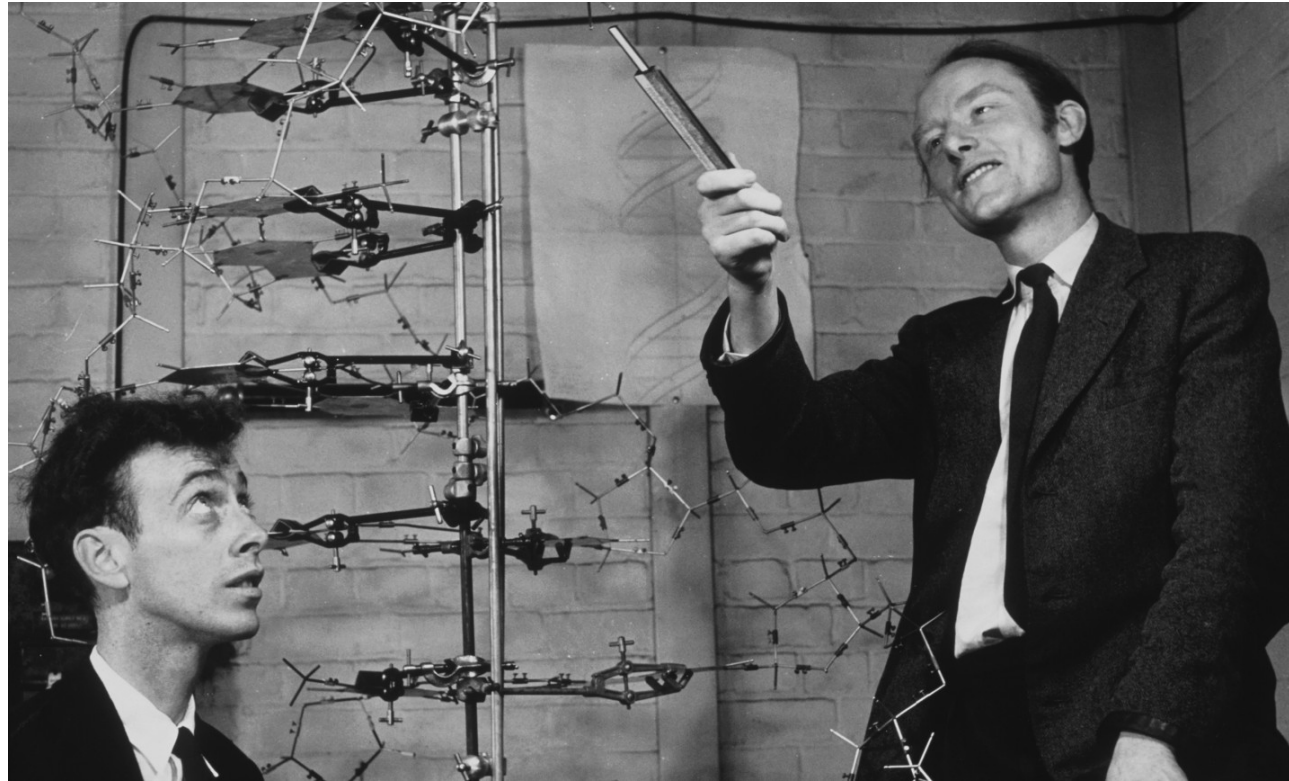
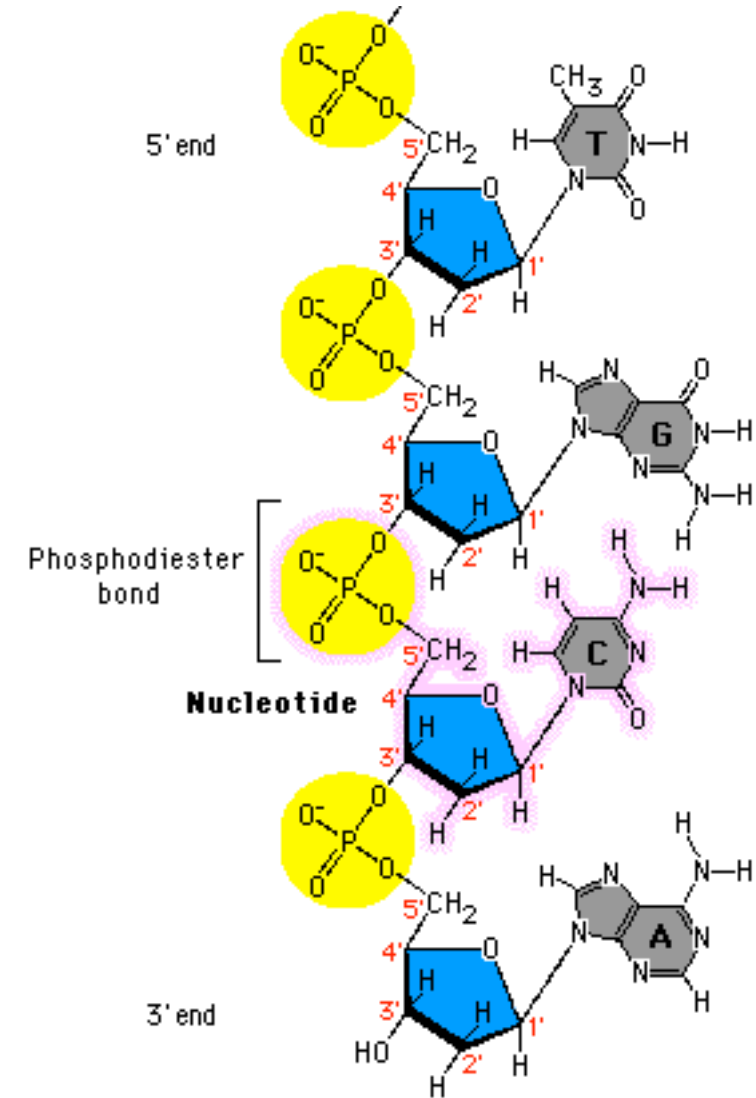


DNA Structure

- DNA which stands for **deoxyribonucleic acid** is the molecular basis of **inheritance**. The development of the model for the structure of DNA was credited to **Watson and Crick** in 1953.

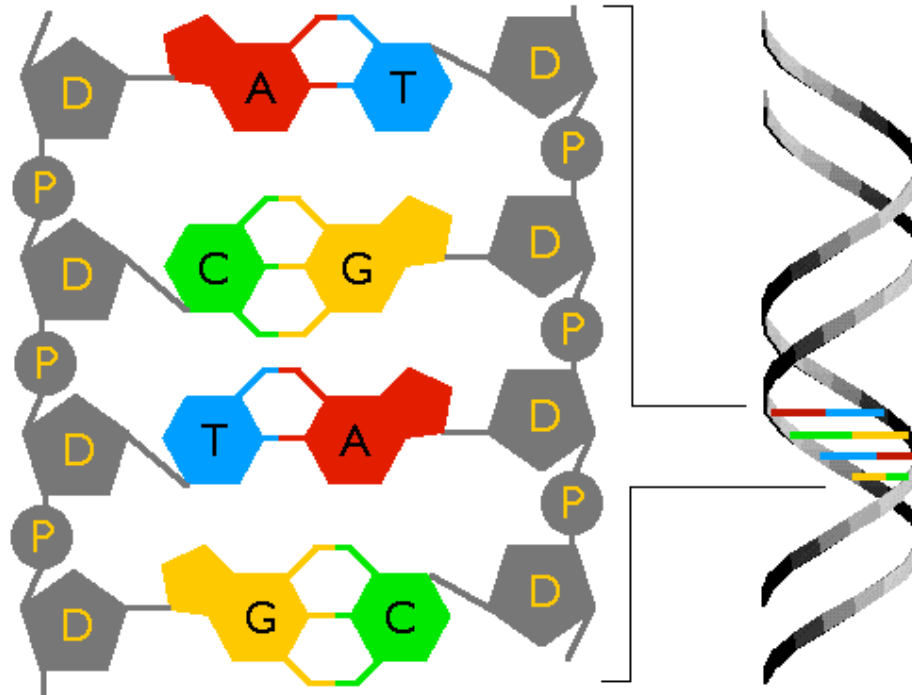


- DNA is a **double-stranded** molecule that forms a **double helix**.
- Each strand is made up of a **sugar-phosphate** backbone and **nitrogenous** bases. The backbone has two distinct ends. One is known as the **5' end** (phosphate) and the other the **3' end** (hydroxyl). This distinction is important when it comes time for DNA replication and protein synthesis.
- Each subunit in the backbone combines with a **nitrogenous** base to form a nucleotide.

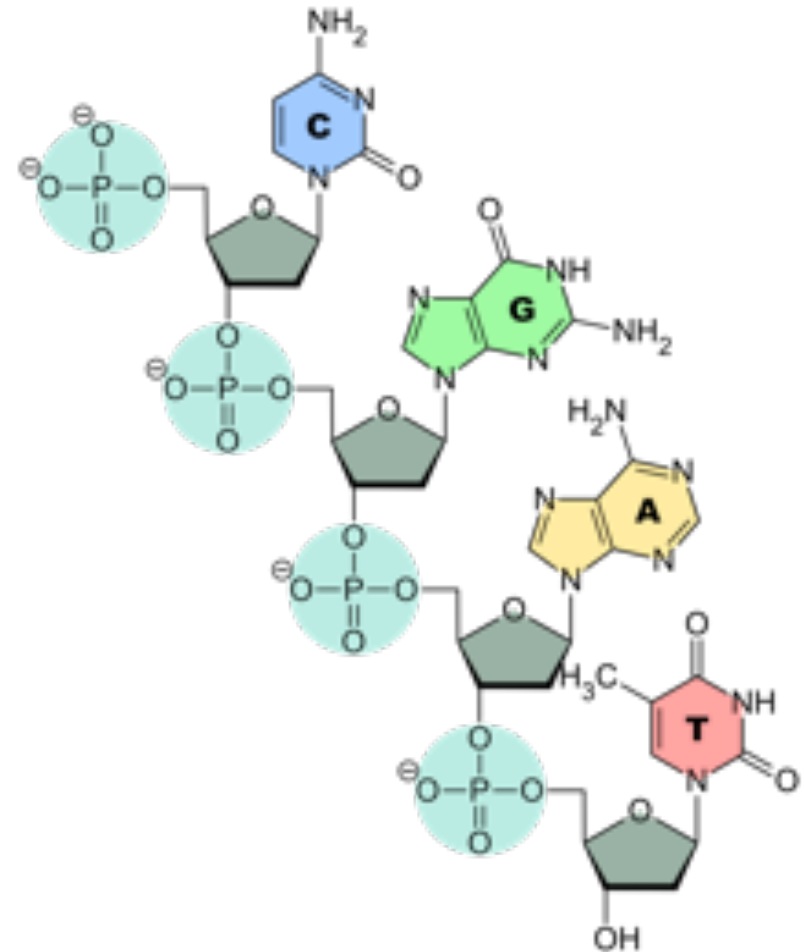


Complementary Base Pairing

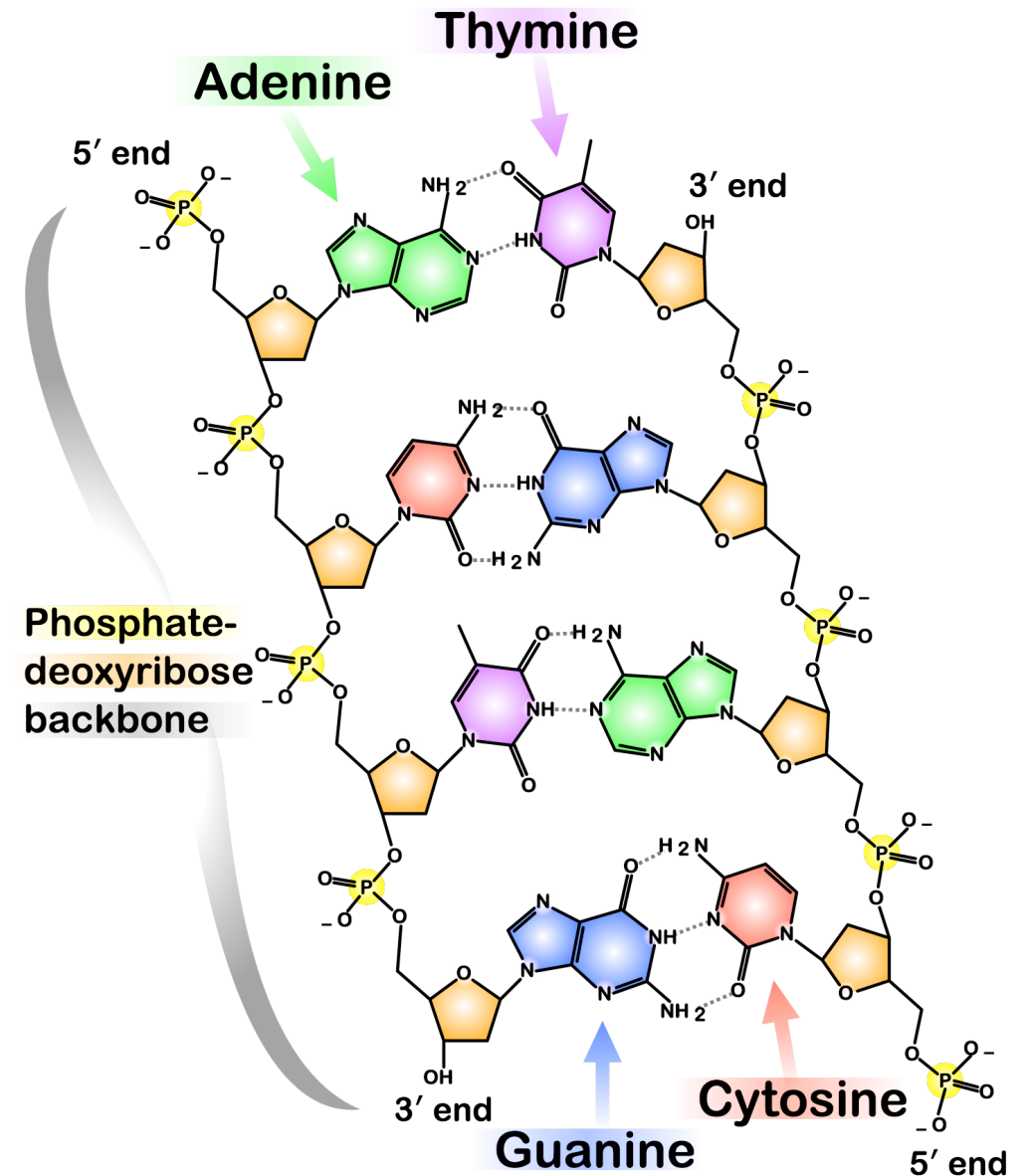
- There are four nitrogenous bases: **adenine**, **guanine**, **cytosine** and **thymine**. They are categorized as **purines** and **pyrimidines**.



- Adenine and guanine are **purines** and have **two** rings while thymine and cytosine are **pyrimidines** that have a **single** ring. Because of the width of these bases, a purine must pair with a pyrimidine in order to keep a consistent **diameter** throughout the DNA helix.

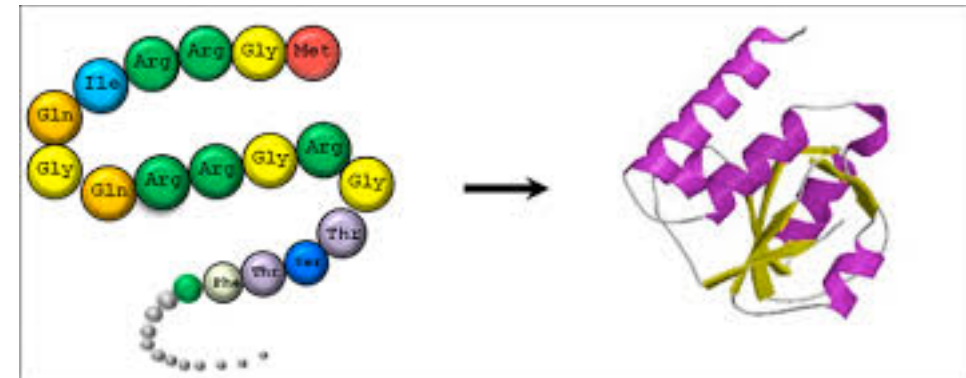
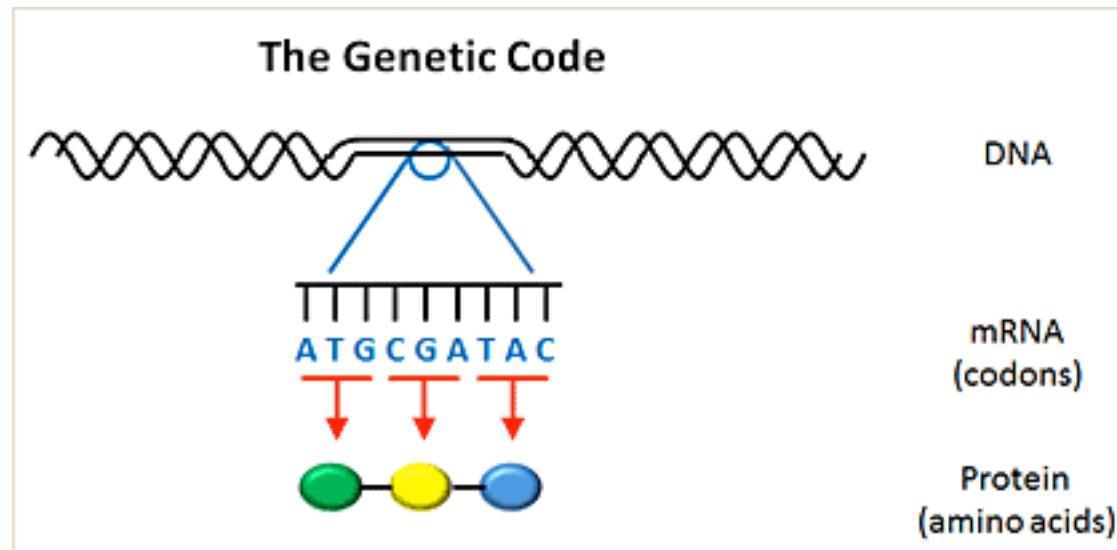


- The bases are joined by a **hydrogen bond**. Adenine can form **two** hydrogen bonds with thymine; guanine forms **three** hydrogen bonds with cytosine. In shorthand, A pairs with T and G pairs with C.



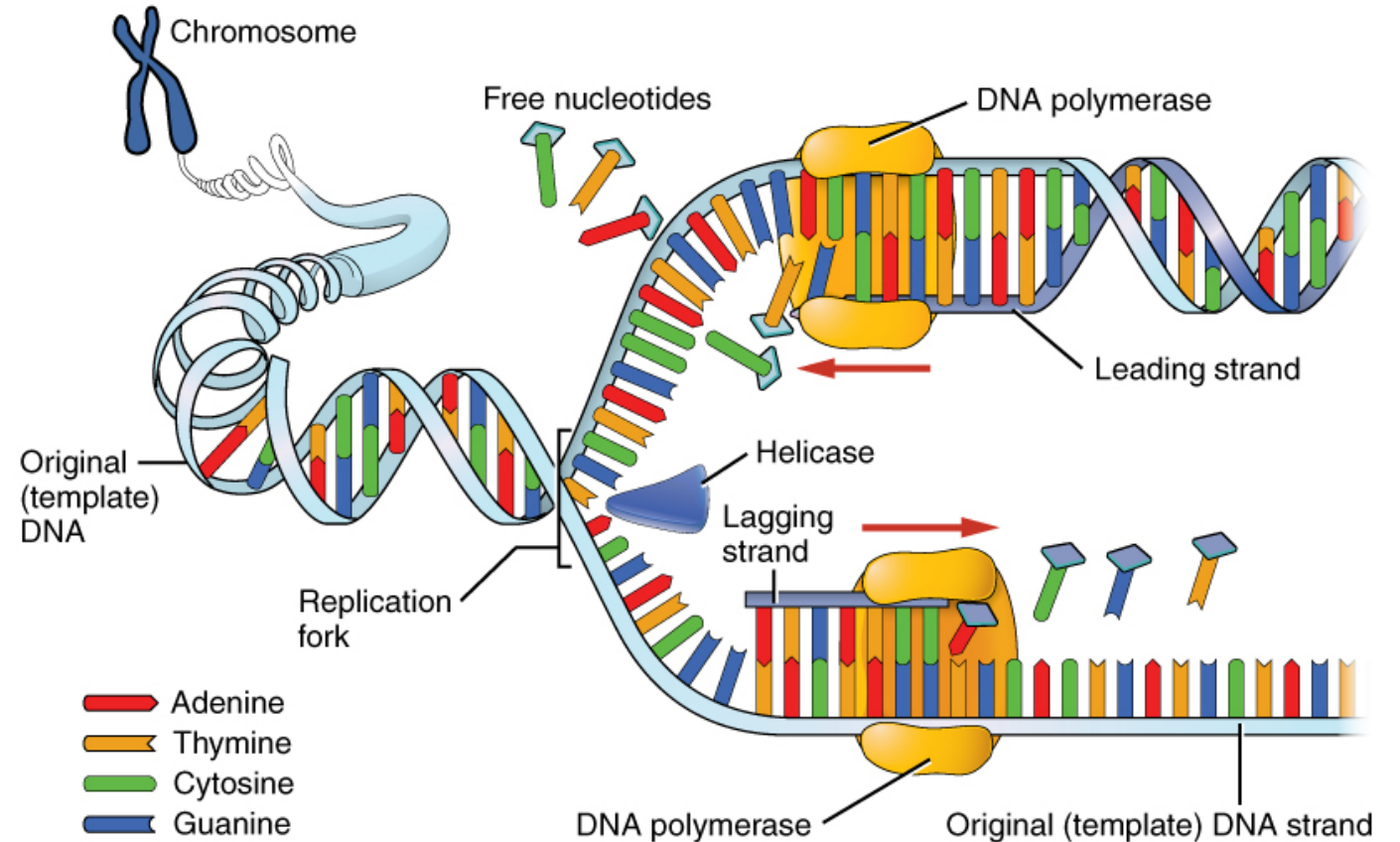
DNA and Evolution

- DNA encodes proteins
- Each group of three nitrogenous bases (codon) forms one amino acid.
- Amino acids string together to form proteins



Evidence for evolution in DNA

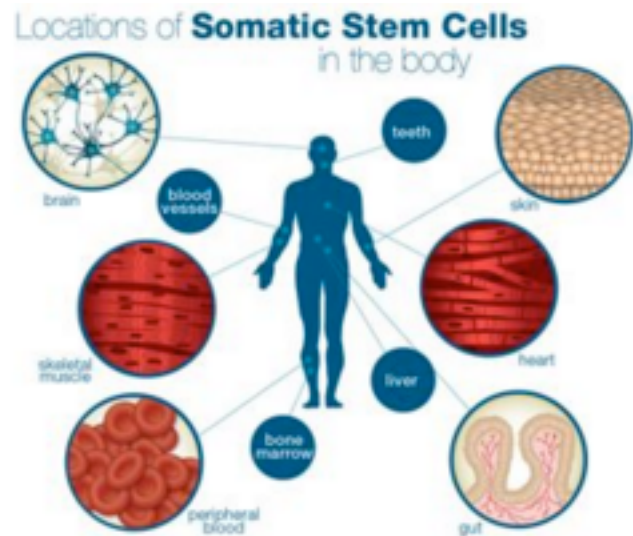
- DNA must be **replicated** in order to be passed on to newly formed cells (cell division)
- Cells have a sophisticated system of ensuring that DNA is copied correctly, but mistakes do occur. These are called **mutations**.



Evidence for evolution in DNA

Somatic cells vs. Gametes

- When mutations occur in somatic cells, offspring are not affected.
- If the mutations happen in gametes or sex cells those mutations do get passed on to the next generation



Evidence for evolution in DNA

- By comparing genetic information (analyzing overlapping sequences) of different species, we can determine which ones are more closely related
- Proteins that are needed for the most basic processes of life are conserved in all species, so those sequences are usually studied most.