The Double Helix

- DNA has 2 polynucleotide strands that are held together by hydrogen bonds. The two strands are coiled together to form a helical structure known as the double helix.
- The polynucleotide backbone is on the outside of the helix, and the bases are on the inside.
- Adenine is always opposite of thymine, and cytosine is always opposite of guanine. This is known as complementary base pairing, and it is fundamental to your understanding of replication, transcription and translation.
Replication

- Replication: It is complementary base pairing that makes replication of DNA possible. The strands separate into 2 polynucleotide chains. Each strand provides a blueprint for the other strand. From this blueprint, the other (complementary) strand can be synthesized.
Transcription

- **Transcription:** The synthesis of RNA from DNA; Very similar to replication of DNA; Short segments of DNA unwind, and a short segment of RNA is synthesized from the DNA template (3’→5’). Once the RNA has been synthesized, the DNA reforms the double helix. This occurs in the nucleus of cells.
Translation

Translation: The process by which the genetic message carried by RNA is decoded and used for protein synthesis. Once synthesized, mRNA passes out of the nucleus to the cytoplasm of the cell where it meets up with rRNA. tRNA is a polynucleotide that brings the appropriate amino acid to the site of protein synthesis (rRNA). When the correct mRNA meets up with the correct tRNA via complementary base pairing between the codon and anticodon, amino acids form peptide bonds resulting in peptide/protein synthesis.