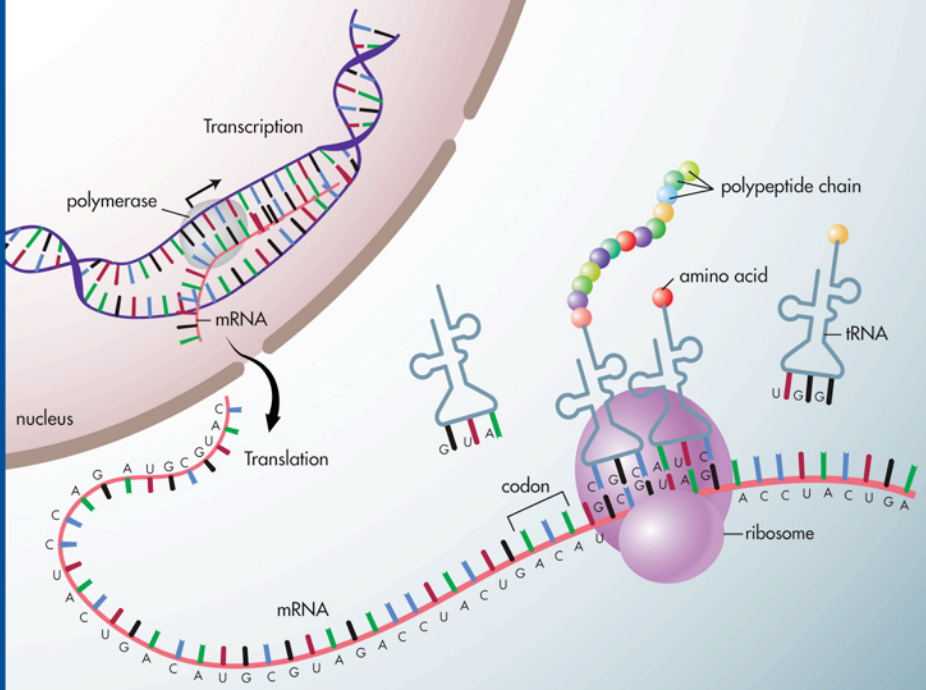
Figure B: Making a Protein



Each nucleotide base (A, C, T, G) along one strand of the double-stranded DNA chain has a complementary base across from it on the other strand. Adenine (A) always attaches with its complementary partner thymine (T). Cytosine (C) always attaches with guanine (G). When the information of a gene is used to make a protein it is first "transcribed" (copied) to a molecule of messenger RNA. The complementary DNA strands "unzip" to expose the coded gene, and a molecular machine known as polymerase makes a complementary strand of mRNA. The mRNA molecules then leave the cell nucleus and move to a ribosome, where codons forming the genetic code specify the particular amino acids that are needed to make the individual protein. The mRNA associated with a ribosome calls for a particular amino acid as determined by the "genetic code" (see Figure A). Each amino acid is brought to the ribosome by another special kind of RNA called transfer RNA (tRNA). These tRNAs are specific for the particular amino acid they carry and recognize the codons along the mRNA. As each amino acid is brought to the ribosome by tRNA and added to a growing polypeptide chain, the ribosome moves further along the mRNA chain to the next codon until the entire sequence is completed. The complete polypeptide chain can then be folded and assembled into a functional protein.