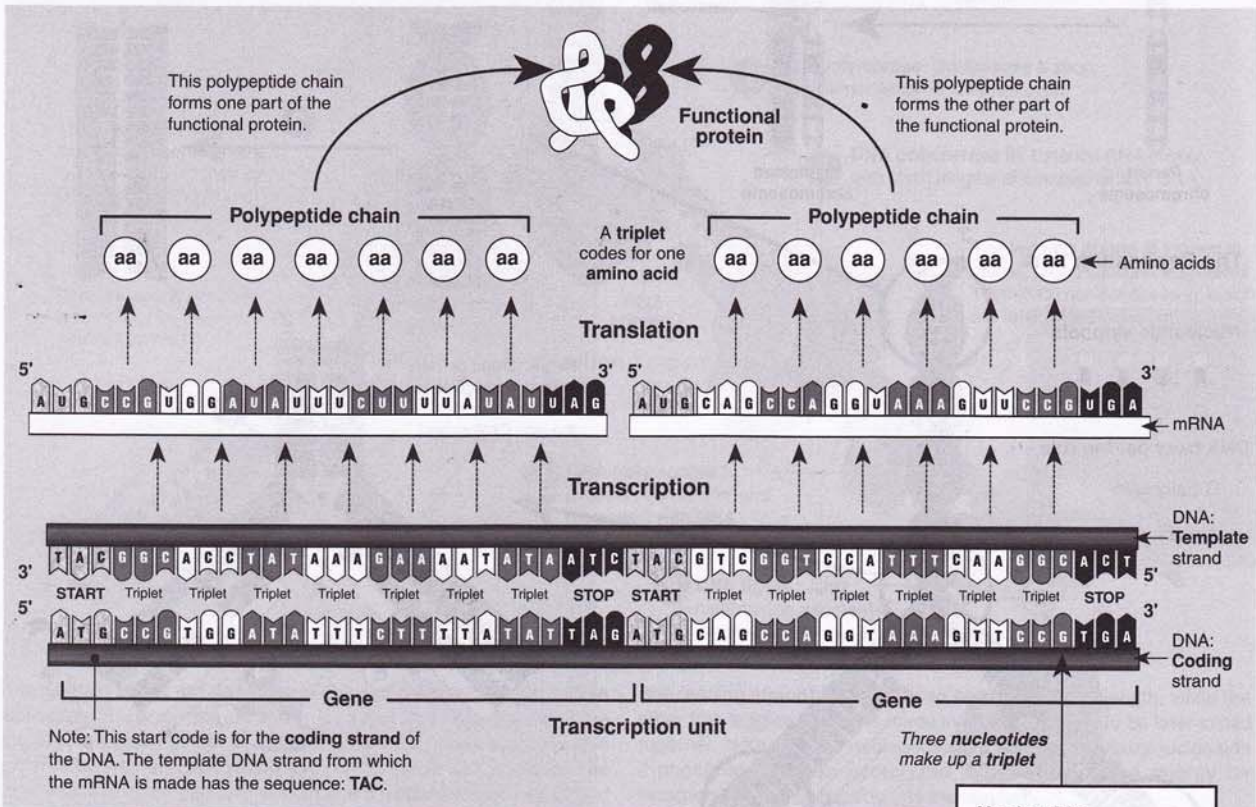


The Simplest Case: Genes to Proteins

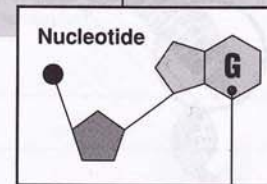
The traditionally held view of genes was as sections of DNA coding only for protein. This view has been revised in recent years with the discovery that much of the nonprotein-coding DNA encodes functional RNAs; it is not all non-coding "junk" DNA as was previously assumed. In fact, our concept of what constitutes a gene is changing rapidly and now encompasses all those segments of DNA that are transcribed (to RNA). This activity considers only the simplest scenario: one in which the gene codes for a functional protein. **Nucleotides**, the basic unit

of genetic information, are read in groups of three (**triplets**). Some triplets have a special controlling function in the making of a polypeptide chain. The equivalent of the triplet on the mRNA molecule is the **codon**. Three codons can signify termination of the amino acid chain (UAG, UAA and UGA in the mRNA code). The codon AUG is found at the beginning of every gene (on mRNA) and marks the starting point for reading the gene. The genes required to form a functional end-product (in this case, a functional protein) are collectively called a **transcription unit**.



1. Describe the structure in a protein that corresponds to each of the following levels of genetic information:

- (a) Triplet codes for: _____
- (b) Gene codes for: _____
- (c) Transcription unit codes for: _____



In models of nucleic acids, nucleotides are denoted by their base letter. (In this case: G is for guanine)

2. Describe the basic building blocks for each of the following levels of genetic information:

- (a) **Nucleotide** is made up of: _____
- (b) **Triplet** is made up of: _____
- (c) **Gene** is made up of: _____
- (d) **Transcription unit** is made up of: _____

3. Describe the steps involved in forming a functional protein: _____

