Name: Date: Block:

The double helix structure of DNA explains how DNA can be copied, but it does not explain how a gene works. Genes are coded DNA instructions that control the production of proteins. How do we get from a **gene** to a **protein**?

**Types of RNA**

1. Most genes contain instructions for assembling amino acids into proteins. The type of RNA that carries copies of those instructions called
2. Proteins are assembled on ribosomes. Ribosomes are made up of two things: proteins and .
3. During the construction of a protein, transports the amino acids to the ribosome as it is specified by the code within mRNA.

**Transcription/Translation**

1. :The process by which a part of DNA is copied into a complementary sequence of RNA.
2. DNA does not leave the of the cell, so the molecule of mRNA is transcribed there.
3. The “language” of mRNA instructions is called the genetic code. The code is written using only four letters: **A,U,C, G.** The genetic code is written three letters at a time, so that each “word” om the code is three bases long. Each three letter “word’ is called a
4. A codon consists of consecutive nucleotides that specify a single amino acid. A series of codons is assembled into a series of amino acids. A chain of connected amino acids is called a .
5. The decoding of an mRNA message into a polypeptide is known as
6. During translation, the cell uses information from messenger RNA to produce proteins. Where does translation take place?
7. Translation begins when an mRNA molecule attaches to a ribosome. As each **codon** of the mRNA strand moves through the ribosome, the proper amino acid is brought into the ribosome by .
8. Each tRNA molecule carries only one kind of amino acid. In addition to the amino acid, each molecule of tRNA has three unpaired bases called the , which are complementary to the mRNA codon.
9. The ribosome makes one bond and breaks one bond for each amino acid that is added to the chain. It makes a bond between the incoming amino acid and the previous amino acid called a bond. Then the ribosome breaks the bond between the tRNA molecule and the amino acid it brought in so that the tRNA can move on, leaving its amino acid behind.
10. Because there are four different bases, there are 64 possible three-base codons (4x4x4=64). Yet, there are only amino acids. Some amino acids can be specified by more than one codon. Four example, 6 different codons code for the amino acid Leucine. There is also one codon **(AUG)** that can either code for the amino acid methionine or serve as the codon. There are three **STOP** codons that signify the end of the polypeptide (like the period at the end of a sentence) and do not code for an amino acid.

**Reflection**

1. Transcription takes place in the and translation occurs at a in the cytoplasm.
2. What is a gene? What does a gene do?
3. What is a transcript? Why do you think the process might be called transcription?
4. What does it mean to translate? Why do you think the process might be called translation?