# Mysterious Monster Lab

Background Information: Genes are the sections of DNA code that determine inherited characteristics, such as hair color or blood type. Genes are a segment of the DNA molecule that determines the structure of proteins, and thus a specific trait.

The sequence of nucleotides in the DNA determines the sequence of amino acids in the polypeptides, and thus the sturcute of the proteins.

In a process called *transcription* (which takes place in the nucleus of the cell) DNA is used to create a messenger RNA (mRNA), using **complimentary base pairing**. The process of *translation* (which happens outside the nucleus) comes next. The mRNA leaves the nucleus, and moves to the ribosome in the cytoplasm of the cell. The code of the mRNA bases is “read” by the ribosome, and the proper transfer molecules (tRNA) are added, one at a time. These transfer molecules add the amino acids they carry to the growing polypeptide chain.

In this investigation, the student will simulate the mechanism of protein synthesis and thereby determine the traits inherited by their fictitious organism called the Mysterious Monster (MM) whose cells contain 7 genes. Each of which is responsible for a certain trait.

**Procedure:**

For each trait:

1. **Determine your DNA**
   1. Open the “Variety in the Monster Population” document. This contains all the possible genes for each trait
   2. For each trait, **use a random number generator** (or a dice with the same number of sides as there are possible versions of that gene) **to determine your monsters genes**
   3. **The number your roll determines which gene you have. Roll a new number for each trait!**

For example: I roll a 4 for Hair Color, and a 3 for legs. I use “Hair 4” and “Leg 3”

* 1. **Write your DNA letters into your Monster Genetics worksheet for each trait**

1. **Determine your RNA**
   1. **Use base pairing rules** to write your mRNA strand below each DNA strand in your Monster Genetics worksheet
   2. REMEMBER, THERE IS NO “T” IN RNA. **An “A” on the DNA pairs with a “U” on the mRNA!**
2. **Determine your Amino Acids**
   1. Use one of the **codon charts** linked to figure out the amino acids for each trait
   2. Write the amino acids below the mRNA for each trait
3. **Determine your Traits**
   1. Use the chart in the “Variety in the Monster Population” document to figure out which traits your amino acid chains code for!
   2. Each string of amino acids codes for a specific version of a trait.
   3. If you do not find your amino acid sequence, then you made a *mutation* and need to go back and correct your mistake.

**Then:**

1. Draw your monster in the space provided in the Monster Genetics Worksheet
2. Answer the Problem Questions