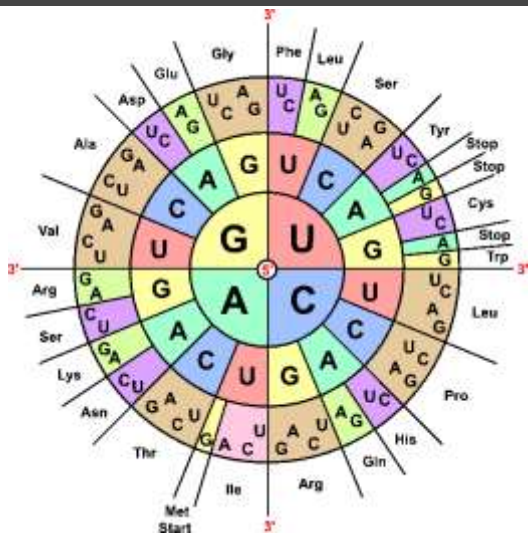
DNA & Proteins Unit - Summative Assessment

Background: Fireflies are able to glow because their cells produce a protein called *luciferase*. When luciferase binds with ATP and another molecule, it changes chemical energy into light energy.

1. One of the traits of the firefly is light production. **What is the relationship between the firefly's DNA, the proteins produced in their cells, and the light-production trait?** *(Use all underlined terms)*
2. DNA is a macromolecule that is made from repeating units of three molecules. **Describe each of these molecules and explain how they enable DNA to function.**
3. **Summarize the function of helicase and DNA polymerase during DNA duplication.**
4. **What happens to the *luciferase* gene during transcription?** Explain using: *Polymerase, DNA, mRNA.*
5. **How do the firefly's cells assemble the *luciferase* protein during translation**? Include and underline the following: *mRNA; ribosome; tRNA; amino acids.*

The luciferase protein consists of 547 amino acids. This shows the first 17 amino acids as well as a portion of the gene and mRNA used to assemble them.

A	TAC CTT CTA CGC TTT TTG TAA TTT TTT CCG GGC CGC GGC AAA ATA GGC GAC
B	AUG GAA GAU GCG AAA AAC AUU AAA AAA GGC CCG GCG CCG UUU UAU CCG CUG
C	MET GLU ASP ALA LYS ASN ILE LYS LYS GLY PRO ALA PRO PHE TYR PRO LEU



6. **What do rows A, B, and C represent in the image above?**
7. **If the 15th codon (ATA) were changed to ATT, what would be the most likely outcome? How would this change affect the traits of the firefly?**