Lab: Protein Synthesis

Purpose: To allow students the opportunity to see the roles of messenger RNA, DNA, transfer RNA, DNA and ribosomes in the process of protein synthesis as well as how minor changes in the genetic message may cause major effects (mutations) on the finished product

Procedure:

1. Students are in groups of 2
2. ~~Send one~~ Both members of the group up to the board (which will symbolize the nucleus) to make an exact copy (replicate) of the DNA that is assigned to them. *model how to copy DNA
3. Take your DNA strand back to ~~your group~~ the index cards w/ your # and transcribe the DNA strand into a messenger RNA strand. (remember mRNA has uracil instead of thymine)
4. Students then take their transcribed mRNA and break the mRNA message into 3 nucleotide subunits (codons) *Tell them to break it up at the DNA part.
5. The messenger RNA needs to travel to the ribosomes (lab tables) to make the proteins. Your mRNA will act like a template (pattern) for making proteins.
6. The index cards you find on the lab tables will have various anti-codons on the front and a single letter of the alphabet on the back. These represent transfer RNA with their respective amino acid on the back.
   tRNA code -> Amino Acid on back
7. Assemble your protein (translation) by using your mRNA codons to find your tRNA anti-codons on the cards. The protein is symbolized by the message you get from the letters, which are on the back of the cards.

Letters come together to form the phrase.

Phrase = protein

***Hints: (Codon) (Anti-codon)

DNA	mRNA	tRNA	Amino Acid
GCA	CGU	GCA	A
TTA	AAU	UUA	B

Summary Questions

1. What structure in the cell did the board represent?
2. What structure in the cell did the lab benches represent?
3. What do the single letters on the back of the index cards represent in the cell?
4. What do the sentences that you constructed represent in the cell during protein synthesis?
5. What is the function of the messenger RNA in the process of protein synthesis?
6. What is a group of three mRNA nucleotide subunits called?
7. What is the group of three tRNA nucleotide subunits called?
8. What is the Central Dogma (the order of making proteins)?