**Protein Synthesis Race –** [**https://www.biomanbio.com/HTML5GamesandLabs/LifeChemgames/protsynthracehtml5page.html**](https://www.biomanbio.com/HTML5GamesandLabs/LifeChemgames/protsynthracehtml5page.html)

**Race to build a protein in this fun game about protein synthesis. Learn about transcription and translation as you build a protein the same way that a real cell does!**

Transcription:

1. Transcription is the copying of a \_\_\_\_\_\_\_\_\_ (section of DNA).
2. The following DNA nitrogen bases (found in nucleotides) match up to make the rungs of the DNA ladder:
   1. T: \_\_\_\_\_
   2. A: \_\_\_\_\_
   3. C: \_\_\_\_\_
   4. G: \_\_\_\_\_
3. For transcription to occur, DNA must \_\_\_\_\_\_\_\_\_\_\_\_\_.
4. \_\_\_\_\_\_\_\_\_\_\_\_ polymerase is used to add new RNA nucleotides to make RNA.
5. In transcription, which bases match up?
   1. U: \_\_\_\_\_
   2. A: \_\_\_\_\_
   3. C: \_\_\_\_\_
   4. G: \_\_\_\_\_
6. The mRNA will release from the DNA and to the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, the site of protein synthesis.
7. For the game, use the directional keys/arrows to move the mRNA down and out of the nucleus.
8. Both DNA and RNA are made of building blocks called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
9. The enzyme that adds new nucleotides to build mRNA is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
10. DNA has \_\_\_\_\_ strands and mRNA has \_\_\_\_\_ strand of nucleotides.
11. The function of mRNA is to:
12. DNA \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ after transcription.

Translation:

Look at the mini-codon chart in the upper right corner.

1. How many nucleotides make up a codon (section of mRNA): \_\_\_\_\_\_\_\_\_
2. The “start” codon is \_\_\_\_ - \_\_\_\_ - \_\_\_\_\_\_
3. A protein is a chain of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ also called a polypeptide.
4. Each codon codes for an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Here is the mRNA sequence. Write the matching tRNA “anticodons” then play the game.

tRNA

mRNA AUG – UCA – AUG – UCA – AAA- GAC – CGA – AAA – GAC – CGA – UCA – AUG – AAA – UGA

What happens to the tRNA after it brings the amino acids to the ribosome?

Quiz:

1. Define “translation”;

Match the following terms:

\_\_\_\_\_\_ 2. Translation A. triplets of tRNA

\_\_\_\_\_ 3. mRNA B. brings amino acids to the ribosome

\_\_\_\_\_\_ 4. tRNA C. copies DNA code to take it from the nucleus to the ribosome

\_\_\_\_\_\_ 5. Codons D. triplets of mRNA

\_\_\_\_\_\_ 6. Anticodons E. another name for a protein

\_\_\_\_\_\_ 7. Polypeptide F. building blocks of proteins