NAME: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

DATE: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

CLASS: \_\_\_\_\_\_\_\_\_\_\_

Protein Synthesis: Transcription

**VOCAB REVIEW:**  Define each word using your textbook. (We will go over in class, once you have completed it.)

* DNA-
* RNA-
* Nucleotides-
* Ribosome-

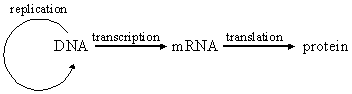
**Fill in the blank:**

A \_cell\_ is a dynamic, living chemical factory which requires precise control. The \_DNA\_ of a cell exerts control over cellular events by manufacturing \_proteins\_ through the process called \_protein synthesis\_. Many of these proteins are \_enzymes\_ and because each type of enzyme has a particular and specific shape, each will catalyze a specific \_reaction\_ in the cell.

proteins reaction cell protein synthesis enzymes DNA

**What is Protein synthesis?**

Protein synthesis involves two specific steps. The first main step, called transcription, involves the production of an mRNA molecule using DNA as a template. The second step, called translation, occurs at the ribosomes. It involves lining up the proper amino acids in the specific order needed to form a protein molecule. The amino acids are then joined together to form the protein. Because of its amino acid make up, each type of protein will thus have a specific shape.



**Transcription:**

Transcription is the process of making an mRNA molecule using a DNA segment as a template.

**DNA vs RNA**

|  |  |  |
| --- | --- | --- |
|  | **DNA** | **RNA** |
| **Sugar:** | deoxyribose | ribose |
| **Bonds with Adenine:** | thymine | uracil |
| **# of Strands:** | two | one |

Procedure-

1. Complete the following 5 examples to produce 5 double stranded DNA molecules with your partner using the notecards provided. Now, separate the double stranded DNA molecules you have made. (Move a single DNA strand to another part of your desk for later use). Using the single DNA strand you just made, produce an mRNA strand from the nucleotides in the envelope provided.

Remember that in DNA: A pairs with T, and G pairs with C

Remember that in RNA: A pairs with U, and G pairs with C

**Write your answers down below in the spaces provided.**

1. After the mRNA is produced, it detaches and moves outside the nucleus. Move your mRNA to a ribosome area on your table and close the DNA helix again. This concludes the process of transcription.
2. ATG AAA AAC AAG GTA CAC ATC TAG
3. ATG AAA AAC AAT TGC ACG TAG
4. ATG TAA ACC ACT ACA TAG
5. ATG AGA AGT AGG AGA AGC ATA ATC TAG
6. ATG ATT CAA CAC ATC CAG CCA CAT TAG

DNA strand sequences:

1. TAC TTT TTG TTC CAT GTG TAG ATC

1. TAC TTT TTG TTA ACG TGC ATC

1. TAC ATT TGG TGA TGT ATC
2. TAC TCT TCA TCC TCT TCG TAT TAG ATC

1. TAC TAA GTT GTG TAG GTA GGT GTA ATC

mRNA strand sequences:

1. AUG AAA AAC AAG GUA CAC AUC UAG
2. AUG AAA AAC AAU UGC ACG UAG
3. AUG UAA ACC ACU ACA UAG
4. AUG AGA AGU AGG AGA AGC AUA AUC UAG
5. AUG AUU CAA CAC AUC CAG CCA CAU UAG

**Post activity questions for discussion:**

1. Did you notice how every strand of DNA begins with TAC? Why do you think this is?
2. Did you notice how every strand of DNA ends with ATC? Why do you think this is?
3. How does this translate in mRNA terms?