**Protein Synthesis Race WebQuest Game**

**Prior Knowledge**: Before beginning the game, use the Learning Scale below to rate your knowledge of protein synthesis. Place a check in the before box. Re-rate yourself after you play the game.

|  |  |  |
| --- | --- | --- |
| **Rating Before You****Play** | **Learning Scale** | **Rating After You****Played** |
|  | **4** I can teach to others the process of protein synthesis, and explain how enzymes and protein are formedthrough the processes of transcription and translation. |  |
|  | **3** I can explain the process of protein synthesis and explain how enzymes and protein areformed through the processes of transcription and translation. |  |
|  | **2** I can describe some of the process of protein synthesis and define transcription and translation. |  |
|  | **1** With help, I can identify some of the process of protein synthesis. |  |
|  | **0** I do not understand the process of protein synthesis, but I plan to learn more in order to understand it. |  |



# Task: Protein Synthesis Race Video Game:

1. Become a protein builder! Click on the link to access the Protein Synthesis Race Video Game at the BioMan Biology Website.

<https://biomanbio.com/HTML5GamesandLabs/LifeChemgames/protsynthracehtml5page.html>

1. Click “Start a New Game” to begin.
2. Read all the game instructions and follow the directions to complete the game. As you complete the game, answer the questions on this handout.

# Transcription In the Nucleus

1. Transcription is the process of copying a gene to create
2. Transcription is the first process that must happen in order to make a
3. In order for transcription to happen, DNA must
4. How many strands of DNA are used for transcription?
5. Will you be playing with the top or bottom strip of DNA?
6. What is the name of the enzyme used to make RNA nucleotides?

*\*\*Helpful Hint! Transcription is different than DNA base pairing! In transcription, the RNA nucleotide Adenine pairs with DNA nucleotide Thymine, and DNA nucleotide Adenine pairs with the RNA nucleotide Uracil. The Cytosine still pairs with the Guanine.*

1. What type of molecule did you create when you transcribed all of the nucleotides?
2. What does the messenger RNA (mRNA) do?
3. What happens to the DNA molecule after transcription?
4. Where does the messenger RNA have to travel to after transcription?

*Transcription - Did You Get It?*

Answer the 9 multiple choice questions in the game.

Write down your score here

# Translation in the Ribosome

1. A protein is a chain of
2. The of amino acids in the chain and the of the chain determine what kind of protein it will be.
3. Codons are triplets of nitrogenous bases on mRNA that code for a specific
4. Which type of RNA is responsible for translation of mRNA?

*\*\*Hint! Look at the chart at the upper right of the screen to see what codons code for which amino acid! Pick up the complementary tRNA anticodon to pair with the mRNA codon. When you are pairing the two codons, look at the mRNA code to pair with the correct amino acid color. Use the black line above the tRNA to pick up the correct color. Each code for amino acids is a specific color!*

1. What is another name of a chain of amino acids?
2. What happens to the ribosome after translation?
3. What does the shape of a folded polypeptide indicate?

*Translation - Did You Get It?*

Click on the correct term where the arrow or bracket is indicating. How many did you get correct?

Answer the 8 multiple-choice questions. Write your score here: \_\_\_\_\_\_\_\_\_\_



1. In 4 or more complete sentences, describe the process of protein synthesis and explain how transcription and translation create proteins.
2. Draw a diagram of mRNA and tRNA during the process of translation. Label codons, anticodons, tRNA, mRNA, ribosome, and polypeptide in your diagram.

LINK #2 <http://www.diffen.com/difference/DNA_vs_RNA>

Objective: The purpose of this assignment is to give you a better understanding of how the message found on a molecule of DNA is used to build a protein.

Use the information in the table to complete the following comparison table:

|  |  |  |
| --- | --- | --- |
|  | DNA | RNA |
| A. Structure: How many strands are in each nucleic acid molecule? |  |  |
| B. Structure: What sugar is found in each nucleic acid molecule? |  |  |
| C. Base-Pairing: What are the base pairing rules in each nucleic acid molecule? |  |  |
| D. Location: Where in the cell can each nucleic acid molecule found? |  |  |
| E. Stability: How easy is it for an enzyme to attach each nucleic acid molecule? |  |  |
| F. Unique Features: Describe how UV light affects each nucleic acid. |  |  |

20. Scroll down until you see the section titled “Function.” Describe the functions of the 3 types of RNA. Don’t be basic!

Remember, half an answer only gets half the credit.

A. Messenger RNA (mRNA): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

B. Transfer RNA (tRNA): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

C. Ribosomal RNA (rRNA): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Link 3- General Information about Proteins <https://learn.genetics.utah.edu/content/basics/proteins/>

21. Proteins make up \_\_\_\_\_% of the dry weight of a human body.

22. What single protein holds our hair, skin, nails and bones together? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

23. a. Proteins are made of building blocks called \_\_\_\_\_\_\_\_\_\_\_\_\_\_ acids.

 b. How many amino acids are used to build our proteins? \_\_\_\_\_

24. List the 6 high protein foods described on the website:

 1.

 2.

 3.

 4.

 5.

 6.

25. What happens to a protein when we eat it?

26. How are the amino acids reused?