DNA, RNA, and Protein Internet Worksheet

Today we are going to be using an Internet resource to explore some of the ins and outs of transcription and translation. Open your web browser and go to this address:

http://learn.genetics.utah.edu

Under the heading BASICS, click on button titled “Tour the Basics.” At the top of the blue window, click on the button called “What is DNA?” Use the NEXT and PREVIOUS buttons to advance through the presentation, and use the information to answer the following questions.

1. What instructions are found in the nucleus of every cell?

2. What does DNA look like?

3. What are the letters of the bases? Which letters bond together? What holds the bases together?

4. What is the backbone made of?

5. What do genes do?

6. What are the names of the bases?

After you have answered the questions above, go back to http://learn.genetics.utah.edu. Under the heading BASICS, click on button titled “DNA to Protein.” On the block titled “DNA and Genes,” click on the words “Build a DNA Molecule.” In this activity, you will be matching complimentary base pairs on a DNA strand to simulate DNA replication.

After 16 matches, answer the following question:

7. How long would it take to transcribe the DNA in one cell?
After you have answered the questions above, go back to
http://learn.genetics.utah.edu. Under the heading BASICS, click on button titled
“DNA to Protein.” Click on the words “Transcribe and Translate a Gene”, in the
middle column of the page. Click on “Click Here to Begin”. The first thing you will
have to do is match base-pairs to make a strand of mRNA from a DNA template.
Record your work below. Start by filling out the given DNA sequence on the lines
next to “DNA”, and then fill in the complementary mRNA sequence.

DNA __ __ __ __ __ __ __ __ __ __ __ __ __ __ __ __ __ __ __ __
mRNA sequence:
 __ __ __ __ __ __ __ __ __ __ __ __ __ __ __ __ __ __ __ __

Next, you are going to be using the mRNA you just made as a template to make a
protein. The first thing you have to do is to identify the start codon. Once you do
that, you will need to find the amino acid that correlates with each codon of the
mRNA. You do not need to find the anti-codon sequence, just match the codons of
the mRNA. Record the amino acids that in order below.

Congrats! You just made a protein. Now it’s time to explore how a protein works. Go
back to the address at the top of this page. Next, click on “What makes a Firefly
Glow?” As you watch the simulation, answer the questions below. Answers can be
found in the text next to the animation.

What is the name of the gene that causes the firefly to glow? ___________________________
What is the name of this process and why? ____________________________
________________________________________________
________________________________________________________________________________

Where does the mRNA go once it is made? ____________________________

What recognizes the mRNA? ____________________________

What is the name of the enzyme that is made? ____________________________

What is the name of this process and why? ____________________________
________________________________________________

What has to happen to make the enzyme function?

________________________________________________
What does the enzyme have to bind to? ________________________________

Please describe the chemical reaction that takes place:
________________________________________________________________________________
________________________________________________________________________________
________________________________________________________________________________

What is the light used for?
________________________________________________________________________________