

Name:

Date:

Period:

Biology: DNA

Transcription and Translation Activity

Background: DNA is copied through a process called replication. Turning the messages, or genes, from DNA into an actual protein requires two steps: transcription and translation. Transcription is the process of making a mRNA copy of the DNA gene you want, and translation is the process of making a protein from the mRNA strand. You will be using the same manipulatives kit that you used for the DNA replication activity.

Part 1: Transcription

1. Each lab group will have 4 different DNA sequence strands. Get one of the strands and write your DNA sequence down below:
2. Now, get a green 'blank' strip. Using your base pair rules for RNA, make a mRNA copy of your DNA strip. Write the results below:
3. Once your group has completed all of their mRNA strands, answer the first set of activity questions and wait for your teacher to check your work.

Part 1 Analysis questions:

1. Why is the pre-printed DNA strand you received called the 'sense' strand?
2. Why are the bases separated into groups of three? What are these groups called?
3. What enzyme makes the mRNA copy of the DNA?
4. Where does the messenger RNA strand go when the copy is finished?
5. Why do you think this step is called transcription?

Part 2: Translation

1. Using your mRNA strand, create a tRNA (blue) that has the correct anticodon for each codon. Record your anticodons below in the correct order
2. The amino acid chart uses codons, NOT anticodons, for identifying the correct amino acids. Match your tRNA molecules up to your mRNA chain. Use the codons on the mRNA chain to identify which amino acid should be delivered by which tRNA. Write the correct amino acids on the yellow polypeptide chain. Record your results below.
3. Once your group has completed all of their polypeptide chains, answer the second set of activity questions and wait for your teacher to check your work.

Part 2 Analysis questions

1. What is the difference between a codon and an anticodon?
2. Can all tRNA molecules carry the same amino acids? Explain.
3. Where do the amino acids in our body come from?
4. What organelle assembles the amino acids brought by the tRNA molecules?
5. Why do we call the yellow strand a polypeptide and not a protein?
6. What would happen to the protein if the fourth base in the DNA sequence was removed?
7. Practice: Write down the mRNA codons, tRNA anticodons, and amino acids for the DNA sequences below:
 - a. DNA: ATC TTA GAG CCA AAA CAG
mRNA:
tRNA:
amino acid:
 - b. DNA: ATC GGC CCG AAT TTC GTC
mRNA:
tRNA:
amino acid: