

**Topic:** Protein Synthesis Worksheet

**Summary:** Students will practice DNA and RNA base pairing to build a polypeptide. Students will also answer questions about transcription and translation and the central dogma of molecular biology.

**Goals & Objectives:** Students will be able to apply base pairing rules for DNA and RNA. Students will be able to explain the basics of transcription and translation.

**Standards:** CA Biology *1d. Students know* the central dogma of molecular biology outlines the flow of information from transcription of ribonucleic acid (RNA) in the nucleus to translation of proteins on ribosomes in the cytoplasm. *4b. Students know* how to apply the genetic coding rules to predict the sequence of amino acids from a sequence of codons in RNA.

**Time Length:** 30 minutes

**Prerequisite Knowledge:** Students know the basics of transcription and translation.

**Materials:**

- Textbook for reference
- Handouts and pencils
- Have the CODON TABLE as a separate sheet so students have easy access.

**Procedures:**

1. Students work on the handout by themselves.

**Accommodations:** Students with an IEP can take the handout home if they need extra time, and/or do only the first page of the two page assignment.

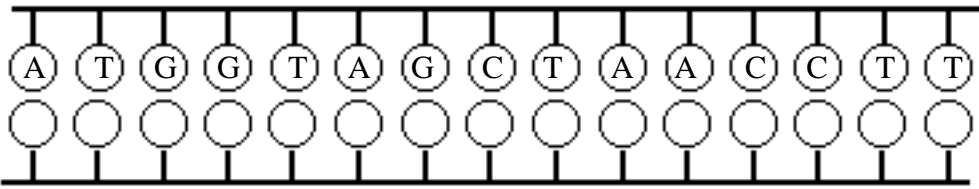
**Evaluation:**

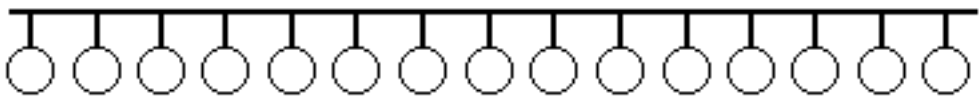
Each numbered question is worth 1 point for a total of 24 points.


## Protein Synthesis Worksheet


Directions:

- 1<sup>st</sup> Fill in the complimentary DNA strand using DNA base pairing rules.
- 2<sup>nd</sup> Fill in the correct mRNA bases by transcribing the bottom DNA code.
- 3<sup>rd</sup> Translate the mRNA codons and find the correct amino acid using the Codon Table
- 4<sup>th</sup> Write in the amino acid and the correct anti-codon the tRNA molecule.
- 5<sup>th</sup> The answer to the questions about protein synthesis below the amino acids.

1.  **DNA**

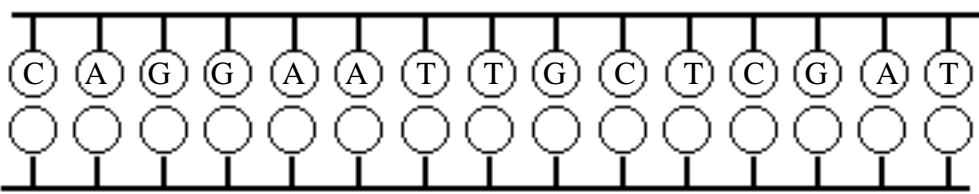
2.  **mRNA**

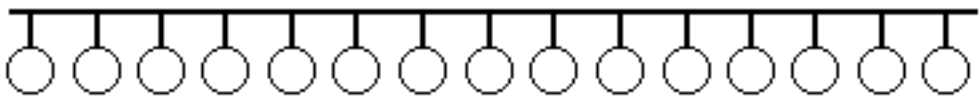
3.  **tRNA**


4.  **Amino Acids**


5. mRNA is synthesized in translation or transcription?

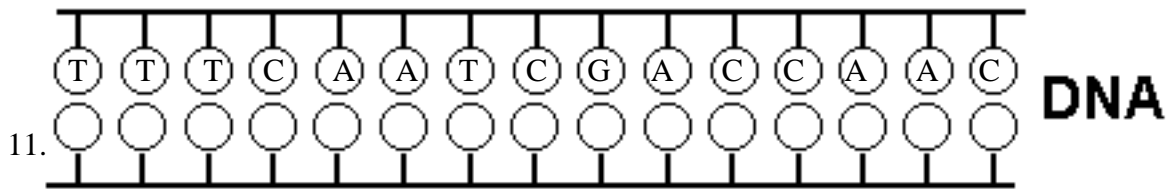
6. mRNA has codons or anti-codons?

7.  **DNA**

8.  **mRNA**

9.  **tRNA**

10.  **Amino Acids**



15. 1 or 3 codons equal one amino acid?

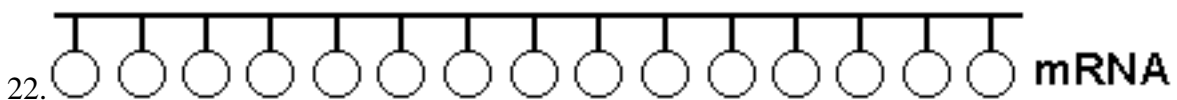
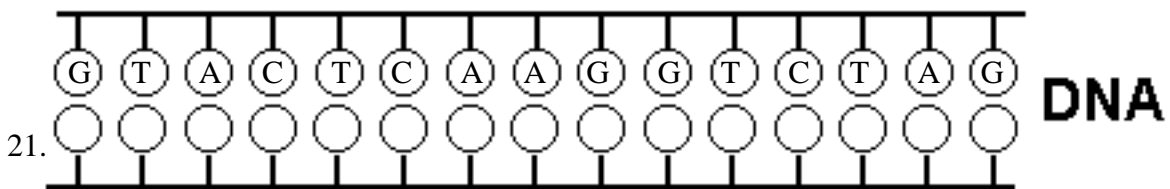
16. tRNA brings amino acids to the nucleus or ribosome?

17. A polypeptide is a sequence of proteins or amino acids?

18. tRNA has codons or anti-codons?

19. tRNA transfers amino acids during translation or transcription?

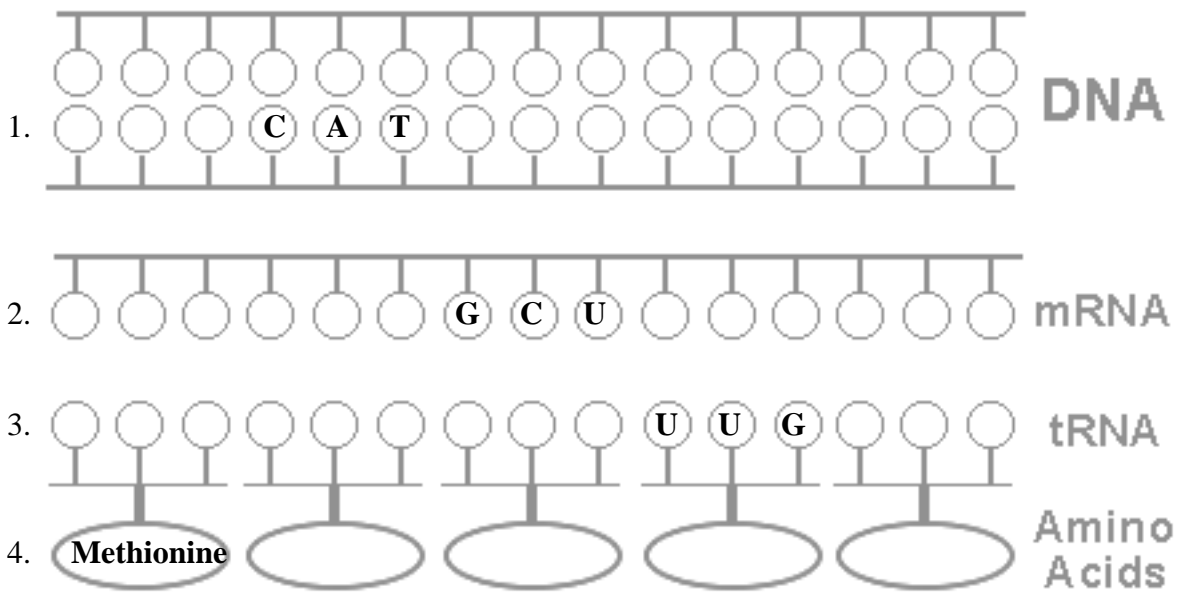
20. Ribosomes are the site where translation or transcription takes place?



# CODON TABLE

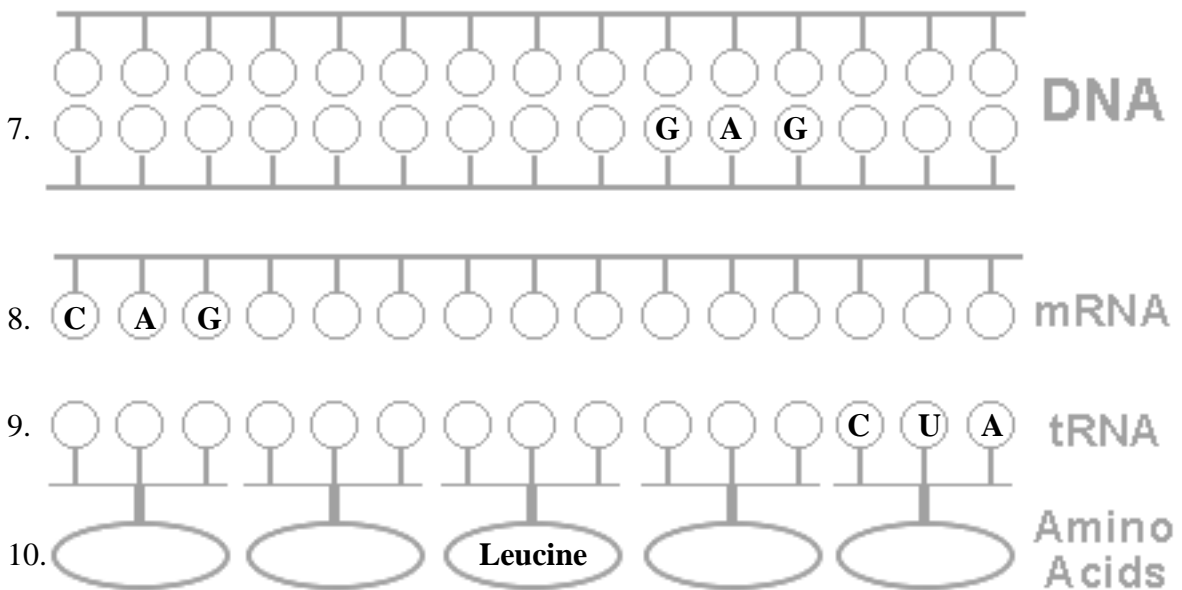
<b>1 s t  B a s e</b>	<b>U</b>	Phenylalanine	Serine	Tyrosine	Cysteine	<b>U C A G</b>
		Phenylalanine	Serine	Tyrosine	Cysteine	
		Leucine	Serine	Stop	Stop	
		Leucine	Serine	Stop	Tryptophan	
	<b>C</b>	Leucine	Proline	Histidine	Arginine	<b>U C A G</b>
		Leucine	Proline	Histidine	Arginine	
		Leucine	Proline	Glutamine	Arginine	
		Leucine	Proline	Glutamine	Arginine	
	<b>A</b>	Isoleucine	Threonine	Asparagine	Serine	<b>U C A G</b>
		Isoleucine	Threonine	Asparagine	Serine	
		Isoleucine	Threonine	Lysine	Arginine	
		Methionine	Threonine	Lysine	Arginine	
	<b>G</b>	Valine	Alanine	Aspartic acid	Glycine	<b>U C A G</b>
		Valine	Alanine	Aspartic acid	Glycine	
		Valine	Alanine	Glutamic acid	Glycine	
		Valine	Alanine	Glutamic acid	Glycine	
		<b>U</b>	<b>C</b>	<b>A</b>	<b>G</b>	
<b>2nd Base</b>						
						<b>3 r d  B a s e</b>

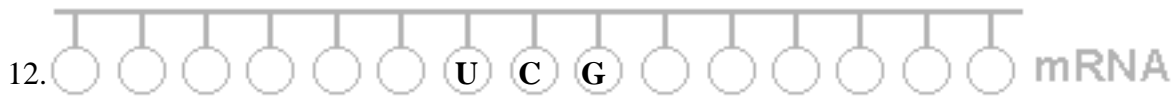
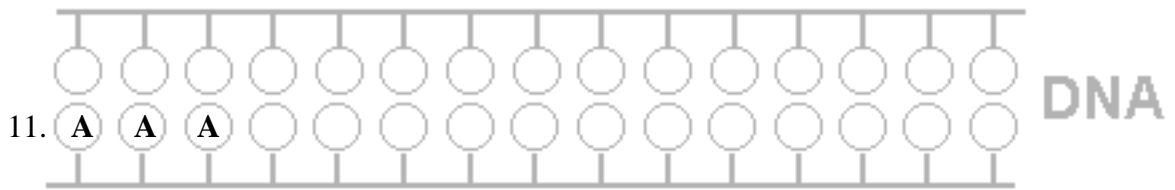
# Protein Synthesis Worksheet Key



5. mRNA is synthesized in translation or transcription?

6. mRNA has codons or anti-codons?





15. 1 or 3 codons equal one amino acid?

16. tRNA brings amino acids to the nucleus or ribosome?

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