

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* that 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.

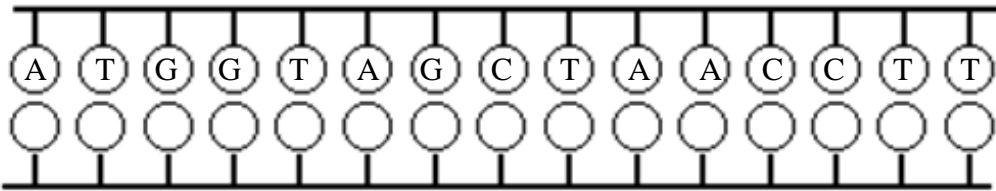
Evaluation:

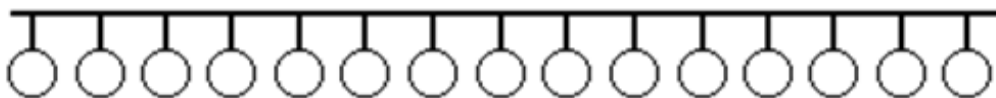
Each numbered question is worth 1 point, for a total of 24 points.


Protein Synthesis Worksheet

Directions:

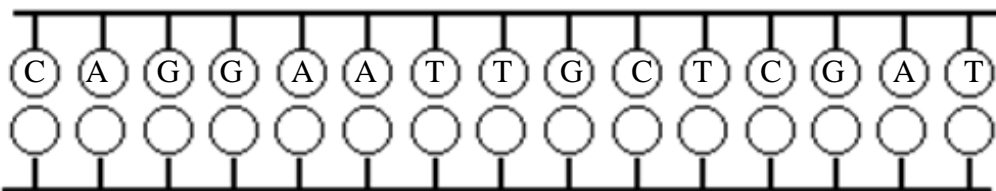
- 1st Fill in the complimentary DNA strand using DNA base pairing rules.
- 2nd Fill in the correct mRNA bases by transcribing the bottom DNA code.
- 3rd Translate the mRNA codons and find the correct amino acid using the Codon Table.
- 4th Write in the amino acid in the large circle.
- 5th Circle One the correct answer to each question.

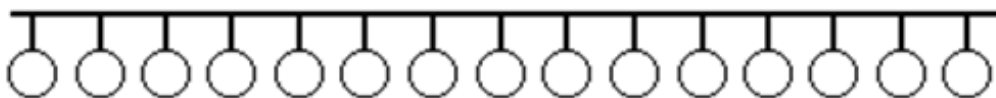
1.  **DNA**

2.  **mRNA**

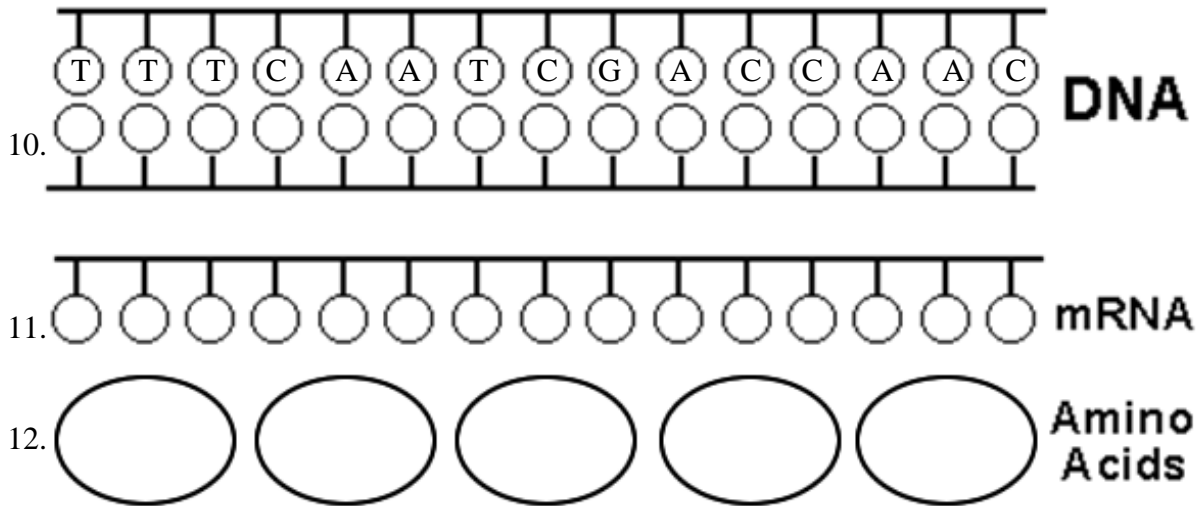
3.  **Amino Acids**

4. **Circle One:** mRNA is synthesized in translation or transcription.
5. **Circle One:** mRNA has codons or anti-codons.
6. **Circle One:** mRNA is synthesized in the ribosome or nucleus.

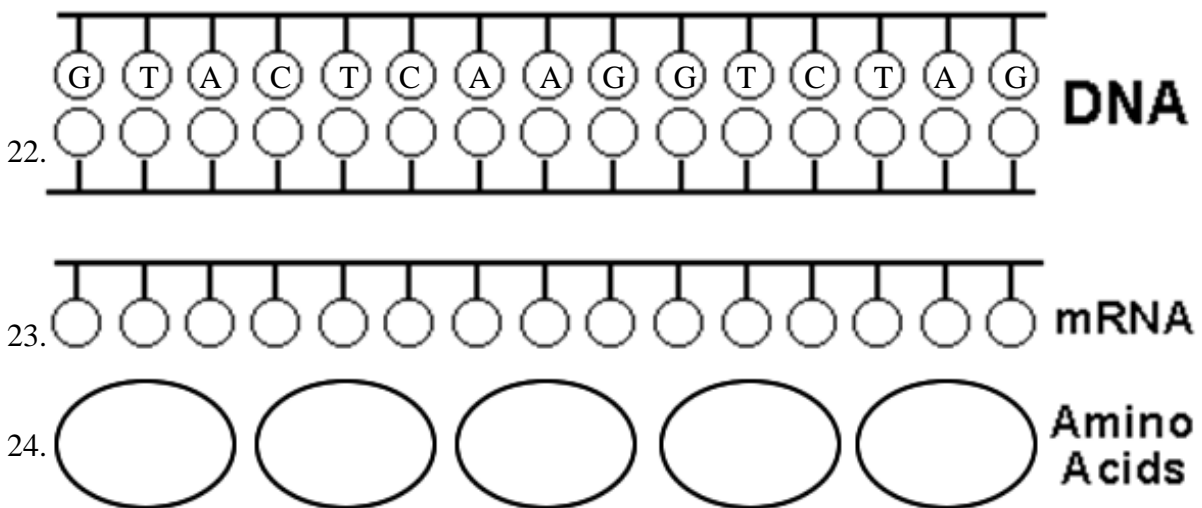
7.  **DNA**

8.  **mRNA**

9.  **Amino Acids**



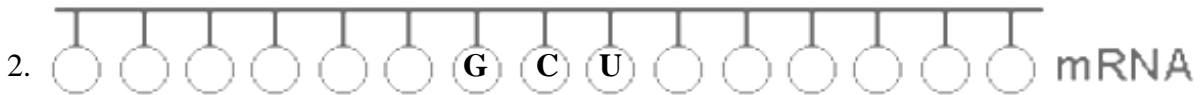
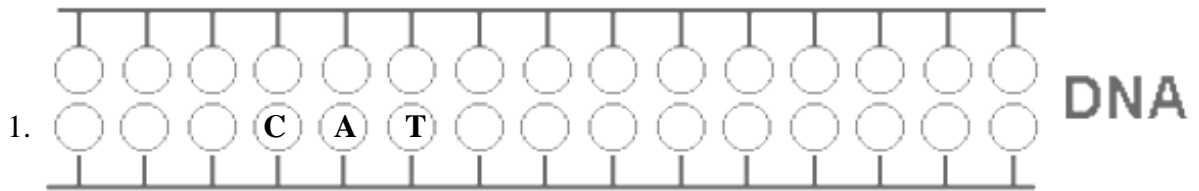
13. **Circle One:** 1 or 3 codons equal one amino acid.
14. **Circle One:** tRNA brings amino acids to the nucleus or ribosome.
15. **Circle One:** A polypeptide is a sequence of proteins or amino acids.
16. **Circle One:** tRNA has codons or anti-codons.
17. **Circle One:** tRNA transfers amino acids during translation or transcription.
18. **Circle One:** Ribosomes are the site where translation or transcription takes place.
19. **Circle One:** 1 or 3 nitrogen bases equal one amino acid.
20. **Circle One:** There are 20 or 3 different amino acids.
21. **Circle One:** A hydrogen or peptide bond binds amino acids together.



CODON TABLE

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

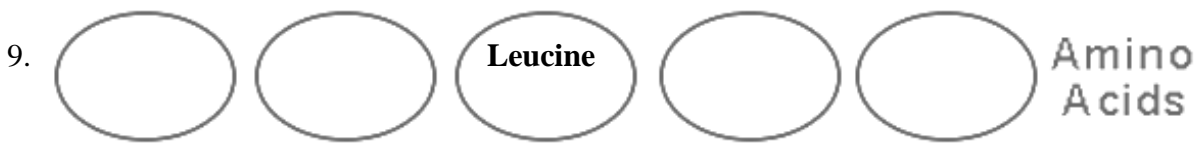
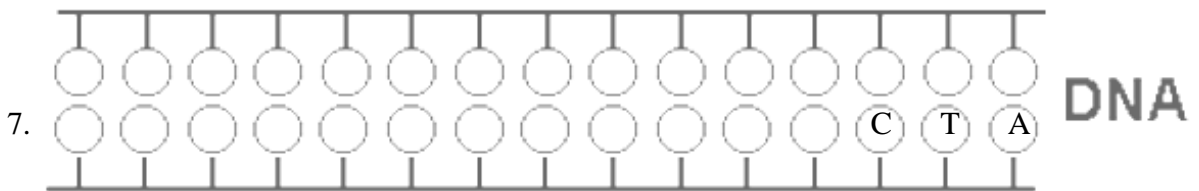
Protein Synthesis Worksheet Key

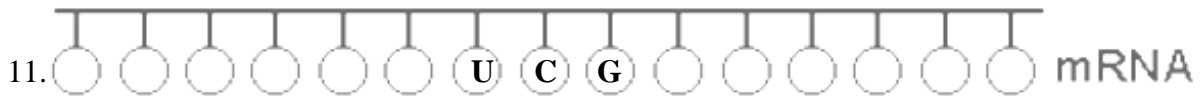
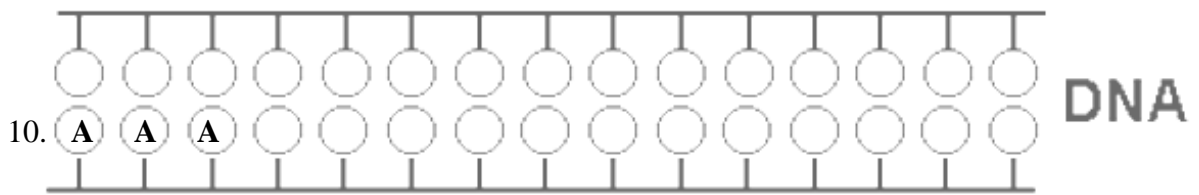


4. mRNA is synthesized in translation or transcription.

5. mRNA has codons or anti-codons.

6. mRNA is synthesized in the ribosome or nucleus.





13. 1 or 3 codons equals one amino acid.
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21. A hydrogen or peptide bond binds amino acids together.

