

Key

Name: _____ Row: _____

Date: _____ Period: _____

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 and the correct anti-codon the tRNA molecule.
- 5th The answer to the questions about protein synthesis below the amino acids.

1.

A	T	G	G	T	A	G	C	T	A	A	C	C	T	T
T	A	C	C	A	T	C	G	A	T	T	G	G	A	A

DNA

2.

A	U	G	G	U	A	G	C	U	A	A	C	C	U	U
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mRNA

3.

U	A	C	C	A	U	C	G	A	U	U	G	G	A	A
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tRNA

4.

Valine	Valine	Alanine	Asparagine	Leucine
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Amino Acids
Methionine

5. mRNA is synthesized in translation or transcription?

6. mRNA has codon or anti-codons?

7.

C	A	G	G	A	A	T	T	G	C	T	C	G	A	T
G	T	C	C	T	T	A	A	C	G	A	G	C	T	A

DNA

8.

C	A	G	G	A	A	U	U	G	C	U	C	G	A	U
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mRNA

9.

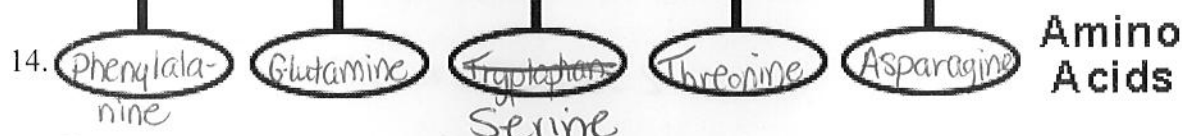
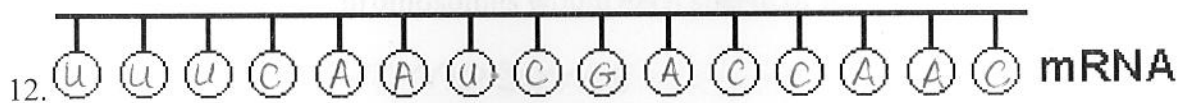
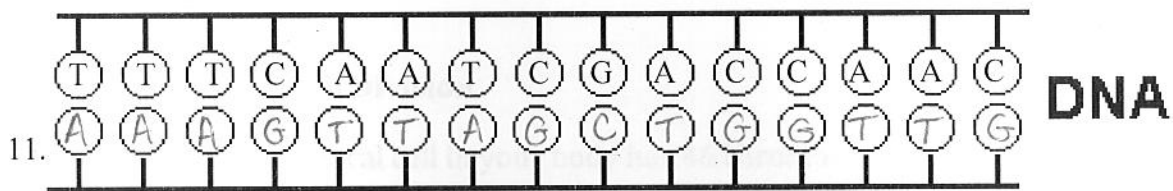
G	U	C	C	U	U	A	A	C	G	A	G	C	U	A
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tRNA

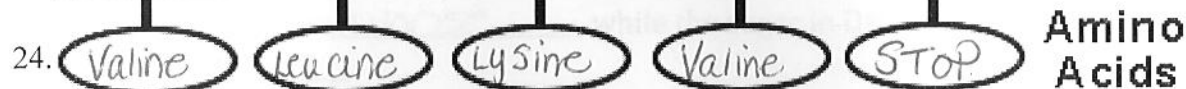
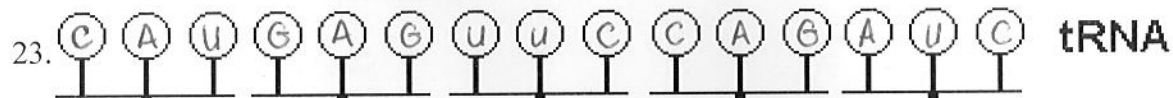
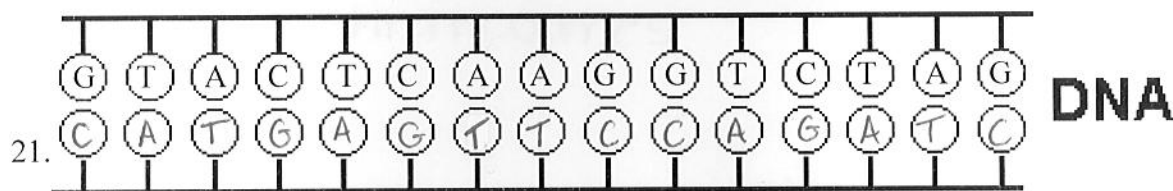
10.

Glutamine	Glutamic Acid	Leucine	Leucine	Aspartic acid
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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?



The Importance of Cell Division

1. Remember that a typical cell in your body has 46 chromosomes (23 pairs of homologous chromosomes). Suppose that human sperm and eggs were produced by mitosis. How many chromosomes would each sperm or egg have?

46 chromosomes

2. If a sperm of this type fertilized an egg of this type, and both the sperm and egg contributed all of their chromosomes to a zygote, how many chromosomes would the resulting zygote have?

92 chromosomes

3. In humans, how many chromosomes should a zygote have, so the baby's body cells will each have a normal set of chromosomes?

46 chromosomes

4. Obviously, if the body used mitosis to make sperm and eggs, the resultant zygote would have too many chromosomes to produce a normal baby. To produce a normal zygote, how many chromosomes should each sperm and egg have?

23 chromosomes

DNA STRUCTURE

1. The subunits that make up nucleic acids are called nucleotide.
2. What are the three components that make up a nucleotide?

- a) Sugar
- b) phosphate
- c) base

3. The sugar in RNA is ribose, while the sugar in DNA is deoxyribose.

4. The nitrogenous base that is found in RNA but not in DNA is uracil.
5. The DNA molecule has 2 strands.
6. In the bonding between the nitrogenous bases of the DNA strands, adenine bonds only with Thymine, and cytosine bonds only with guanine.
7. The nucleotide sequence of a segment of a DNA strand is shown below.
- a. Fill in the complementary nitrogen bases of the second strand.

ACGGCTATTCGCGTGTA
TGCCGATAAGCGCACAT DNA
ACGGCUAUUCGCGUGUA mRNA

- b. What would the complimentary mRNA strand look like?
8. How does the structure of RNA differ from that of DNA?
- a) Ribose instead of deoxyribose
b) single stranded
c) uracil instead of thymine

9. What are the two types of RNA involved in protein synthesis and what are their roles?

mRNA - messenger RNA - transcribe DNA to carry the code for proteins to the ribosome.

tRNA - transfer RNA - translates the mRNA into proteins. tRNA carries amino acids and creates a protein chain based on the codons on the mRNA.