

## Student Answer Sheet

### Part 3 - Modeling DNA Function: Transcription

Date: \_\_\_\_\_ Student Name: \_\_\_\_\_

1. Identify the specific difference in structure between the deoxyribose sugar of DNA and the ribose sugar of RNA.

\_\_\_\_\_

2. TAKE TIME TO THINK: Without searching additional resources (the internet or textbooks), what do you think is the purpose of the additional oxygen in RNA?

\_\_\_\_\_  
 \_\_\_\_\_

3. What modification(s) must be made to convert the DNA nitrogen base thymine to the RNA nitrogen base uracil?

\_\_\_\_\_  
 \_\_\_\_\_

4. Hypothesize a reason for the substitution of uracil in RNA with thymine in DNA. (Further exploration of this topic will occur later.)

\_\_\_\_\_  
 \_\_\_\_\_

5. Why doesn't DNA transport the message outside of the nucleus instead of utilizing messenger RNA?

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

6. Complete the following base pairing chart:

DNA Base	Complementary RNA Base
Guanine (G)	
Thymine (T)	
	Guanine (G)
Adenine (A)	

7. Identify the enzyme responsible for untwisting and base pairing complementary messenger RNA nucleotides to the DNA.

\_\_\_\_\_

## Student Answer Sheet

8. Did you begin pairing complementary RNA nucleotides at a 3' or a 5' end of the DNA molecule? Explain your choice.

---

---

9. Record the complementary mRNA base sequence below:

---

10. Use the provided Genetic Codon Chart® to **translate** this very short codon sequence into an amino acid sequence.

---

# Student Answer Sheet

## The Genetic Codon Chart®

	U	C	A	G
U	UUU → Phe F UUC → Phe F UUA → Leu L UUG → Leu L	UCU → Ser S UCC → Ser S UCA → Ser S UCG → Ser S	UAU → Tyr Y UAC → Tyr Y UAA → Stop UAG → Stop	UGU → Cys C UGC → Cys C UGA → Stop UGG → Trp W
C	CUU → Leu L CUC → Leu L CUA → Leu L CUG → Leu L	CCU → Pro P CCC → Pro P CCA → Pro P CCG → Pro P	CAU → His H CAC → His H CAA → Gln Q CAG → Gln Q	CGU → Arg R CGC → Arg R CGA → Arg R CGG → Arg R
A	AUU → Ile I AUC → Ile I AUA → Ile I AUG → Met M	ACU → Thr T ACC → Thr T ACA → Thr T ACG → Thr T	AAU → Asn N AAC → Asn N AAA → Lys K AAG → Lys K	AGU → Ser S AGC → Ser S AGA → Arg R AGG → Arg R
G	GUU → Val V GUC → Val V GUA → Val V GUG → Val V	GCU → Ala A GCC → Ala A GCA → Ala A GCG → Ala A	GAU → Asp D GAC → Asp D GAA → Glu E GAG → Glu E	GGU → Gly G GGC → Gly G GGA → Gly G GGG → Gly G

### Amino Acid Properties

<span style="border: 1px solid green; display: inline-block; width: 15px; height: 15px;"></span>	Translation Start Codon
<span style="border: 1px solid red; display: inline-block; width: 15px; height: 15px;"></span>	Translation Stop Codon

<span style="background-color: yellow; display: inline-block; width: 15px; height: 15px;"></span>	Hydrophobic / Non-polar
<span style="background-color: lightblue; display: inline-block; width: 15px; height: 15px;"></span>	Hydrophilic / Polar

<span style="background-color: red; display: inline-block; width: 15px; height: 15px;"></span>	Negative Charge
<span style="background-color: blue; display: inline-block; width: 15px; height: 15px;"></span>	Positive Charge

<span style="background-color: lightgreen; display: inline-block; width: 15px; height: 15px;"></span>	Cysteine
---	----------