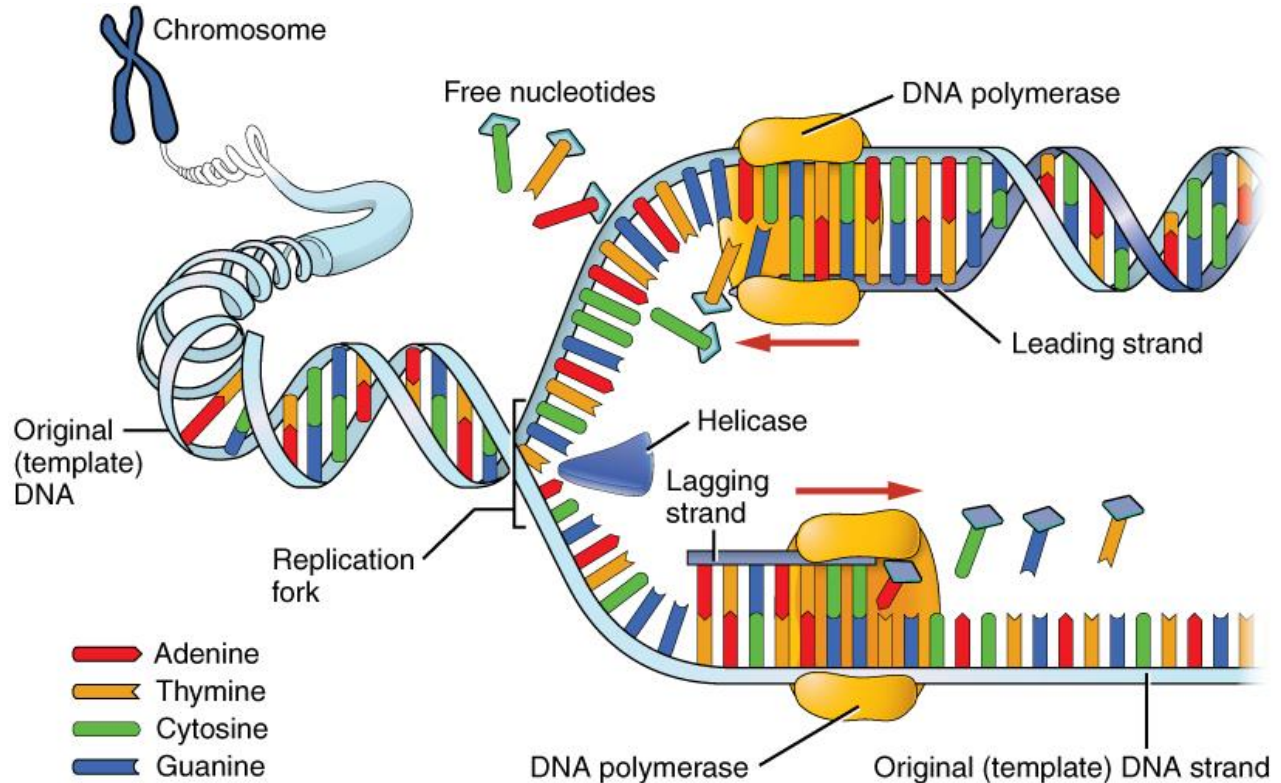


Worksheet: The Genetic Code

B I O L O G Y : U n i t 4

Directions: Complete the following questions using your notes and textbook.

PART 1: REPLICATION: Replication is the process of DNA making an exact copy of itself before cell division (DNA making DNA)



STEPS of Replication:

1. Enzyme 'unzips' DNA molecule by breaking hydrogen bonds exposing bases
2. Complementary bases attach to bases on each strand (**A-T and C-G**)
3. Two identical molecules of DNA are made (each with one original strand and one new strand)

QUESTIONS:

1. What is the purpose of **replication**?
2. What is the **monomer** of a nucleic acid (DNA)?
3. What are the four nitrogen-bases found in **DNA** and which ones are **complementary** to each other?

4. When DNA is being copied (replication) what would the **new complementary strand** of DNA look like? (*What bases will join to original strand?*) Add them below letters

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

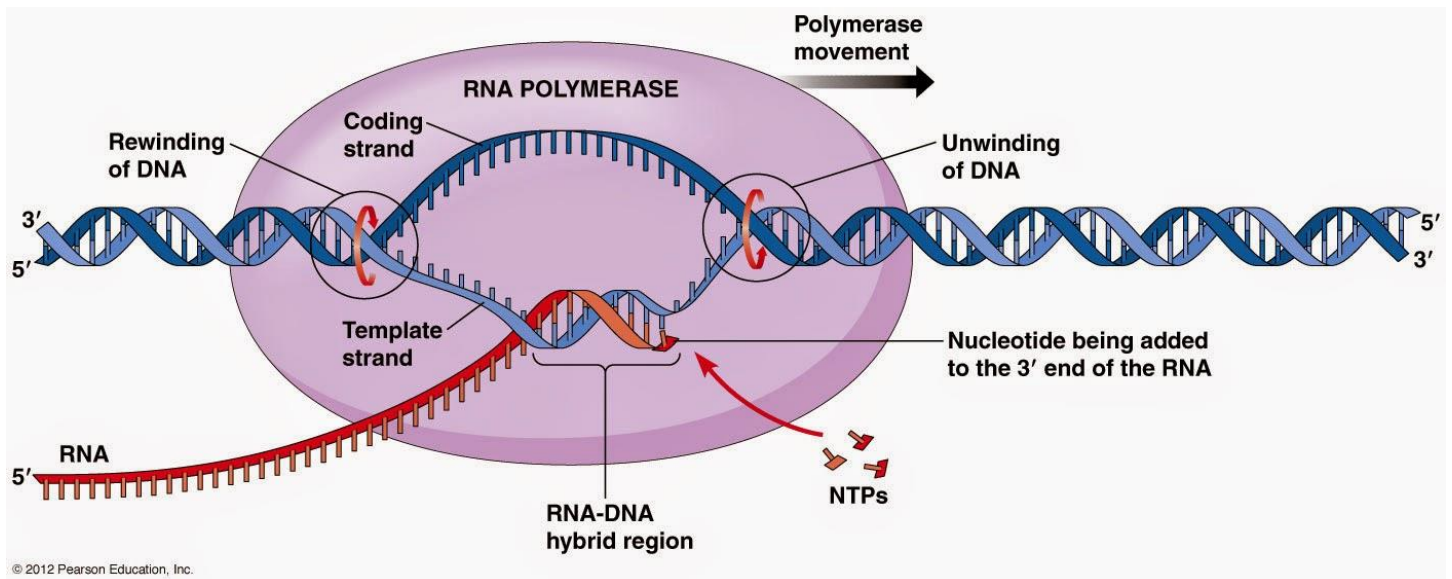
5. When **DNA** is being copied (replication) what would the **new complementary strand** of DNA look like? (*What bases will join to original strand?*) Add them below letters

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

6. When DNA is copied (replicated) each new double-stranded molecule of DNA is composed of one _____ strand and one _____ strand.

7. Where does the process of **replication** take place?

PART 2: TRANSCRIPTION: Transcription is the process where DNA makes a copy of RNA. RNA act like a 'disposable copy' of the information found on DNA. DNA broken into about 20,000 different genes which contain instructions for making different proteins.



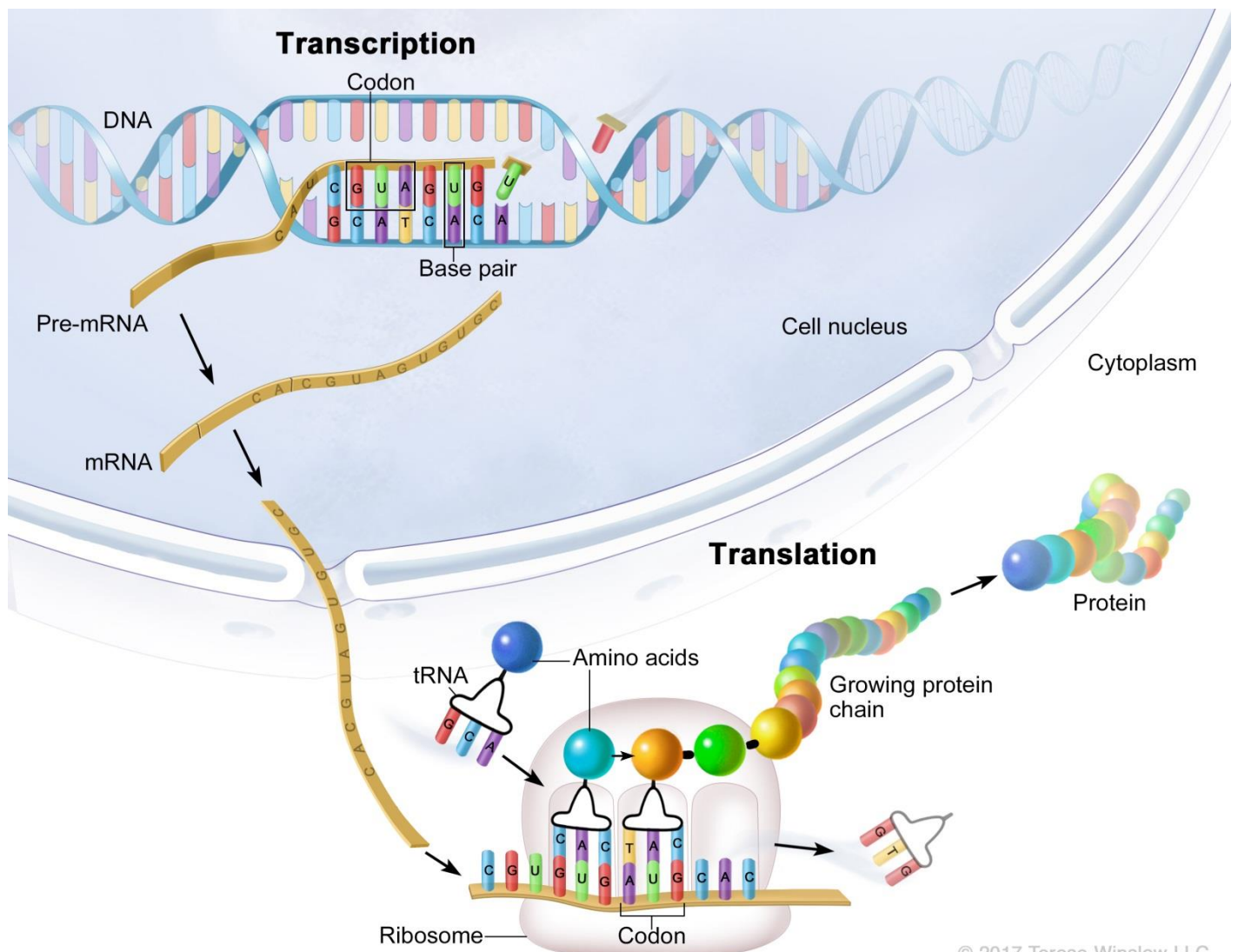
STEPS of Transcription

1. Enzyme 'unzips' DNA molecule by breaking hydrogen bonds exposing bases.
2. Transcription copies sequence of DNA (one gene) and is helped by enzymes
3. DNA begins to unwind at specific site (gene)
4. Using one strand of DNA, complementary strand of RNA is produced (**A-U and C-G**)
5. RNA leaves nucleus and travels to ribosome to make protein

QUESTIONS:

1. What is the purpose of **transcription**?
2. How do the **nitrogen bases** of **DNA** differ from the **nitrogen bases** on **RNA**?
3. How does the **RNA** produced **differ** from the **DNA** molecule?
4. Where does the process of **transcription** take place?

PART 3: TRANSLATION: Translation is the process of producing **proteins** from the code on an **mRNA** molecule. This process takes place in the **cytoplasm** and takes place on a **ribosome**.



QUESTIONS:

1. What is the purpose of **Translation**?
2. What is **mRNA** and what does it do?
3. What is **tRNA** and what does it do?
4. What is a **codon** and where is it found?
5. What is an **anticodon** and where is it found?
4. Where does the process of **translation** take place?

The Genetic Code: To determine the exact protein that was coded for on the mRNA molecule you can use a simple table using each of the 3-letter codons (e.g. AUG. locate letters from codon on chart to determine amino acid coded for)

5. Using the table to the right, determine the amino acid sequence (**protein**) coded for in the following **mRNA** segments.

mRNA: **UUC | AGC | UAA**

Amino Acid sequence:

mRNA: **UUCAGCUAG**

Amino Acid sequence:

mRNA: **AAUCGGUGA**

Amino Acid sequence:

		Second letter				
		U	C	A	G	
First letter	U	UUU } Phe UUC } UUA } Leu UUG }	UCU } UCC } Ser UCA } UCG }	UAU } Tyr UAC } UAA Stop UAG Stop	UGU } Cys UGC } UGA Stop UGG Trp	U C A G
	C	CUU } CUC } Leu CUA } CUG }	CCU } CCC } Pro CCA } CCG }	CAU } His CAC } CAA } Gln CAG }	CGU } CGC } Arg CGA } CGG }	U C A G
	A	AUU } AUC } Ile AUA } AUG Met	ACU } ACC } Thr ACA } ACG }	AAU } Asn AAC } AAA } Lys AAG }	AGU } Ser AGC } AGA } Arg AGG }	U C A G
	G	GUU } GUC } Val GUA } GUG }	GCU } GCC } Ala GCA } GCG }	GAU } Asp GAC } GAA } Glu GAG }	GGU } GGC } Gly GGA } GGG }	U C A G
						Third letter