

Assignment 7 - DNA Replication and The Central Dogma of Biology

Part 1 – DNA Replication:

1. To comprehend DNA replication, complete the table below.

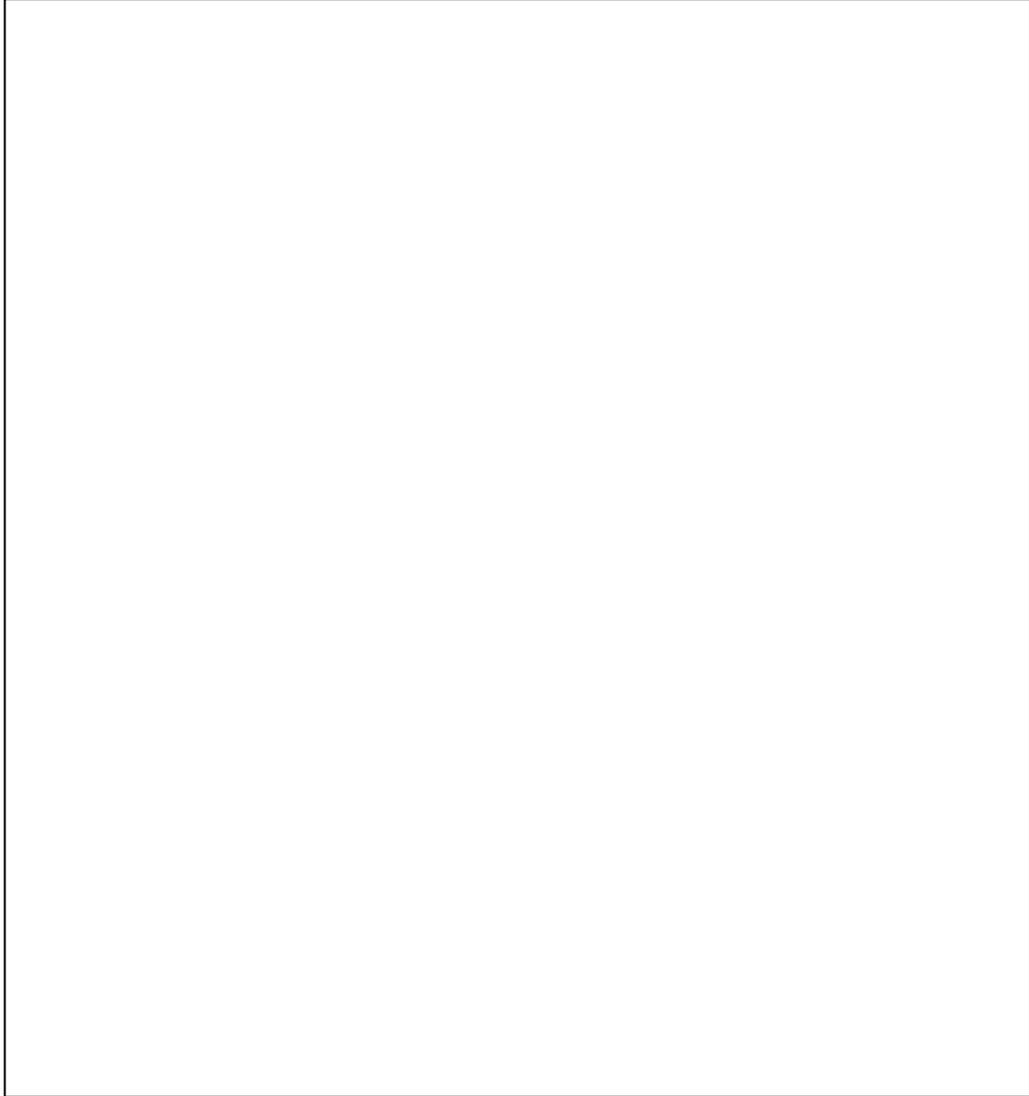
DNA Replication	
What is DNA replication?	
Where in eukaryotic cells does DNA replication occur?	
Where in prokaryotic cells does DNA replication occur?	
When during the cell-cycle does DNA replication occur?	
Why do cells need to replicate their DNA?	

2. List the enzymes required to catalyze DNA replication in cells, and explain each enzyme's function.

Enzyme	Function
DNA helicase	Unwinds the DNA double-helix by breaking the hydrogen bonds between complementary DNA strands of DNA.
DNA primase	
DNA polymerase III	
DNA polymerase I	
DNA ligase	
DNA gyrase	

Last Name: _____ First Name: _____ Date: _____ Class: BIO3 Section: _____

3. Create a diagram of a strand of DNA being replicated. The leading strand has the following/ DNA sequence, 5'-AGTTGTCCGATTGCGAAATTCGGTATA-3' Label **ALL** of the following: leading strand, lagging strand, DNA helicase, DNA primase, RNA primer, Okazaki fragment, and DNA ligase.



4. Explain why DNA replication is a semi-conservative process.

5. If a cell has 46 chromosomes, after DNA replication is completed, the cell will have _____ chromosomes.

Part 2 – The Central Dogma:

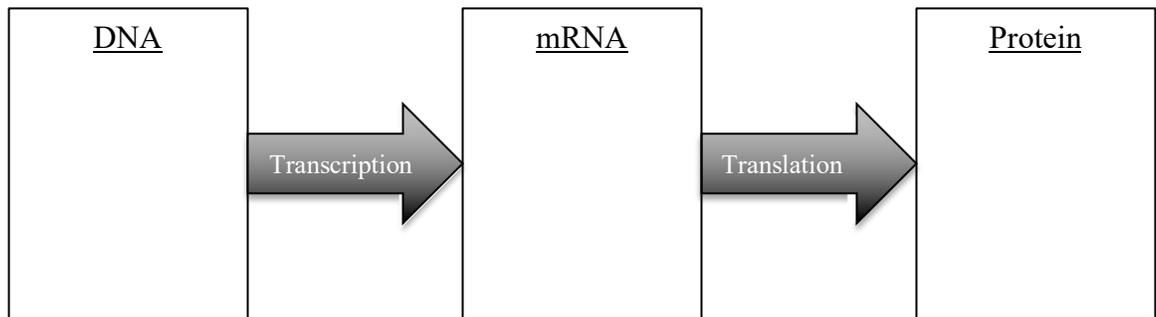
1. Complete the following sentences by using the words in the word bank to fill-in-the-blanks.

Word Bank

- Work
- Proteins
- Nucleus
- Genes
- Genome

The Central Dogma of Biology is a process that describes how cells ultimately create _____, which do all the _____ in cells. The instructions to make a protein are held in the _____, which are located in chromosomes in the _____ of eukaryotic cells. Prokaryotic cells do not have a nucleus, so their _____ is located in the nucleoid region in the cytoplasm. All organisms must use the processes outlined in the Central Dogma of Biology.

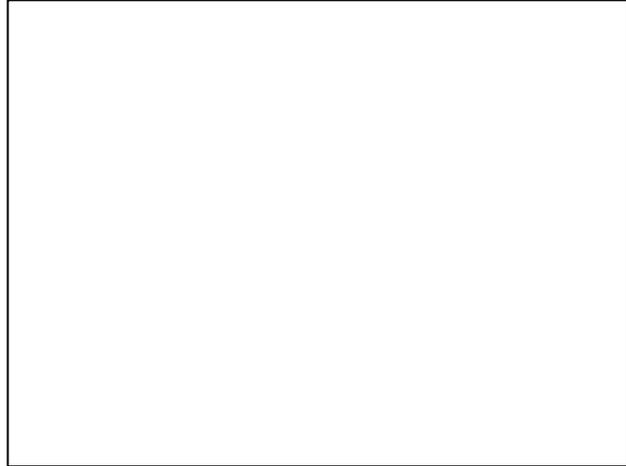
2. Complete the following graphic by illustrating an example of each part of the Central Dogma of Biology.



3. To comprehend DNA replication, complete the table below.

Transcription
What is transcription?
Where in eukaryotic cells does transcription occur?
Where in prokaryotic cells does transcription occur?
What enzyme is needed for create the mRNA transcript?

7. Draw a diagram of a single transfer RNA (tRNA) holding a methionine amino-acid. Be sure the anti-codon is UAC, since the codon for methionine is AUG. Label **ALL** of the following: anti-codon, amino acid, and tRNA.



8. List the DNA start and stop codons.

Start codon: _____

Stop codons: _____

9. Apply your knowledge of the Central Dogma of Biology to transcribe and translate the DNA sequences below.

Template strand 3' - TAC-TTC-CGA-AAT-TTA-GCT-ATT-5'

Complementary strand

mRNA

Protein

Template strand 3' - TAC-GGG-CCC-CAT-TAC-TCC-ATC-5'

Complementary strand

mRNA

Protein

Template strand 3' - TAC-ACT-CAC-GCC-TTA-TGC-ACT-5'

Complementary strand

mRNA

Protein