Name _____ Period _____ Date _____

Study Guide: DNA, RNA, and Protein Synthesis

Use your notes and/or chapter 12 of the Biology textbook to complete the following questions and terms. To get full credit for this study guide, **you must complete all parts.**

Terms/Scientists: Use a separate sheet of paper for the terms. You may make flashcards or write a list.

DNA

DNA
deoxyribose
parts of a nucleotide
purine
pyrimidine
hydrogen bond
helicase
DNA polymerase

RNA

RNA
ribose
mRNA
rRNA
tRNA
ribosome
How is DNA different from RNA?

Protein Synthesis

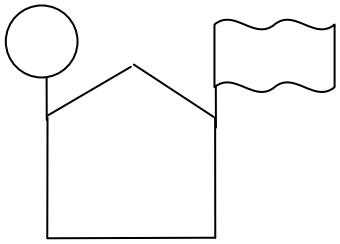
protein synthesis
amino acid
codon
anticodon
transcription
translation
polypeptide
promoter

Scientists

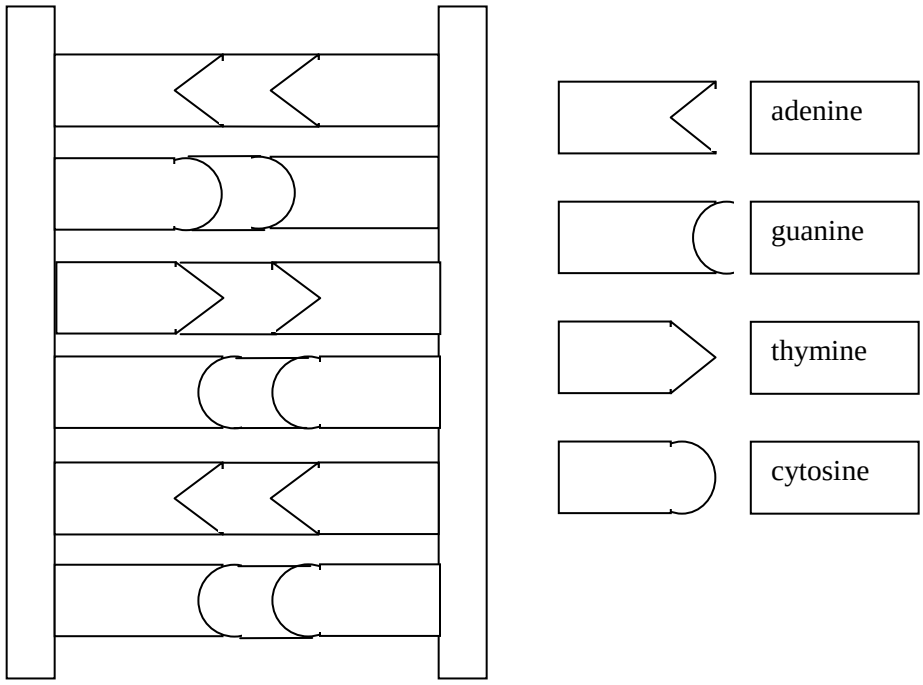
Griffith
Avery/McCarty/MacLeod
Hershey & Chase
Rosalind Franklin
Watson & Crick
Chargaff

Label the Diagram: Follow the coloring scheme for each diagram below, then label the parts listed.

Nucleotide Structure
phosphate group – brown
five-carbon sugar – orange
nitrogen(ous) base – purple



DNA Structure
sugar-phosphate backbone – brown/orange
adenine – red
thymine – green
cytosine – blue
guanine – yellow
hydrogen bond – black

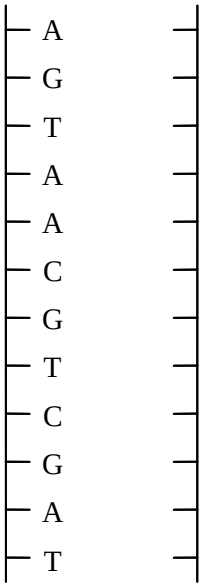


What kind of macromolecule is DNA, and what are its monomers?

What does the cell produce according to the coded directions in DNA?

DNA replication

List the four steps of DNA replication using the strand below. Start by writing down the missing DNA sequence, then use the space to the right to draw what the DNA strand would look like during replication.



Why is DNA replication said to be semi-conservative?

What is the end result of DNA replication?

Protein Synthesis Given the DNA, mRNA, or tRNA sequence below, and using your codon chart from class, fill out the chart to find the amino acids present in this protein. To abbreviate, use the first three letters of the amino acid.

DNA		CAG						CCC					GTC
mRNA	UUU		AAU		CAU	CUG	UGU		AGU	CAC		GUC	
tRNA				GUC							GAU		
A.Acid													

What is transcription, and where in the cell does it occur?

What is translation, and where in the cell does it occur?

What is the function of messenger RNA? ribosomal RNA? transfer RNA?

Suppose a protein is 703 amino acids long. How long would the strand of DNA need to be to code for this protein?

How many different messenger RNA codons are possible in the genetic code?

Some codons do not code for amino acids. Instead, they provide instructions for assembling the protein. What are some instructions these codons might give?