RNA Synthesis

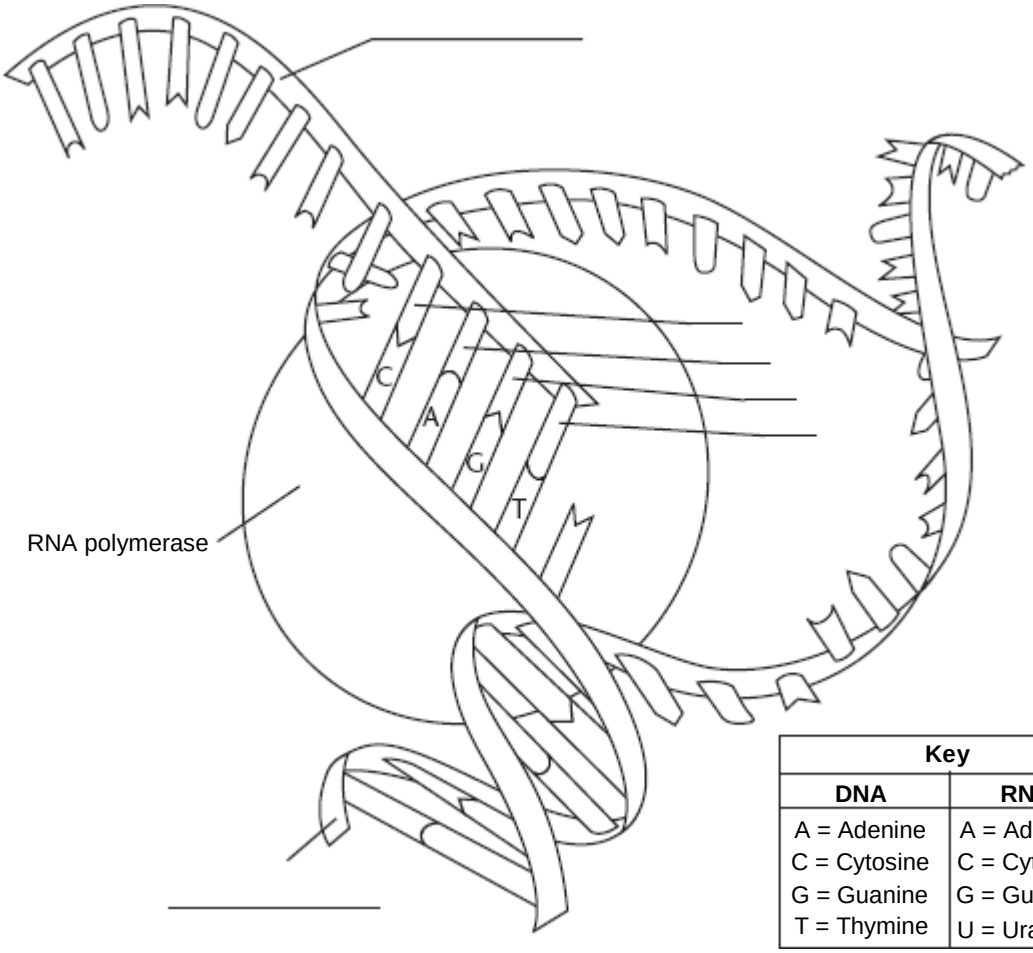
In transcription, RNA polymerase separates the two DNA strands. RNA then uses one strand as a template to make a complementary strand of RNA. RNA contains the nucleotide uracil instead of the nucleotide thymine.

Follow the directions.

1. Label the RNA

2. Label the DNA.

3. Use the key to label the missing nucleotides marked on the diagram.



Key	
DNA	**RNA**
A = Adenine	A = Adenine
C = Cytosine	C = Cytosine
G = Guanine	G = Guanine
T = Thymine	U = Uracil

Answer the questions. Circle the correct answer.

4. In DNA, _____ is always paired with cytosine.
adenine guanine uracil

5. In RNA, _____ replaces thymine.
uracil cytosine adenine

6. In DNA, _____ is paired with adenine.
uracil thymine guanine

Name _____ Class _____ Date _____

RNA Synthesis

In DNA replication a cell copies its DNA. Both strands of the double helix are used as templates to make complementary, or matching, strands of DNA. In DNA transcription a single strand of DNA is used as a template to generate a strand of mRNA.

Follow the directions.

1. Fill in the missing information. One row has been completed for you.

Template	Complementary DNA	Messenger RNA (mRNA)
TTACGG	AATGCC	AAUGCC
	GGCGGC	
		ACGUAG
AGACTC		
	GATAAG	
		CUGGCUACA

Answer the questions.

2. What is the mRNA if the complementary DNA is TCTGAG? _____

3. What does a cell copy in DNA replication? _____

4. How many strands of DNA are used to make complementary strands of DNA? _____

5. How does the cell make RNA? _____

_____

_____

_____

Follow the directions.

Create your own example of DNA. Fill in the chart.

Template	Complementary DNA	Messenger RNA (mRNA)

Name _____ Class _____ Date _____

13.2 Ribosomes and Protein Synthesis

Lesson Objectives

- Identify the genetic code and explain how it is read.
- Summarize the process of translation.
- Describe the "central dogma" of molecular biology.

BUILD Vocabulary

A. The chart below shows key terms from the lesson with their definitions. Complete the chart by writing a strategy to help you remember the meaning of each term. One has been done for you.

Term	Definition	How I'm Going to Remember the Meaning
Anticodon	Group of three nucleotide bases in tRNA that is complementary to one codon	
Codon	Group of three nucleotide bases in mRNA that specifies an amino acid	
Gene expression	The way genetic information is put into action	
Genetic code	Language made up of letters that stand for the nucleotide bases in RNA and DNA	***In a code, letters can stand for other letters. Letters in the genetic code stand for nucleotides.***
Polypeptide	Long chains of amino acids that make up proteins	
Translation	Process of decoding mRNA in order to make a protein	

B. As you work through this lesson, you may find these terms in the activities. When you need to write a key term or a definition, **highlight** the term or the definition.

Name _____ Class _____ Date _____

BUILD Understanding

Two-Column Table A two-column table is a way to take notes about what you have read. Complete the table with the main idea of each section. The first one has been done for you.

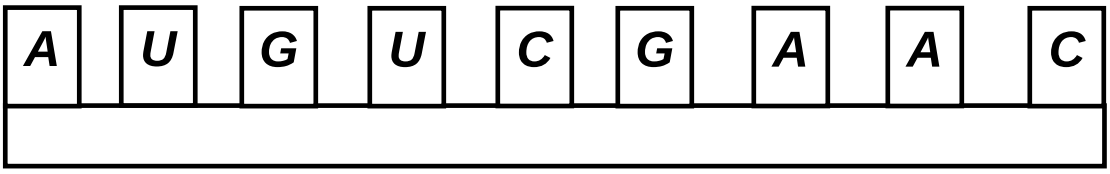
Section Heading	Main Idea
The Genetic Code	***The genetic code is read three "letters" at a time. Each "word" is three bases long and corresponds to a single amino acid.***

The Genetic Code

A codon is a group of three nucleotide bases in messenger RNA. Each codon corresponds to one amino acid.

Follow the directions.

1. Circle each codon in the diagram of RNA below.



Answer the questions. Circle the letter of the correct answer.

2. What is a polypeptide?

A. a chain of amino acids

B. a chain of enzymes

3. What does the letter A stand for in the genetic code?

A. amino acid

B. adenine

4. Can a codon contain two of the same nucleotide bases?

A. yes

B. no

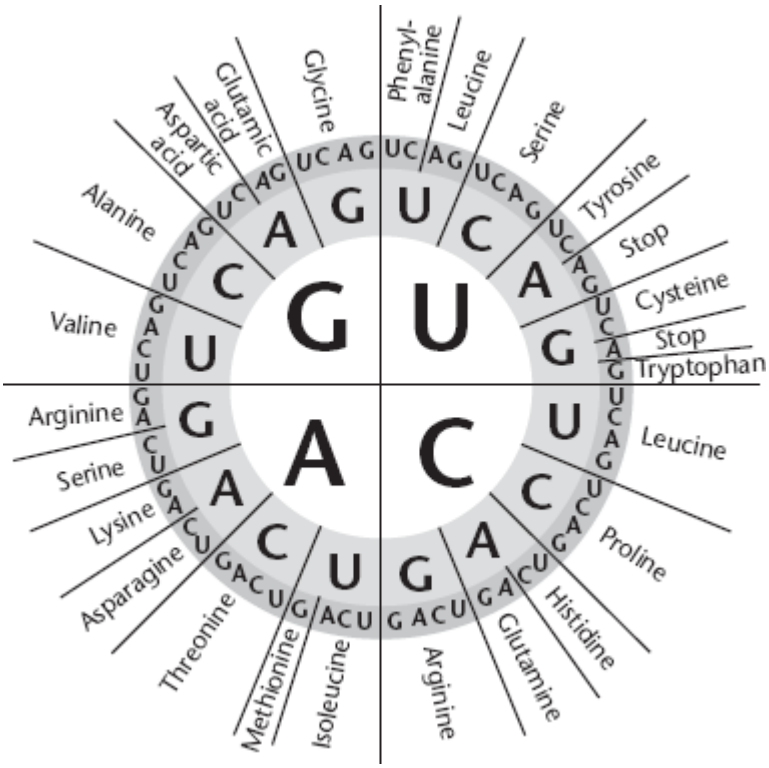
Name _____ Class _____ Date _____

The Genetic Code

The diagram below shows the mRNA codes that correspond to amino acids and stop codons. Read the diagram from the center outwards. For example, the mRNA code UAC corresponds to the amino acid tyrosine.

Follow the directions.

1. In the chart below the diagram, write the name of the amino acid that corresponds to each mRNA code.



mRNA Code	Amino Acid
AAA	lysine
GCG	
GAU	
CAA	

Answer the questions.

2. Which two mRNA codes correspond to histidine?

CAU & CAC CAA & CUC

3. How many different mRNA codes correspond to arginine?

2 4 6

4. How many different mRNA codes correspond to methionine? _____

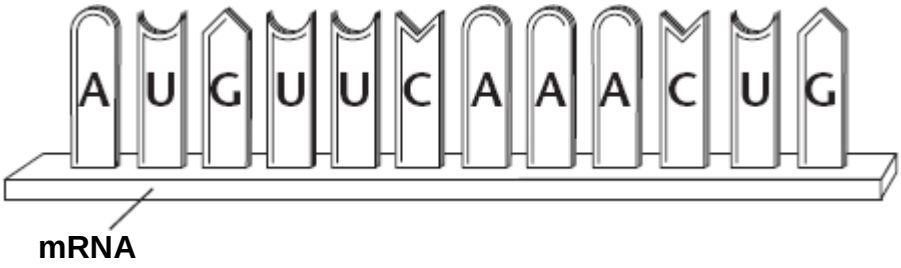
Name _____ Class _____ Date _____

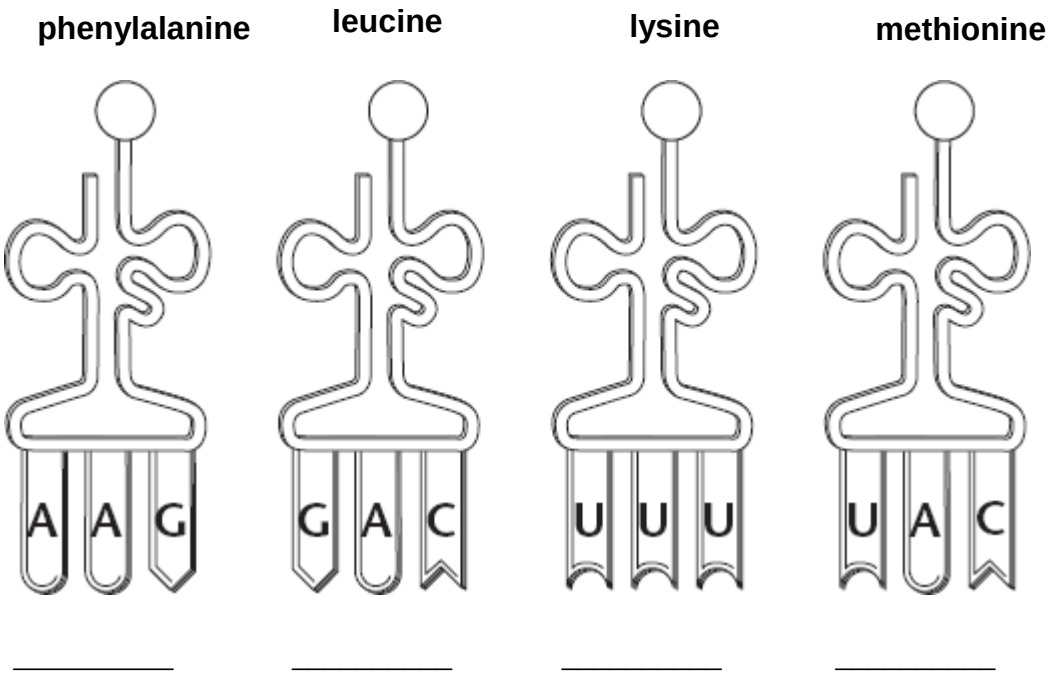
Translation

During translation, transfer RNA (tRNA) anticodons match to messenger RNA (mRNA) codons. Each tRNA molecule can carry one particular amino acid. The amino acids are joined to form a polypeptide.

Follow the directions.

1. Number the four tRNA anticodons in the order in which they should appear to match the codons in the mRNA strand.





_____ _____ _____ _____

Answer the questions.

2. Which anticodon matches the mRNA codon UUC? _____

3. Which amino acid is carried by the anticodon UUU? _____

4. List the amino acids in the order they would appear in the polypeptide coded for by the mRNA._____