

Name Kay

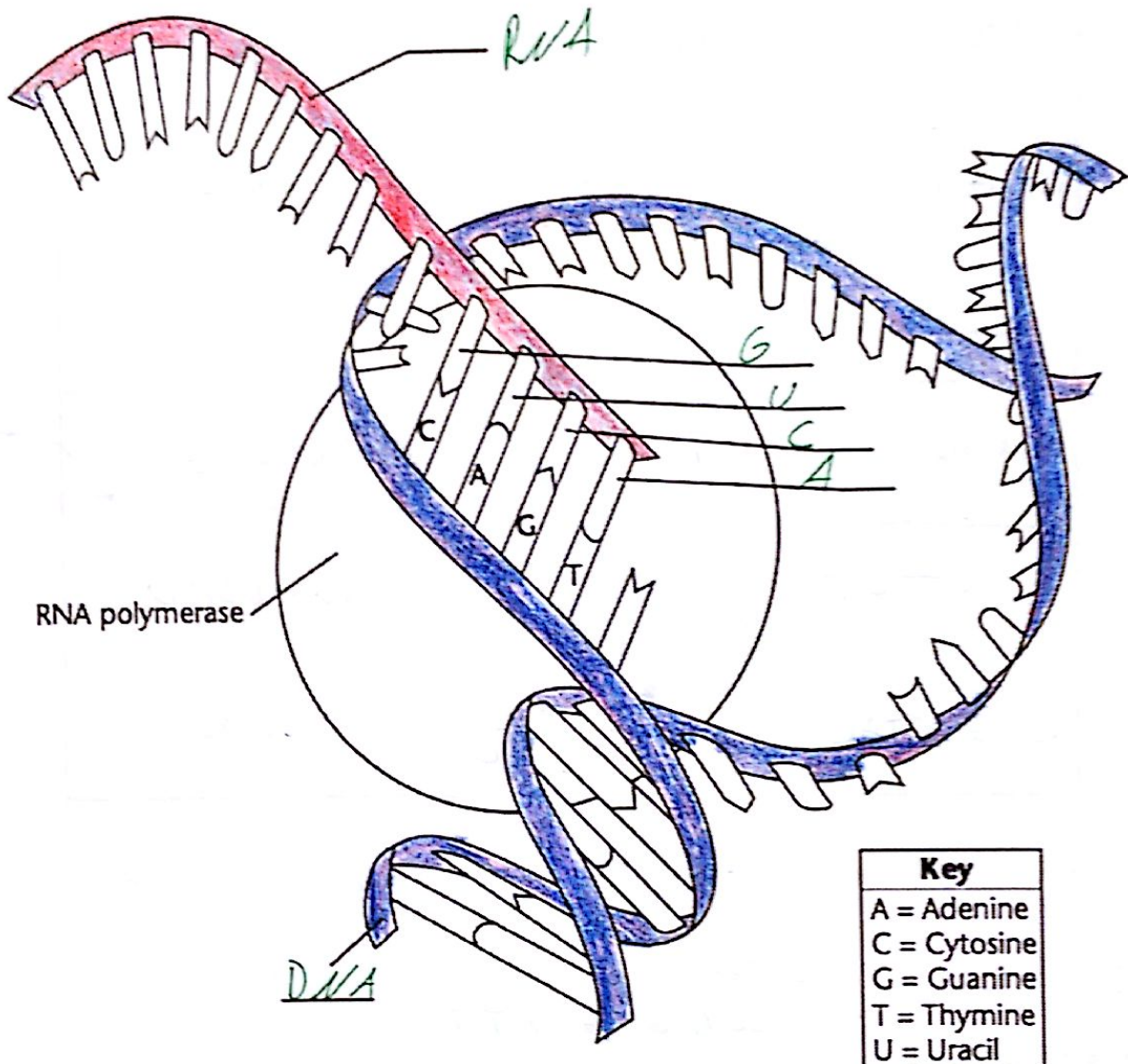
## 12 DNA and RNA Transcription and Translation

Test Date \_\_\_\_\_

In transcription, RNA polymerase splits the two halves of a strand of DNA. RNA then uses one half as a template to make a copy of the other half. RNA contains the nucleotide uracil instead of the nucleotide thymine.

Label the DNA and RNA. Then, label the missing nucleotides marked on the diagram.

Color the DNA backbones blue and the RNA backbone red.



1. In RNA, which nucleotide is always paired with uracil?

Adenine

2. Name three differences between an RNA molecule and a DNA molecule.

- DNA uses Thymine, RNA uses Uracil  
- DNA is double stranded, RNA is single stranded  
- DNA nucleotides use the sugar deoxyribose, RNA uses the sugar ribose

**Comparing DNA Replication and Transcription**

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

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

Template DNA	Complementary DNA	Messenger RNA (mRNA)
TTACG	AATGC	AAUGC
CCGCC	GCCGG	GGCGG
TGCATCG	ACGTAGC	ACGUAGC
AGACTC	TCTGAG	UCUGAG
CTATTCT	GATAAGA	GAUAAGA
GACCGATG	CTGGCTAC	CUGGCUAC

*always!*

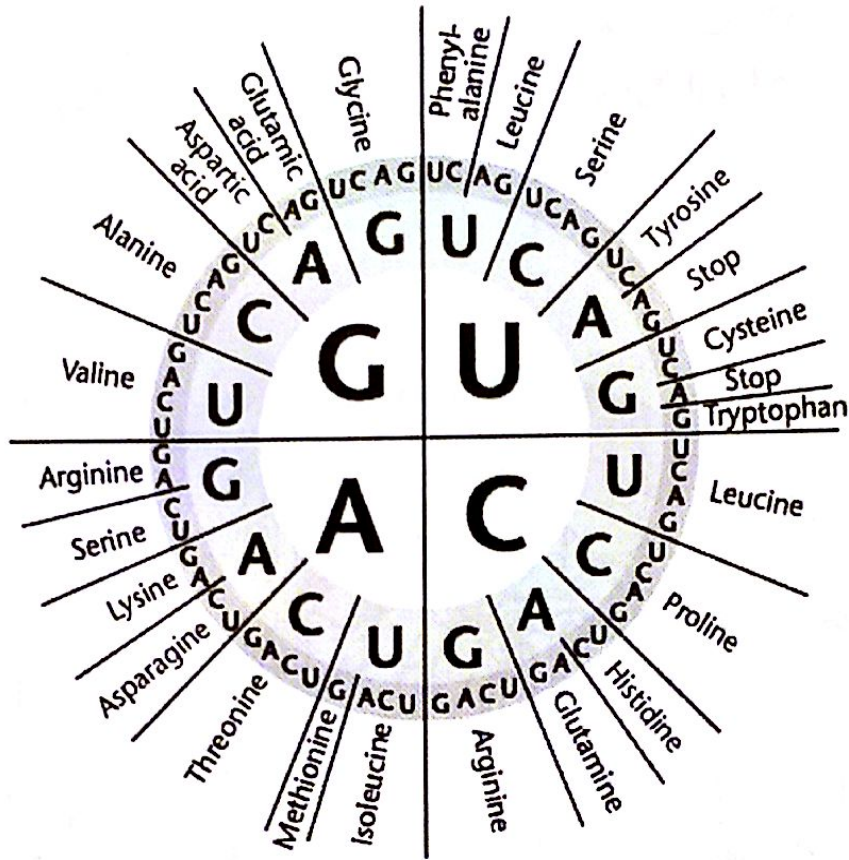
1. Give another example of a template DNA code that is twelve base pairs long. Then, give its matching complementary DNA and mRNA codes.

Template - T A C G G G C C C A A A  
 Complement (coding) - A T G C C C G G G T T T  
 mRNA - A U G C C C G G G U U U

*Decoding mRNA - The Genetic Code*

The diagram 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.

Write the name of the amino acid that corresponds to each mRNA code. The first one has been done for you.



mRNA Code	Amino Acid
AAA	lysine
GCG	Alanine
GAU	Aspartic Acid
CAA	Glutamine

1. Which two mRNA codes correspond to histidine?

*CAU, CAC*

2. How many different mRNA codes correspond to arginine?

*6*

3. What is unique about the amino acid methionine?

*First A.A. in any polypeptide.*

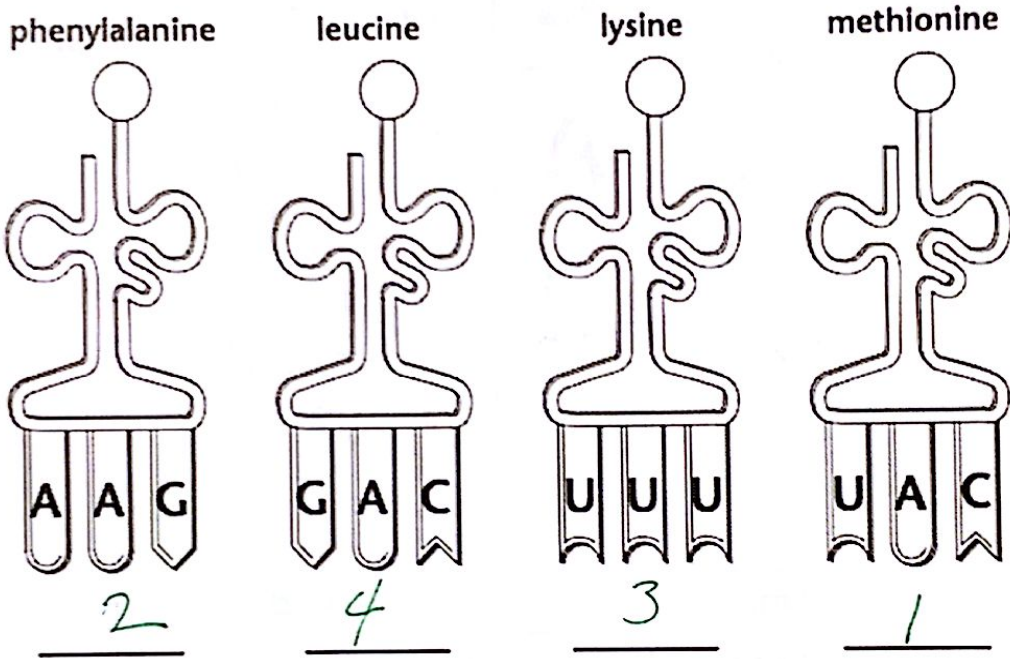
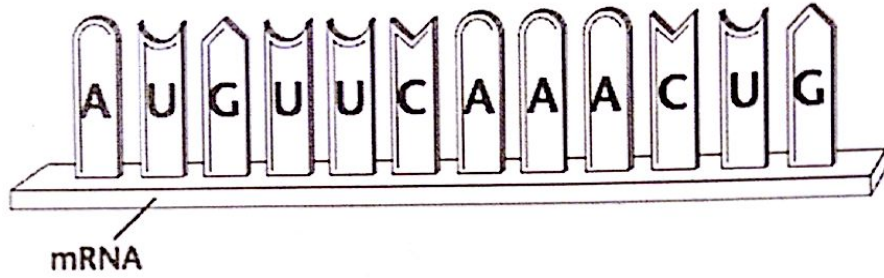
4. How many stop codons are there in the genetic code?

*3*

**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.

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



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

*Met - phe - Lys - Leu*

2. For the following DNA sequence, determine first the complimentary mRNA strand that would be produced. Then determine which amino acids are coded for by the mRNA.

DNA sequence      T A C A C T C C C G G G T A C T G A C G A T T A G G C  
 mRNA sequence    A U G U G A G G G C C C A U G A C U G C U A A U C C G  
 amino acid sequence *Met - Stop!*

3. Using words and arrows, show the flow of genetic information within the cell.

