

Name: _____ Date: _____ Period: _____

Code Cracking

Protein Synthesis

In this activity, you will translate segments of DNA into their respective amino acid sequences and record the one letter amino acid symbol that corresponds to the correct translation of each codon. If you have accurately translated each DNA segment, the resulting amino acid sequence will spell out a word or phrase. A codon wheel is included to assist you in translation.

1. Locate the codon wheel below. You will need to use this to translate the RNA sequence.
2. Start by transcribing the DNA sequence into mRNA. Remember that DNA bases pair together in specific ways: C with G, and A with T. Your RNA sequence will pair U with A instead of T.
3. Record your RNA sequence.
4. Remember that the cell reads the DNA code in groups of three bases. Each triplet of bases, also called a codon, specifies which amino acid will be added next during protein synthesis. (Putting dashes or lines between each triplet, or circling each group of 3 bases can make translation easier.)
5. Using the codon wheel, find the first base letter of the codon at the center of the wheel, the second base letter in the next circle out and finally the last base in the third circle.
6. Record the amino acid indicated outside the colored wheel. Find and record its one letter symbol from the symbol table.
7. If you have accurately synthesized your protein, the amino acid symbols should spell out a word or phrase in English.

Example:

DNA sequence: **C C A C T C T T A C T T**

mRNA sequence: G G U-G A G-A A U- G A A

Amino acid: GLY-GLU-ASN-GLU

Letter symbol: GENE

Now you try it!

Name: _____ Date: _____ Period: _____

DNA Decoding (Protein Synthesis) Practice Sheet

1. DNA: CTTCCACCT

mRNA:

AA:

Symbol:

2. DNA: GTGCTTTTA

mRNA:

AA:

Symbol:

3. DNA: GGTCGTACC

mRNA:

AA:

Symbol:

4. DNA: TCGTTCTAA

mRNA:

AA:

Symbol:

Name: _____ Date: _____ Period: _____

Try a longer sentence

5. Following the same procedure, decode the message your teacher gives you below. (Note: the stop codons are used as spaces)

Now create your own message!

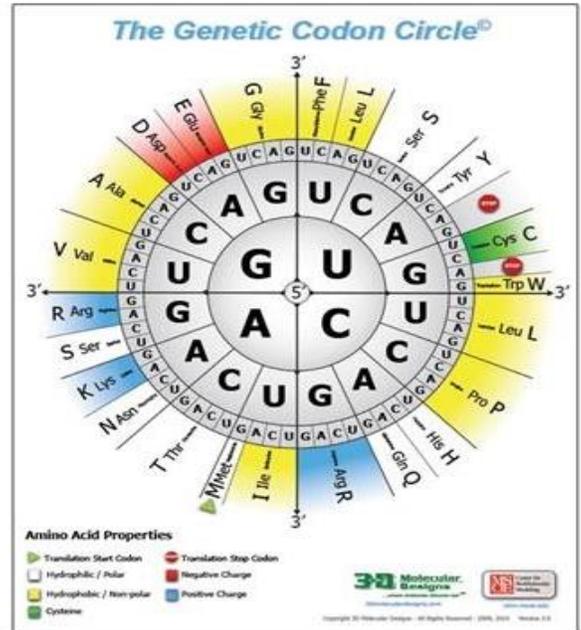
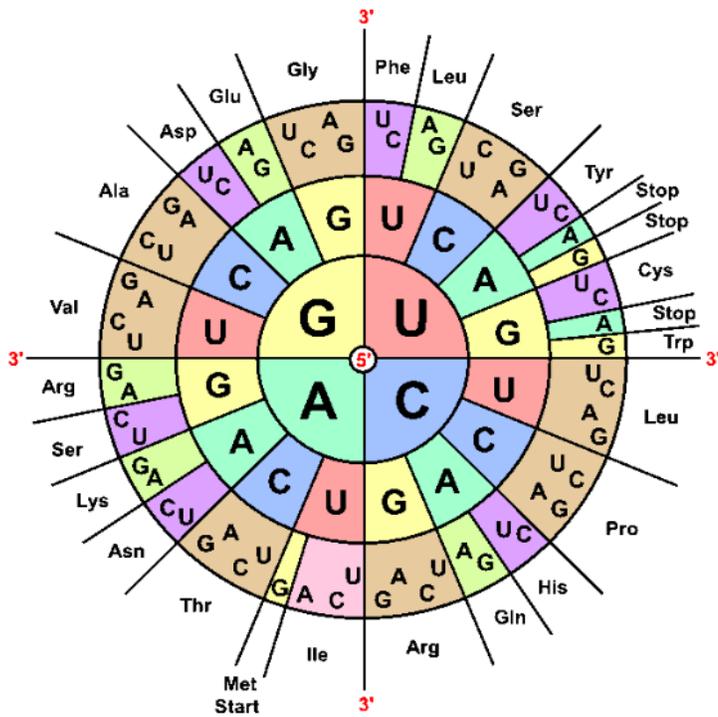
6. Create your own message. (Letters not available: B J O U X Z)

Decoded Message (English word or words):

AMINO ACID SEQUENCE (three-letter abbreviations are okay):

mRNA:

DNA:



Amino Acid	Three-Letter Abbreviation	One-Letter Abbreviation
Alanine	Ala	A
Arginine	Arg	R
Asparagine	Asn	N
Aspartate	Asp	D
Cysteine	Cys	C
Glutamate	Glu	E
Glutamine	Gln	Q
Glycine	Gly	G
Histidine	His	H
Isoleucine	Ile	I
Leucine	Leu	L
Lysine	Lys	K
Methionine	Met	M
Phenylalanine	Phe	F
Proline	Pro	P
Serine	Ser	S
Threonine	Thr	T
Tryptophan	Trp	W
Tyrosine	Tyr	Y
Valine	Val	V