Name_____ Date_____ Period_____

Protein Synthesis Simulation

To begin click the link: https://learn.genetics.utah.edu/content/basics/txtl/

Step 1: Click the “START” on the main page

Step 2: Press the **“Play”** button on the Video , turn on the **captions** by clicking the 

Step 3: Watch the video and answer the questions below **(STEPS 1- 4)**

1. What is “Transcription and Translation”?

PROCESSES ORGANISMS USE TO READ THE INFORMATION IN DNA TO MAKE PROTEINS

2. What happens during “Transcription”?

CELLS MAKE A COPY OF THE GENE INTO mRNA (DNA HAS THE GENES).

3. What happens during “Translation”?

In translation they (tRNA and rRNA) use mRNA as a blueprint to build amino acids

4. What do proteins “do”?

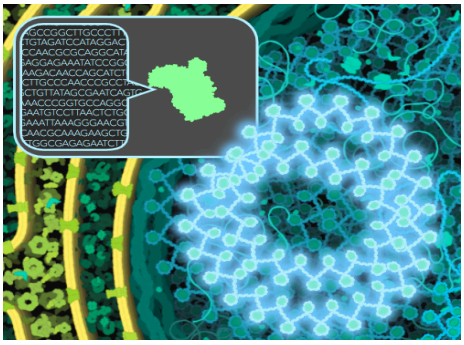
PROTEINS PERFORM THE TASKS THAT MAKE LIVING THINGS FUNCTION

5. In what order does genetic information “flow”?

DNA TO mRNA to PROTEINS (CENTRAL DOGMA)

YOU HAVE TO KEEP GOING THOUGH THE FOUR VIDEOS UNTIL THE END TO GET THE ANSWER FOR THE PROTEIN MADE.

Step 4: Click top left gene to begin.

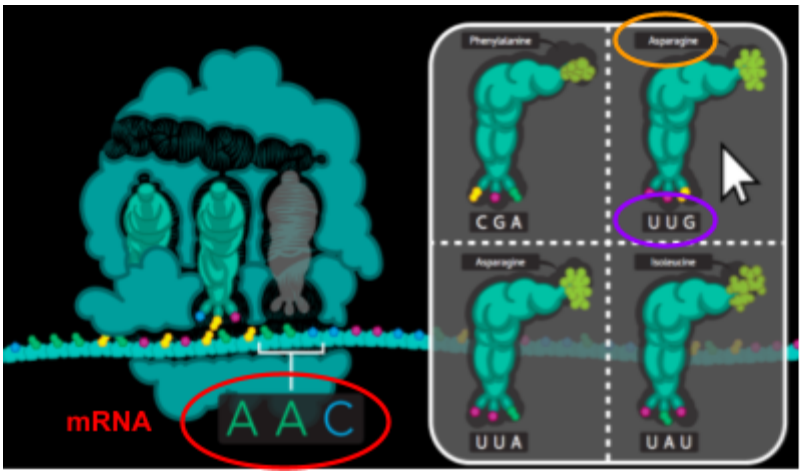


1. ***Transcription*** - Complete the mRNA strand in the online activity. In boxes below type the complementary mRNA that corresponds to the DNA.
   REMEMBER! In mRNA A → U, T → A, C → G, G → C.

DNA Strand	G	A	T	C	A	C	G	T	G	C	A	G	C	A	G
mRNA Strand	C	U	A	G	U	G	C	A	C	G	U	C	G	U	C

2. **Translation**- In the online activity read the mRNA codon and "click" the complementary anticodon on the tRNA.

   In the boxes below type in the complementary tRNA anticodon and the corresponding amino acid KEEP PRACTICING UNTIL THE END. THE VIDEO NUMBER 4 WILL CONTINUE AND WILL GIVE YOU THE NAME OF THE PROTEIN .



mRNA Codon	**AAC**	**CUU**	**CCA**	**GAU**	**UCC**	**ACC**	**GUG**	**AGU**	**UUU**	**CUU**	**GCA**
tRNA anticodon	UUG	GAA	GGU	CUA	AGG	UGG	CAC	UCA	AAA	GAA	CGU
Amino Acid	Asparagine	LEU	PRO	ASP	SER	THR	LEU	SER	PHE	LEU	ALA

3. What is the name of the protein created? Click the **"Play"** button on the VIDEO AND (**Watch the video until 00:24 for the name of the protein**)

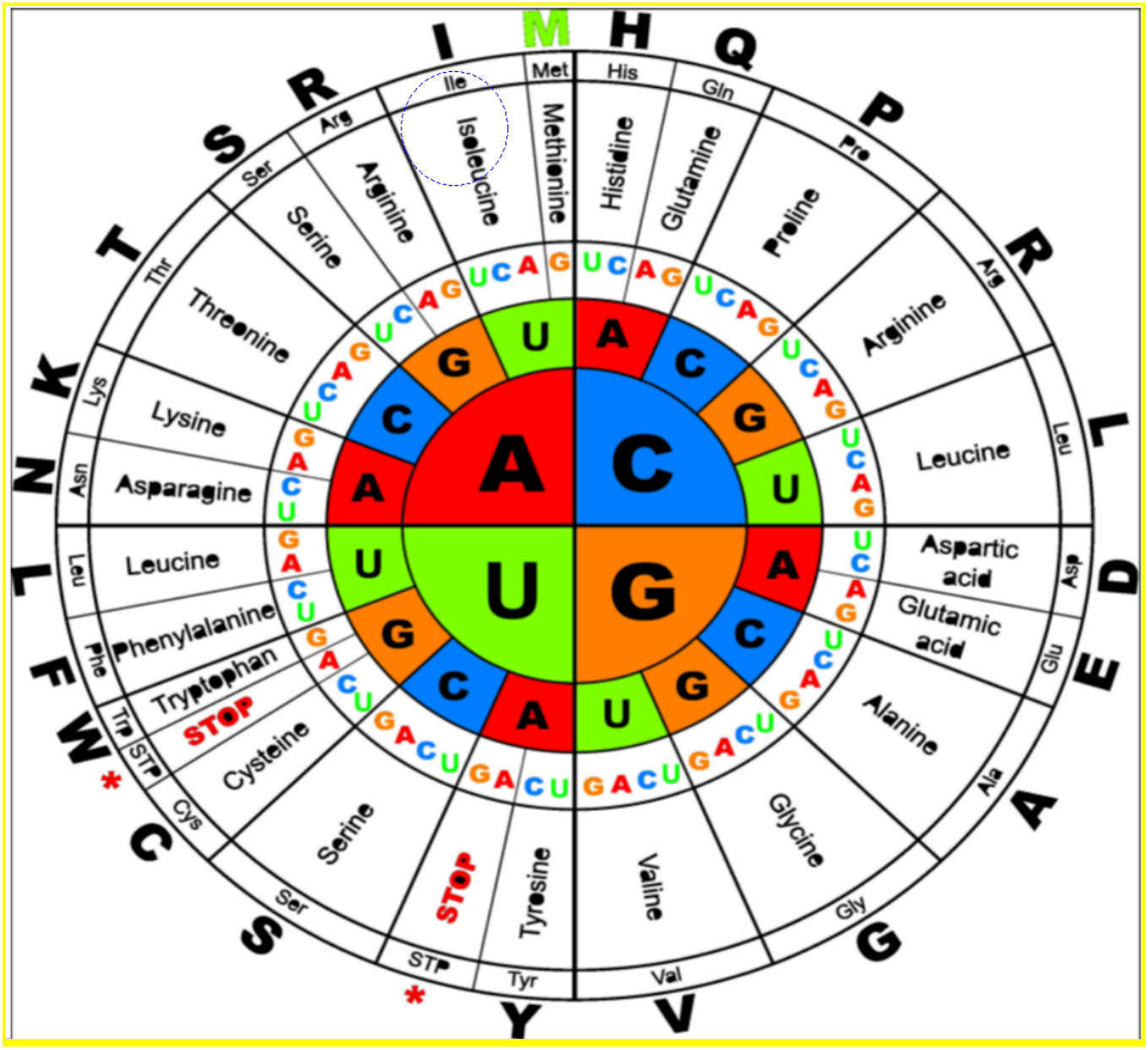
AMINOACYL tRNA SYNTHETASE (PROTEIN IS AN ENZYME)

THE SECOND PROTEIN WE MADE IS: **PROTEASOME**

4. NOW PRACTICE SOME MORE TRANSLATION USING THESE WEBSITES:

http://lab.concord.org/embeddable.html#interactives/sam/DNA-to-proteins/3-modeling-translation.json
https://biomanbio.com/HTML5GamesandLabs/LifeChemgames/protsynthracehtml5page.html
https://learn-resources.concord.org/sam-riitest/101-dna-to-proteins/transcription.mp4

Use the charts BELOW for mRNA TO FIND THE AMINO ACIDS



The Genetic Code is Biology's Rosetta Stone

THIS IS FOR RNA ONLY

first base	second base: U	second base: C	second base: A	second base: G	third base
U	UUU phe	UCU ser	UAU tyr	UGU cys	U
	UUC phe	UCC ser	UAC tyr	UGC cys	C
	UUA leu	UCA ser	UAA **Stop**	UGA **Stop**	A
	UUG leu	UCG ser	UAG **Stop**	UGG trp	G
C	CUU leu	CCU pro	CAU his	CGU arg	U
	CUC leu	CCC pro	CAC his	CGC arg	C
	CUA leu	CCA pro	CAA gln	CGA arg	A
	CUG leu	CCG pro	CAG gln	CGG arg	G
A	AUU ile	ACU thr	AAU asn	AGU ser	U
	AUC ile	ACC thr	AAC asn	AGC ser	C
	AUA ile	ACA thr	AAA lys	AGA arg	A
	AUG met **(start)**	ACG thr	AAG lys	AGG arg	G
G	GUU val	GCU ala	GAU asp	GGU gly	U
	GUC val	GCC ala	GAC asp	GGC gly	C
	GUA val	GCA ala	GAA glu	GGA gly	A
	GUG val	GCG ala	GAG glu	GGG gly	G

DOES NOT HAVE T

These are the words of the genetic language.