



## Create a "CHNOPS" Creature Simulation of Protein Synthesis

Data Table 1: *CHNOPS genes*

<b>Gene A</b> DNA: <b>ACC GGT TAT</b> mRNA _____ tRNA _____ AA's _____ Trait _____	<b>Gene B</b> DNA: <b>ACG CGA</b> mRNA _____ tRNA _____ AA's _____ Trait _____	<b>Gene C</b> DNA: <b>TTT AAC</b> mRNA _____ tRNA _____ AA's _____ Trait _____
<b>Gene D</b> DNA: <b>GGA CGC CGA</b> mRNA _____ tRNA _____ AA's _____ Trait _____	<b>Gene E</b> DNA: <b>GGG AGG AAA</b> <b>CCC</b> mRNA _____ tRNA _____ AA's _____ Trait _____	<b>Gene F</b> DNA: <b>CAA CAA CTA</b> mRNA _____ tRNA _____ AA's _____ Trait _____
<b>Gene G</b> DNA: <b>ACC ATA ATA</b> mRNA _____ tRNA _____ AA's _____ Trait _____	<b>Gene H – Your own!</b> DNA: _____ mRNA _____ tRNA _____ AA's _____ Trait _____	<b>Gene I – Your own!</b> DNA: _____ mRNA _____ tRNA _____ AA's _____ Trait _____

**Questions:**

1. What is translation?
2. What is transcription?
3. How are translation and transcription different?
4. What is the specific site in the cell where transcription occurs?
5. What is the specific site in the cell that translation occurs?
6. How many tRNA nucleotides or nitrogenous bases form an anticodon that will attach to the mRNA codon?
7. How could one change in a DNA nucleotide (base) alter the formation of the amino acid sequence?
8. Extra Credit (2 pts): what does CHNOPS stand for?

Complete the data table without using any of the existing traits or amino acid sequences

Amino Acid Sequence (your own)	Trait (your own)

# Create a "CHNOPS" Creature

## Simulation of Protein Synthesis



### Procedure:

1. Code DNA to mRNA for Gene A in **Table 1**
2. Use the "**Genetic Code**" chart (Table 11.1 on Pg. 292 of your book) to find the amino acids.
  - You may abbreviate to the first three letters. Ex: Tryptophan-Leucine-Serine can be written Try-Leu-Ser.
3. Find the trait that corresponds to this amino acid chain in **Table 2** below.
4. Repeat #1-3 for Genes B-G
5. Create your own Gene H and I *without* duplicating an existing AA sequence or trait. (you must create a new one not found in table 2)
6. Fill in Table 1 including Genes H & I and enter your own amino acid sequences and traits in the table on your copy
7. Draw your CHNOPS creature according to the traits the genes coded for
8. Answer the questions

**Data Table 2: Traits for Amino Acid Sequences**

Amino Acid Sequence	Trait
Tryptophan-Glycine-Isoleucine	Hairless
Tryptophan-Proline-Isoleucine	Hairy
Tryptophan-Tyrosine-Tyrosine	Plump
Cysteine-Tyrosine-Tyrosine	Skinny
Cysteine-Alanine	Four-legged
Cysteine-Proline	Five-legged
Arginine-Serine-Phenylalanine-Glycine	Long nose
Proline-Serine-Phenylalanine-Glycine	Short nose
Lysine-Leucine	Freckles
Lysine-Phenylalanine	No freckles
Proline-Alanine-Alanine	Orange skin
Proline-Alanine-Proline	Blue skin
Valine-Valine-Aspartic Acid (Aspartate)	Blue eyes
Valine-Valine-Glutamic Acid (Glutamate)	Yellow eyes

*(enter your own amino acid sequences and traits in the table on your copy)*

