**Snork Activity**

*How Does DNA Determine the Traits of an Organism?*

**Introduction:** In this simulation, you will examine the DNA sequence of a fictitious organism- the snork. Snorks were discovered on the planet Dee Enae in a distant solar system. There are four species of snork. Snorks only have one chromosome with five genes on it. Your job is to analyze the genes of its DNA and determine what traits the organism has and then sketch the organism (You can be creative here).

For simplicity, the gene sequences are much smaller than real gene sequences found in living organisms. Each gene has two versions (alleles) that result in a different trait being expressed in the snork.

|  |  |  |
| --- | --- | --- |
| **Genes** | **Amino Acid Sequence** | **Trait Description** |
| Gene 1- body shape | tyr- pro- gln- gln- lys | Circular |
|  | val- pro- thr- pro- lys | Rectangular |
| Gene 2- legs | leu- leu- leu- pro | 3 legged |
|  | leu- leu- ser- ala | 2 legged |
| Gene 3- body pigment | ser- pro- val | Blue pigment (hair/skin) |
|  | val- phe- tyr | Green pigment (hair/skin) |
| Gene 4- eyes | asn- iso- leu- leu- pro- thr | 2 Small slanted eyes |
|  | asn- iso- pro- pro- pro- thr | 1 Large round eye |
| Gene 5- mouth | val- asn- asn- ala | Circular mouth |
|  | asn- asn- asn- ala | Rectangular mouth |

Each of the DNA samples was taken from volunteer snorks. Your job is to transcribe the DNA into the complementary mRNA strand and then translate the mRNA into a protein (chain of amino acids). Analyze the protein to determine the phenotype (outward physical appearance) based on the protein’s amino acid sequence. The genes are in order from gene 1 to gene 5.

**Directions:**

1. Write the name of your assigned snork. (1 point)

2. Write the DNA gene and complementary mRNA strand for each of the 5 genes of your snork. (5 points)

3. Write the amino acids for each gene. (5 points)

4. Figure out the traits. Draw your snork and label the features. Use color. (5 points)

5. Answer Analysis Questions (8 points)

<http://biologycorner.com/worksheets/DNA_snorks.html>

**Snork Analysis**

**Directions:** For each of your Snork’s 5 genes, write out the DNA sequence. Then transcribe the mRNA sequences from the given DNA. Finally, translate the mRNA sequences to determine the amino acid sequences. Use the chart provided to determine the trait description of your snork. Then answer the analysis questions that follow.

Type of Snork: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Gene 1**

|  |  |
| --- | --- |
| **DNA** |  |
| **mRNA** |  |
| **Amino Acid** |  |
| **Trait** |  |

**Gene 2**

|  |  |
| --- | --- |
| **DNA** |  |
| **mRNA** |  |
| **Amino Acid** |  |
| **Trait** |  |

**Gene 3**

|  |  |
| --- | --- |
| **DNA** |  |
| **mRNA** |  |
| **Amino Acid** |  |
| **Trait** |  |

**Gene 4**

|  |  |
| --- | --- |
| **DNA** |  |
| **mRNA** |  |
| **Amino Acid** |  |
| **Trait** |  |

**Gene 5**

|  |  |
| --- | --- |
| **DNA** |  |
| **mRNA** |  |
| **Amino Acid** |  |
| **Trait** |  |

**Analysis Questions:** Answer the following questions in complete sentences.

1. Write the name of the process (transcription or translation) that completes each part of the central dogma:

a. DNA 🡪 mRNA: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 b. mRNA 🡪 Protein: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. Where within the cell:

 a. Are the DNA instructions located? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 b. Does transcription occur? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 c. Does translation occur? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. A protein is a chain of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ connected together.

4. Why is it necessary to use the mRNA codon to determine the correct amino acid for a protein? (Would you get the correct amino acid if you used the tRNA anti-codon instead?)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

5. What is a codon? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

6. Why are the stop codons so important? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

7. Match the following parts with their function during translation:

\_\_\_\_\_\_\_\_\_ Ribosome (rRNA) a. Contains codons (3 bases) that is the “message” to determine the amino acid in the protein.

\_\_\_\_\_\_\_\_\_ mRNA b. Matched its anticodon (3 bases) with the mRNA codon to carry the amino acid to create a protein.

\_\_\_\_\_\_\_\_\_ tRNA c. Moves down and “reads” the mRNA one codon at a time and is the site where the protein is assembled.

8. Use your notes to draw out a ribosome translating the mRNA sequence AUUCCGAAG. Make sure to include:

**tRNA with the correct anticodons and amino acids, the mRNA transcript, and ribosome.**

**Snicker Snork**

Gene 1: ATG GGG GTT GTC TTT

Gene 2: GAG AAT TCA CGC

Gene 3: CAA AAA ATG

Gene 4: TTA TAG AAT GAC GGG TGG

Gene 5: TTA TTG TTA CGG

**Snuffle Snork**

Gene 1: CAA GGA TGA GGT TTC

Gene 2: GAA GAG GAG GGG

Gene 3: CAT AAA ATA

Gene 4: TTA TAA GAA GAC GGG TGT

Gene 5: TTA TTA TTA CGT

**Snapple Snork**

Gene 1: ATG GGG GTT GTC TTT

Gene 2: GAG AAT TCA CGC

Gene 3: AGA GGG CAT

Gene 4: TTA TAA GAG GAG GGG TGG

Gene 5: CAA TTA TTA CGT

**Snoopy Snork**

Gene 1: ATG GGG GTT GTC TTT

Gene 2: AAT GAA GAC GGG

Gene 3: AGA GGG CAT

Gene 4: TTG TAA GAA GAC GGG TGT

Gene 5: TTA TTG TTA CGG

**Old Wise Teacher Snork:**

Gene 1: ATG GGG GTT GTC TTT

Gene 2: GAA GAG GAG GGG

Gene 3: CAA AAA ATG

Gene 4: TTA TAG AAT GAC GGG TGG

Gene 5: TTA TTA TTA CGT