Name: _____ Hour: _____ Date: _____

Snorks: What are the aliens' traits?

5.3.1: Develop or modify a model to predict and justify a change in a system.
5.3.2: Justify the relationships among processes, systems, etc., shown within a model.

Introduction: You were sent on a mission to discover whether there is life on other planets. On the far-off planet of Dee Enae in a distant solar system, you came across some strange creatures called Snorks!

Background: Snorks only have one chromosome with 10 genes on it. Each gene has two possibilities that result in a different trait.

Before you start:

1. What are the two stages of protein synthesis that tell you what protein a DNA sample codes for?
    a. _____
    b. _____
2. The two types of RNA involved in protein synthesis are:
    a. _____
    b. _____
3. Remember: How is RNA different from DNA? (list 2 ways)
    a. _____
    b. _____

Instructions: **Your group has been assigned a mystery DNA sample** to investigate. The labels fell off the samples (oops!) You collected information about the different Snorks you saw there, but you don't know which sample was which. Your job is to determine the traits of your Snork from the DNA.

1. You need to transcribe the **DNA** sequence from each of the ten genes for your Snork.
2. Determine the **mRNA sequence of each gene**. Remember: What is it called when you make an mRNA copy of DNA? _____
3. The mRNA (and the DNA) is broken up into several groups of 3 bases. What is a group of three bases called? _____
4. Only a portion of the DNA is shown. In the complete genome, every Snork's mRNA sequence ends with UAA (not shown). What is the nickname for what this sequence codes for? (consult your codon chart) "_____"
5. Record the appropriate **tRNA** anticodon complementary to each mRNA codon.
6. Get out your **Amino Acid Chart** to determine the amino acid corresponding to each **mRNA** sequence. This will complete translation of each mRNA codon for the 10 genes.
7. Once you have translated all ten genes, ask your teacher for **Table 1 (traits key).** For each gene, find the sequence of amino acids that matches your Snork and write the corresponding trait in your data table.
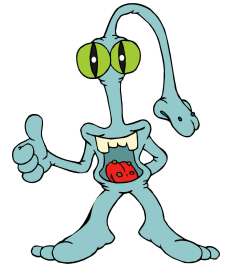
Snork #1:

	GENE 1	GENE 2	GENE 3
DNA	AAA GTT GCC	TTA CTT TAT	AGT GAG CCG
mRNA			
tRNA			
Amino acids			
Trait			

	GENE 4	GENE 5	GENE 6
DNA	ACC GGA GCC	ACG AAA GTG	TTA TGG TTC
Mrna			
tRNA			
Amino acids			
Trait			

	GENE 7	GENE 8	GENE 9	GENE 10
DNA	AGT GAG ACC	GCC GTT CGG	TGC GGA TTC	TAT CAG ATA
mRNA				
tRNA				
Amino acids				
Trait				

Use the 10 traits to sketch a drawing of your Snork:

Snork #2:

	GENE 1	GENE 2	GENE 3
DNA	ACG AAA GTG	TTA TGG TTC	AGT GAG ACC
mRNA			
tRNA			
Amino acids			
Trait			

	GENE 4	GENE 5	GENE 6
DNA	GCC GTT CGG	AGT GAG CCG	ACC GGA GCC
Mrna			
tRNA			
Amino acids			
Trait			

	GENE 7	GENE 8	GENE 9	GENE 10
DNA	TGC GGA TTC	TAT CAG ATA	AAA GTT GCC	TTA CTT TAT
mRNA				
tRNA				
Amino acids				
Trait				

Use the 10 traits to sketch a drawing of your Snork:

FOLLOW-UP QUESTIONS:

1. What is the role of mRNA? Why can't DNA make proteins on its own?

_____

_____

2. What is the role of tRNA? Why can't mRNA make proteins on its own?

_____

_____

3. What is the relationship between DNA and mRNA? mRNA and tRNA? mRNA and amino acids?

_____

_____

_____

_____

4. What is the relationship between transcription and translation? Why are both processes necessary?

_____

_____

_____

_____

5. Predict what would happen to your snork if one of its ten gene sequences changed. Give a specific example by picking one of the ten gene sequences, illustrating the change that occurs, and explaining what would happen as a result of that change.

_____

_____

_____

_____

TABLE 1: (Traits Key)

Genes	Amino Acid Sequence			Description
Gene 1 - body covering	Phe	Gln	Arg	Hairless
	Cys	Phe	His	Hairy
Gene 2 - body style	Asn	Thr	Lys	Skinny
	Asn	Glu	Ile	Plump
Gene 3 - legs	Ser	Leu	Trp	2 legged
	Ser	Leu	Gly	3 legged
Gene 4 - head shape	Trp	Pro	Arg	round head
	Arg	Gln	Ala	square head
Gene 5 - tails	Cys	Phe	His	tail
	Ser	Leu	Gly	no tail
Gene 6 - body pigment	Trp	Pro	Arg	red pigment (hair/skin)
	Asn	Thr	Lys	blue pigment (hair/skin)
Gene 7 - eyes	Ser	Leu	Trp	small slanted eyes
	Thr	Pro	Lys	large round eyes
Gene 8 - mouth	Arg	Gln	Ala	circular mouth
	Ile	Val	Tyr	rectangular mouth
Gene 9 - ears	Phe	Gln	Arg	rounded floppy ears
	Thr	Pro	Lys	pointed standing-up ears
Gene 10 - arms	Ile	Val	Tyr	long spaghetti like arms
	Asn	Glu	Ile	short stumpy arms

RETURN TO TEACHER!

Snork 1 mRNA & Amino Acid key: (for teacher use)

1) UUU CAA CGG 2) AAU GAA AUA

phe gln arg asn glu ile

3) UCA CUC GGC 4) UGG CCU CGG

ser leu gly trp pro arg

5) UGC UUU CAC 6) AAU ACC AAG

Cys phe his asn thr lys

7) UCA CUC UGG 8) CGG CAA GCC

Ser leu trp arg gln ala

9) ACG CCU AAG 10) AUA GUC UAU

Thr pro lys ile val tyr

Snork 2 mRNA & Amino Acid key:

UGC UUU CAC AAU ACC AAG

Cys phe his asn thr lys

UCA CUC UGG CGG CAA GCC

Ser leu trp arg gln ala

UCA CUC GGC UGG CCU CGG

ser leu gly trp pro arg

ACG CCU AAG AUA GUC UAU

Thr pro lys ile val tyr

UUU CAA CGG AAU GAA AUA

phe gln arg asn glu ile