8<sup>th</sup> grade science November 14, 2017

## Practice Test on Cell Biology (the REAL test is on Friday the 17th)

LO: Describe and explain the Central Dogma. SLE: Meet NGSS.

On the real test, you will be given this chart of the genetic code (from openstax.org/details/biology).

			Secon	d letter			
		U	С	Α	G		
First letter	U	UUU } Phe UUC } Leu UUG }	UCU UCC UCA UCG	UAU Tyr UAC Stop UAG Stop	UGU Cys UGC Stop UGG Trp	UCAG	
	С	CUU CUC CUA CUG	CCU CCC CCA CCG	CAU His CAA GIn CAG	CGU CGC CGA CGG	UCAG	Third letter
	Α	AUU AUC AUA Met	ACU ACC ACA ACG	AAU Asn AAC Lys AAG Lys	AGU Ser AGC AGA AGG Arg	UCAG	Third
	G	GUU GUC GUA GUG	GCU GCC GCA GCG	GAU Asp GAC GAA GAG Glu	GGU GGC GGA GGG	UCAG	

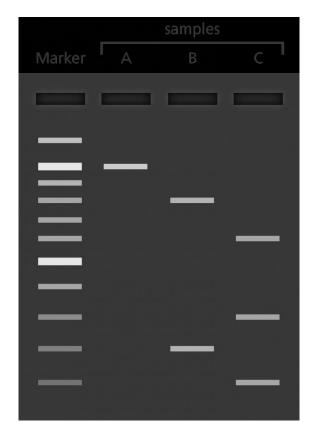
1. Translate the following <u>DNA sequence</u> into an <u>amino acid sequence</u>:

2. Complete this sentence	:			
Osmosis is the diffusion of	f	through a _		membrane.
3a. Complete this chemica	al equation:			
+	→ 6CO <sub>2</sub> + 6F	H <sub>2</sub> O + energy (reca	nptured as A	ГР)
3b. What process does thi	s chemical equati	on represent?		
3c. Where in eukaryotic c	ells does this pro	cess take place?		
a. cell membrane	b. chloroplasts	c. mitochondria	d. nucleus	e. ribosome
Ž	•	1	d. nucleus	e. ribosome

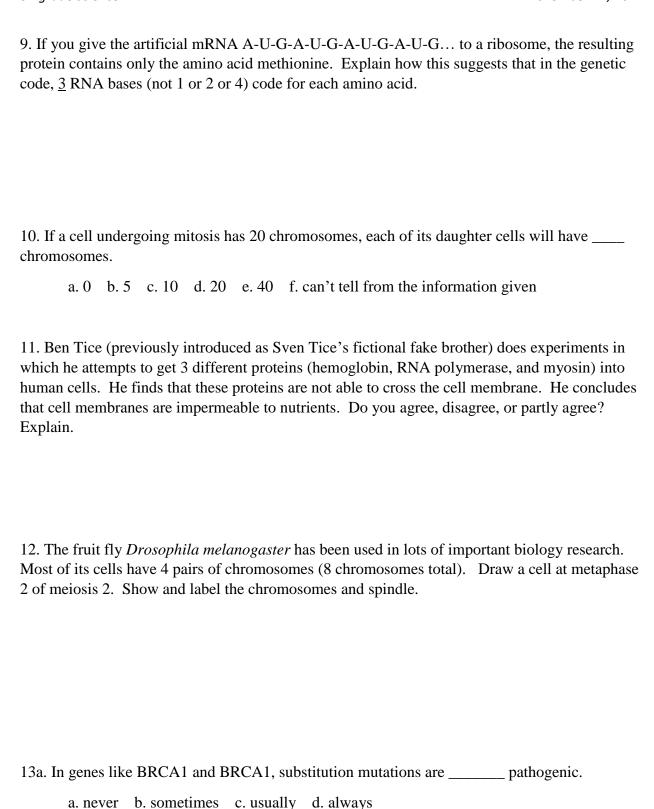
- 4. DNA electrophoresis is the process of
  - a. changing the charge of DNA by swapping out the phosphates for sulfates
  - b. digesting DNA into smaller pieces
  - c. mutating DNA with radiation
  - d. separating pieces of DNA based on size

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- 5. Which is NOT an original part of the cell theory, as formulated in the 1800s?
  - a. All living things are composed of cells.
  - b. Cells are the basic unit of structure and function of living things.
  - c. DNA runs the cell by telling it which proteins to make.
  - d. New cells come from existing cells.
- 6. What is the function of the endoplasmic reticulum (ER) and Golgi complex?
  - a. hold the genetic material of the cell
  - b. process and package new proteins
  - c. protect the interior of the cell by keeping bad stuff out
  - d. transcribe DNA to RNA
- 7. At right is a diagram of a typical DNA gel. The dark slits near the top are the wells into which the DNA is pipetted. Circle the smallest piece (or pieces, if there is a tie) of DNA. (Image from yourgenome.org.)



8. If a protein is 400 amino acids long, Olivia claims that the messenger RNA (mRNA) that gets translated into this protein must be at least 1203 bases long. Explain why she is right.



13b. What is a substitution mutation?

14. Sex-linked traits are controlled by genes on the X chromosome. Why are males more likely than females to display recessive traits such as red-green colorblindness?
15. Say whether each statement is true of DNA, RNA, both, or neither.
a. a type of nucleic acid:
b. a product (end result) of translation:
c. includes the base guanine (G):
d. can move from the nucleus to ribosomes:
e. different forms include a "messenger" (m) form and a "transfer" (t) form
16. As we have seen, there is a gene controlling earlobe appearance (either attached or unattached). This trait is NOT sex-linked; that is, the relevant gene is not on the X chromosome. <u>Unattached lobes are dominant over attached ones</u> .
a. If the two possible alleles are E and e, what genotype(s) result(s) in a phenotype of unattached earlobes?
b. Two people who both have genotypes of Ee have children together. What are their children's possible genotypes, with what odds (percentages)?
c. What are their children's possible phenotypes, with what odds (percentages)?