Study Guidelines: **Mutations and Gene Regulation**

Name: \_\_\_\_\_\_\_\_\_\_\_\_

Period: \_\_\_ Seat: \_\_\_\_

The instructions written out in the DNA for building proteins is very specific and must be followed exactly to make, normal, functioning proteins. However, every now and then changes are made in the instructions. These changes may be due to replication errors or environmental factors that damage the DNA and affect protein synthesis.

Review Objectives

1. Obtain signatures from at least 3 people after explaining DNA replication to them (with as much detail as possible)

2. In a well-organized paragraph, describe the process of transcription including; where it happens, when it happens, what is made, what enzyme is used, transcription factors, promoter, introns and exons, 5’cap and poly A tail

3. a. Create your own labeled illustration (drawing) of translation. From your own imagination, NOT THE INTERNEXT OR BOOK! Should include; ribosome (small and large unit), mRNA, tRNA, codons, anticodons, amino acids

b. Where does translation happen? What is made?

c. How does a tRNA know which amino acid to drop off?

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4. Define mutation in your own words.

5. a. Describe what a frameshift mutation is. b. Explain the consequences of a frameshift mutation

6. a. Describe what a base substitution is. b. Explain the consequences of a base substitution mutation

7. a. Create an argument that explains why not all mutations are bad. b. Draw out an example that demonstrates your answer to part 7a.

8. a. Define gene. b. Explain how genes are regulated c. Describe what can happen in a cell if a gene is turned on or off.

9. a. Define metabolic pathway. b. Describe how gene regulation (turning genes on or off) can affect a metabolic pathway.

10. a. Draw a picture of an operon. b. Label all the parts including the genes, promoter and operator. Explain the role of each of those parts plus the repressor

11. a. Watch the video on operons (many people did not quite understand operons when they explained them in their video)

b. Explain how an inducible operon works. Identify when inducible operons are used.

c. Explain how a repressible operon works. Identify when repressible operons are used.

d. EXTRA CREDIT- Create one single video that explains both repressible and inducible operons and post it on edmodo.

12. Compare and contrast repressible and inducible operons

13. a. Use the internet to find a picture that shows how a chromosome is built/organized. b. On that picture label the chromosome, chromatin, nucleosomes and histone proteins. c. How can you tell chromosome from chromatin?

14. a. Identify the three main ways eukaryotes regulate their genes. b. Name at least three things that could cause a eukaryote to regulate (turn on or off) its genes to be regulated.