

Mutations and Cancer Review Sheet

1. What is a mutation?
2. During which of the 4 stage cell cycle do most mutations occur and **why**? (G₁ S G₂ Cell Division)
3. List the 3 types of mutations.
4. What are the three types of single base substitutions?

Use the following for the next 3 questions.

Before Mutation

DNA = A A T C T C A C C T T A
 mRNA =
 amino acids =

5. Describe a missense mutation. Alter the following strand of DNA to reflect a missense mutation.

After Mutation

DNA = A A T C T C A C C T T A
 mRNA =
 amino acids =

6. Describe a nonsense mutation. Alter the following strand of DNA to reflect a nonsense mutation.

After Mutation

DNA = A A T C T C A C C T T A
 mRNA =
 amino acids =

7. Describe a silent mutation. Alter the following strand of DNA to reflect a silent mutation.

After Mutation

DNA = A A T C T C A C C T T A
 mRNA =
 amino acids =

8. Describe an insertion mutation. Rewrite the following strand of DNA to reflect an insertion mutation.

A A T C T C A C C T T A G G C A G C T G C

9. Describe a deletion mutation. Rewrite the following strand of DNA to reflect a deletion mutation.

A A T C T C A C C T T A G G C A G C T G C

10. Explain why insertions or deletions of 1 base is more harmful than an insertions or deletions of 3 bases.

11. Create a **single "letter" deletion** mutation in the sentence below.

THE BIG FAT CAT ATE THE RAT

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 This results in a frame shift. Why would a deletion of 3 letters be less harmful?

12. Create an **insertion** mutation in both the sentence and DNA sequences below.

Base Sequence: A G A G C A T A G G A T

Single Insertion Mutation: _ _ _ _ _ _ _ _ _ _ _ _

13. With a diagram, show what a translocation mutation would look like.
14. What is cancer?
15. Explain the link between mutations and cancer.
16. What is the difference between a **malign** (malignant) and **benign** tumor.
17. What does "Metastasis" mean in reference to cancer and why does it make cancer so difficult to treat?
18. What is the Ames test?
19. The plates below have been prepared for Ames tests. Explain the results. Is either chemical carcinogenic?

