Topic 4- Lesson 4: "Trait Variations" **name**_____

- **How do genes on sex chromosomes determine different traits?**
- **How do mutations affect protein synthesis and increase variations?**
- **How does the environment influence genetic traits?**

1. **How do differences in traits have the potential to change the population?** _____
   _____
   _____

2. **A variation is** _____.

3. **What are the three ways described in the book that can cause trait variation?**
   a. _____

   b. _____

   c. _____

4. **True or False – Trait variations are either helpful or harmful.**

5. **What are the two types of chromosomes found in your cells?**
   a. # _____ pair(s) of _____
   b. # _____ pair(s) of _____

6. **Humans have a total of _____ pairs of chromosomes in each cell.**

7. **_____ determine whether a person is biologically male or female.**

8. **A human female inherits one _____ chromosome from her mother and one _____ chromosome from her father.**

9. **A human male inherits one _____ chromosome from his mother and one _____ chromosome from his father.**

10. **Autosomal chromosomes are** _____
    _____

11. **All pairs of autosomal chromosomes are "homologous". What does "homologous chromosomes" mean?** _____
    _____

12. **Why does the X chromosome express more traits than the Y chromosome?** _____
    _____
    _____

13. Which parent contributes the sex chromosome that determines the sex of the offspring?
a. mother
b. father
c. neither parent
b. both parents

14. What is a mutation? _____
_____

15. Name the two types of mutations and how they occur.
a. _____ _____
_____
_____
b. _____ _____
_____
_____

<u>Use Figure 4 (pg. 208) "Genetic Mutations" to answer the following questions.</u>

16. Draw the original DNA sequence.

17. One type of genetic mutation that can occur is a deletion. What happens if a deletion occurs? _____

18. What is the deletion in Figure 4? _____

19. Another type of genetic mutation that can occur is an addition. What happens if an addition occurs?_____

20. What is the addition in Figure 4? _____

21. A third type of mutation is called a substitution. What happens if a substitution occurs? _____

22. What is the substitution in Figure 4? _____

23. Why are sex-linked mutations more likely to occur on the X chromosome? _____
_____
_____

24. Mutations can occur on which of the following types of chromosomes? (circle all that apply)

a. Autosomal Chromosomes
b. X chromosomes
c. Y chromosomes
d. RNA chromosome

25. Give an example of a naturally occurring mutagen. _____

26. Give two examples of synthetic mutagens.
_____ and _____

27. What does is mean if a mutation is "helpful"? _____
_____
Example of "helpful" mutation: _____

28. What does is mean if a mutation is "harmful"? _____
_____
Example of "harmful" mutation: _____

29. What does is mean if a mutation is "neutral"? _____
_____
Example of "neutral" mutation: _____

30. What is a nondisjunction? _____
_____

31. What is a karyotype? _____

32. A karyotype sometimes shows an additional chromosome. This grouping is called _____, (_____ meaning "three" and _____ meaning "body"). Edward's Syndrome is called _____ and Down's Syndrome is called _____. If a chromosome is missing, it is called _____, (_____ means "one").

33. Protein changes occur when an _____ _____ sequence is altered causing the directions for _____ _____ to be altered. The result is a _____.

34. Some genes called "_____ _____" can move to a new location on the _____. This causes a _____ to be produced at that point and may disrupt a _____ _____ causing that trait to not be expressed. This can cause a _____ to change.

35. Some species are able to change their _____ in order to create specific _____ in response to their _____.