Chapter 15 – Chromosomal Basis of Heredity

Relating Mendelian Inheritance to the Behavior of Chromosomes

1. Explain how the observations of cytologists and geneticists provided the basis for the chromosome theory of inheritance
2. Explain why *Drosophilia melanogaster* is a good experimental organism for genetic studies
3. Explain why linked genes do not assort independently.
4. Distinguish between parental and recombinant phenotypes.
5. Explain how crossing over can unlink genes.
6. Explain how Sturtevant created linkage maps.
7. Define a map unit.
8. Explain why Mendel did not find linkage between seed color and flower color, despite the fact that these genes are on the same chromosome.
9. Explain who genetic maps are constructed for genets located for apart on a chromosome.
10. Explain the effect of multiple crossovers between loci.
11. Explain what additional information cytogenetic maps provide.

Sex Chromosomes

12. Describe how sex is genetically determined in humans and explain the significance of the SRY gene.
13. Distinguish between linked genes and sex-linked genes
14. Explain why sex-linked diseases are more common in human males
15. Describe the inheritance patterns and symptoms of color blindness, Duchenne, muscular dystrophy, and hemophilia
16. Describe the process of X inactivation in female mammals. Explain how this phenomenon produces the tortoiseshell coloration in cats

Errors and Exceptions in Chromosomal Inheritance

17. Explain how nondisjunction can lead to aneuploidy
18. Define trisomy, triploidy, and polyploidy. Explain how these major chromosomal changes occur and describe possible consequences.
19. Distinguish among deletions, duplications, inversions, and translocations.
20. Describe the typed of chromosomal alterations responsible for the following human disorders' Down syndrome, Klinefelter syndrome, extra Y, triple-X syndrome, Turner syndrome, cri du chat, chronic myelogenous leukemia.
21. Define genomic imprinting. Describe the evidence that suggests that the *Igf2* gene in maternally imprinted.
22. Explain why extra-nuclear genes are not inherited in a Mendelian fashion.