BIOLOGY

OCA - Study Guide: Chapter 11

Biology: Introduction to Genetics – Mendel & Meiosis

Define the following terms.

Allele	Genetics	Meiosis
Codominance	Genotype	Multiple alleles
Crossing over	Haploid	Phenotype
Diploid	Heterozygous	Polygenic trait
Dominance	Homologous	Probability
Fertilization	Homozygous	Punnett square
Gamete	Hybrid	Segregation
Gene	Incomplete dominance	Trait
Gene map	Independenta assortment	True –breeding

Answer all of the following questions on a separate piece of paper:

Section 1 – The Work of Gregor Mendel

1. Briefly describe the work of Gregor Mendel.

2. Explain how the following words are related to each other: true-breeding vs. hybrid, allele & gene, gene & trait, fertilization & gamete , haploid vs. diploid, dominance and recessive, phenotype vs. genotype.

3. Why were peas a good choice for Mendel's experiment? Would Tigers be a good choice for genetic studies? Why or why not?

4. State the principle of dominance.

5. How could you find out if the recessive allele is still present in the F_1 generation?

6. Draw a diagram using Ts that shows how alleles separate during meiosis, then recombine during fertilization.

Section 2 – Probability and Punnett squares

7. Draw a punnett square for each of the following crosses : TT x tt, Bb x Bb TtBb x TtBb

8. For each of the above crosses, give the phenotypic and genotypic ratios.

9. What do the letters on the outside of the punnett square represent?

10. What do the letters on the inside of the punnett square represent? How are they related to probability?

11. What is the principle of independent assortment?

12. List and summarize each of Mendel's four principles.

13. Describe the following inheritance patterns by making a chart that includes a description for each pattern and examples for each pattern. (simple dominance, incomplete dominance, codomince, multiple alleles, polygenic traits) (six rows (including headers) – three columns)

14. Describe the work of Thomas Hunt Morgan.

15. Are an organism's characteristics determined only by its genes? Explain your answer.

Section 4 - Meiosis

16. What does it mean when two sets of chromosomes are homologous?

17. Construct a chart that compares diploid and haploid cells for humans using the following : n, 2n, gametes, fertilized egg, single set of chromosomes, two sets of chromosomes.

18. Why is meiosis described a s a process of reduction division?

19. Compare Meiosis and Mitosis.

20. Explain why it is chromosomes, not individual genes, that assort independently.

21. Draw a picture that illustrates crossing over.

22. What are the results of crossing over? How does crossing over relate to Mendel's principles?

Section 5 – Linkage and Gene Maps

23. What is a gene map? Describe how a gene map is produced.

24. How does crossing over make gene mapping possible?

25. In rabbits, B is an allele for Black coat and b is an allele for brown coat. Write the genotypes for a rabbit that is homozygous for black coat and an other rabbit that is heterozygous for black coat.

26. Using the data above, cross a homozygous black coat with a homozygous brown coat, then draw a punnett square showing the F_2 generation.