

Genetics Ch. 13-15 Study Guide

Chapter 13: Meiosis and Sexual Life Cycles

AP Students should be able to:

- Differentiate between asexual and sexual reproduction.
- Describe the role of meiosis and fertilization in sexually reproducing organisms.
- Explain the importance of homologous chromosomes to meiosis.
- Describe how the chromosome number is reduced from diploid to haploid through the stages of meiosis.
- Provide three important differences between mitosis and meiosis.
- Explain the importance of crossing over, independent assortment, and random fertilization to increasing genetic variation.

TERMS... *AP Students should be able to define:*

haploid, diploid, independent assortment, crossing over, random fertilization, Meiosis I, Meiosis II, prophase I/II, metaphase I/II, anaphase I/II, telophase I/II, tetrad, homologous pair, synapsis, centromere, chromatid(s)

Chapter 14: Mendel and the Gene Idea

AP Students should be able to:

- Explain how to derive the proper gametes when working a genetics problem
- Define the difference between an allele and a gene
- Know how to interpret a pedigree
- Provide the ratios of heterozygous crosses: Monohybrid = 3:1 Dihybrid = 9:3:3:1

TERMS... *AP Students should be able to define:*

P, F₁, F₂, dominant, recessive, homozygous, heterozygous, phenotype, genotype, monohybrid, dihybrid, loci/locus, karyotype, incomplete dominance, codominance, multiple alleles, pleiotropy, epistasis, amniocentesis, CVS test

Chapter 15: The Chromosomal Basis of Inheritance

AP Students should be able to:

- Outline how the chromosome theory of inheritance connects the physical movement of chromosomes in meiosis to Mendel's laws of inheritance.
- Understand the unique pattern of inheritance in sex-linked genes.

TERMS... *AP Students should be able to define:*

nondisjunction, linked genes

You should be able to:

- Discuss the work of Thomas Hunt Morgan, sex-linked traits
- Calculate monohybrid/dihybrid crosses

- Determine blood groups provided information about the P generation
- Complete a chi-square problem and answer questions pertaining to your findings

Sample Problems:

1. A woman sues a man for the support of her child. She has type A blood, her child has type O, and the man has type B. Could the man be the father? Explain.
2. Use a Punnett square to predict the genotypic and phenotypic outcome of a cross between two heterozygous/hybrid tall (Tt) pea plants.
3. In rabbits, black hair depends on a dominant allele, *B*, and brown on a recessive allele, *b*. Short hair is due to a dominant allele, *S*, and long hair to a recessive allele, *s*. If a homozygous black, homozygous short-haired male is mated with a brown, long-haired female, what will their offspring look like? What will be the genotypes of the offspring? If two of these F₁ rabbits mated, what phenotypes would you expect among their offspring, in what proportion?

Assignment:

Read pages 288-297, focusing on reviewing the work of Thomas Hunt Morgan. Morgan was instrumental in the discovery of sex-linkage in living organisms.

Please do the following:

Describe sex-linked inheritance-how are sex-linked traits inherited? Which chromosomes?

Describe two known sex-linked disorders. Are they dominant or recessive? Why?