

Biology 1
Chapter 9

Study Guide

Exam #4

What are the different types of cell division mechanisms?

What is the difference between somatic and sex cells?

What are chromosomes? What are genes? What are histones? What is DNA?

What is the difference between haploid and diploid? How many chromosomes do humans have? Do all human cells have the same number of chromosomes?

What is the cell cycle and what are the phases? What phases make up interphase?

You should know each of the different phases of mitosis and a few of the unique characteristics of each phase. Be able to visually identify the phases of the complete cell cycle.

What are centrioles? What is the spindle apparatus (bipolar mitotic spindle)?

What is cytokinesis? And how does it occur in plant and animal cells?

What is cancer? What are checkpoint genes? What are oncogenes? What are tumor suppressor genes? What are the differences between normal and cancerous cells? What is metastasis? What is the difference between a benign tumor and a malignant one?

What is apoptosis? What is the role of the p53 gene?

Chapter 10

What are gametes? What are germ cells?

What is the difference between asexual and sexual reproduction? Give examples of what types of organisms (kingdoms) do which.

What is a homologous chromosome? What is a sister chromatid? You should be able to list the phases of meiosis and some of the important characteristics of each phase?

What is crossing over? What is random alignment of the chromosomes? Where/when does each of these processes occur?

What is fertilization? What is a zygote?

What is oogenesis? What is spermatogenesis?

What are the 5 major differences between mitosis and meiosis?

Chapter 11

Who is Mendel and what did he do? What 2 principles did he come up with?

What are gametes? How would you predict the number of gametes given the genes (alleles) of parents? What are genes? What are alleles?

What is a true breeding lineage? What is a hybrid offspring?

What does it mean to be homozygous dominant? What does it mean to be homozygous recessive?

What does it mean to be heterozygous? What does it mean to be heterozygous dominant?

What is the difference between genotype and phenotype?

What is a monohybrid cross? What is a dihybrid cross? How would you make a punnett square for each of these crosses? What is a test cross?

What is incomplete dominance? What is codominance? Give examples of each and be able to set up a cross using a punnett square.

What is pleiotropy? What is epistasis? Give examples of each.

What factors influence phenotype? Why is there so much variation in phenotypes in one population?

What are autosomes? What are sex chromosomes? What is a karyotype?

What is crossing over and independent assortment?

What determines sex in humans? What is the gene responsible?

What is a (sex) linked gene? How does crossing over affect linked genes?

What is a pedigree? How would you read a pedigree?

What is an autosomal recessive allele? What is an autosomal dominant allele? What is a sex linked recessive allele? You should be able to give a few examples of each and set up punnett squares with parents affected with each of these different types of alleles.

What causes chromosome structure changes and what types of disorders result?

What causes chromosome (both sex and autosome) number changes and what types of disorders result?

What types of tests can be performed on a human embryo to determine any genetic disorder?

Genetics Problems

1. Determine all the possible gametes that the following individuals could produce:

CC	FfGg	MMNnOO
dd	Ee	FFGG
XxYyZz	AABb	

2. In dogs, wire hair is due to a dominant gene, W, and smooth hair is due to its recessive allele, w.
A) If a homozygous wire haired dog is mated with a smooth haired dog, what type of offspring (F1 generation) could be produced? Give genotypes, phenotypes and the ratios of each.

B) What type of offspring could be produced in the F2 generation. Give genotypes, phenotypes and the ratios of each.

C) A wire haired male is mated with a smooth haired female. The mother of the wire haired male was smooth. What types of offspring would be produced? Give genotypes, phenotypes and the ratios of each.

3. In dogs, black fur is controlled by the dominant allele, B, and brown by its recessive, b. Give the genotypes of the parents and offspring of a cross that produces $\frac{1}{2}$ black pups and $\frac{1}{2}$ brown pups.

4. Cross a homozygous dominant tall, TT, pea plant with a short homozygous pea plant, tt. How many short pea plants will appear in the offspring of this cross (F1)? If you cross these offspring, what will the F2 offspring be? Give genotypes, phenotypes and the ratios of each.

5. A homozygous type A blood male marries a heterozygous type B blood female. What are the chances of generating a type O child from this cross? Give the phenotypes, genotypes and the ratios of each.

6. A type A blood male marries a type B blood female. They have 4 children and after a routine blood test discover that all 4 of their kids have different blood types. Is this possible or did some of their children get switched at birth? Set up Punnett squares in order to answer this question, showing all possible genotypes and phenotypes of the kids.

7. In pea plants, tall, T, is dominant over short, t. Round seeds, R, are dominant over wrinkled seeds, r. Cross 2 heterozygous tall round seeded plants. What types of offspring do you get? Give genotypes, phenotypes and the ratios of each.

8. In snap dragons, red flowers are incompletely dominant to white flowers. Heterozygotes are pink. A red flower plant is crossed with a white flower plant. What are the genotype and phenotype of the F1 offspring? What would be the genotypes, phenotypes and the ratios of the F2 offspring? What kinds of offspring can be produced if a red flower plant is mated with a pink flower plant? Give genotypes, phenotypes and the ratios of each. Would it be possible to get a white flower plant in the F2 generation from these offspring?

9. A) Can a colorblind female have a normal vision son? Give phenotypes, genotypes and set up a sex linked cross. B) Can a hemophiliac man have an unaffected daughter? Give phenotypes, genotypes and set up a sex linked cross.

10. A) 2 heterozygous parents for familial hypercholesterolemia (autosomal dominant disorder) have a child. What are the chances that the child will also have the disease? B) 2 heterozygous parents for cystic fibrosis (autosomal recessive disorder) have a child. What are the chances the child will also have the disease?