

HONORS BIOLOGY

Study Guide

Unit 3: Genetics

Meiosis

1. What are homologous chromosomes?
2. Explain the process of meiosis.
3. Why is crossing over so important to the genetic makeup of sexually reproducing species?
4. How is meiosis similar to mitosis, and how is it different?
5. What is the relationship among chromosomes, gametes, zygotes, and offspring?

Inheritance Patterns

6. What do Punnett squares tell us?
7. Be sure you can complete a monohybrid and a dihybrid Punnett square.
8. Be able to calculate ratios and percentages of offspring phenotypes and genotypes.
9. How is selective breeding done? How is this different from creating a GMO?
10. Describe the more complex modes of genetic inheritance.

Pedigree Charts

11. What is a sex-linked trait?
12. Why are males more commonly affected by recessive sex-linked traits?
13. Be able to determine the genotypes of individuals on a pedigree.
14. Be able to construct a pedigree.
15. What evidence from a pedigree would allow you to infer if a trait is due to a dominant allele, to a recessive allele, or to a recessive sex-linked allele?

GMOs

16. What is a GMO and how is it created?
17. Describe the controversy surrounding GMOs.

Gene Regulation

18. Why aren't all genes producing all proteins in all the cells in your body?
19. What is the difference between gene expression and gene repression?
20. How might a gene be expressed or repressed?
21. What is an epigenome?
22. How is an organism's epigenome different than its genome?
23. How is it that identical twins can look different even if they have the same exact DNA?
24. What is CRISPR used for, and how does it work?
25. Describe the controversy surrounding CRISPR?

Textbook readings that may help:

Meiosis: 275-278

Probability: 267

Monohybrid crosses: 268-269

Dihybrid crosses: 270-271

Complex patterns of inheritance: 272-273

Key Vocabulary

karyotype

chromosome

homologous

allele

haploid

diploid

gamete

zygote

meiosis

crossing over

homozygous

heterozygous

offspring

monohybrid

dihybrid

phenotype

genotype

codominance

incomplete dominance

polygenetic traits

pleiotropy

sex-linked

pedigree

gene expression

gene repression

epigenetics

GMO

CRISPR