

Biology
Genetics Unit Study Guide
Chapters 11 and 14

NOTES:

i.) *When completing probability problems, please show your work. That could mean multiplying fractions, writing out ratios or writing out complete Punnett Squares.*

ii.) *You must bring a scientific calculator on test day—no other electronic devices will be allowed for calculations.*

1. What is genetics?
2. What is the Theory of Preformationism? Do we still believe this to be true?
3. A six-sided die is tossed and lands on two. What is the probability of it landing on two on the next toss?
4. Two coins are flipped together. What is the probability that both coins would land tails?
5. The terms "blue eyed" and "widow's peak" would represent a person's _____.
6. Hybrid is another word for heterozygous. What does the *genotype* for a hybrid trait look like?
7. What is a gamete?
8. Can you have a genotype of Aa in a gamete cell? Why or why not?
9. Every egg cell of a human has which kind of sex chromosomes? WHY?
10. A sperm cell of a human can only contain which sex chromosome? WHY?
11. The Laws of Heredity were first stated by which scientist?
12. Humans have _____ chromosomes within each somatic cell.
13. Explain the difference between an autosome and a sex chromosome.
14. If a certain species has 10 chromosomes in a somatic cell, how many chromosomes does a sperm cell of that species have?
15. Be able to identify the relationships in for all individuals in a *pedigree*.
16. Know the symbols for males and females in a pedigree.
17. Colorblindness is a sex-linked trait. The genotype of a colorblind man is _____.
18. If a colorblind man marries a homozygous normal woman, what fraction of their SONS will be colorblind? What fraction of their DAUGHTERS will be colorblind?
19. In human sex chromosomes, what makes the Y chromosome different from the X chromosome?
20. Why do males exhibit *recessive sex-linked traits*, such as colorblindness, more than females?
21. What is a karyotype? What can a karyotype tell us?
22. Know the genetics behind the following disorders:
 - a. Cystic fibrosis
 - b. Sickle cell anemia
 - c. Trisomy 21
 - d. Huntington's Disease
 - e. Turner's Syndrome
 - f. Polydactyly and Syndactyly
 - g. Tay-Sach's Disease
 - h. Albinism
23. Know the VOCABULARY for both Chapter 11 and Chapter 14!

Mendelian Genetics

24. Name and explain the three reasons Mendel used *Pisum sativum* to study inheritance.
25. A dominant gene always shows itself over a _____ gene.
26. Explain the only way a recessive trait can be expressed.
27. When one parent is pure dominant and the other is pure recessive, all offspring are _____.

28. A homozygous tall pea plant and a heterozygous tall pea plant have the same _____.
29. In squash (a pumpkin-looking fruit), assume that white color is dominant over yellow. If a heterozygous white-fruited plant is crossed with a yellow-fruited plant, what type of proportion of offspring will be expected?
30. When two white sheep are mated, 25% of their offspring are black. What are the *genotypes* of the white parents?
31. (Even though you know this is BUNK in real life, please follow along) Sally and Jim both have blue eyes, a recessive trait. What chances do they have of producing a child with brown eyes?

NON-Mendelian Genetics

32. A red snapdragon plant is crossed with a white snapdragon plant. What are the genotypes and phenotypes for the F₁?
33. Now take any two individuals from the F₁ and cross them. What are the F₂ results?
34. Why would the answer from Number 18 NOT be considered *blending*?
35. Write out all of the genotypes and phenotypes for the human ABO blood system.
36. Cross a person with Type A blood (AO) with someone with Type AB (AB). What are the F₁ results?
37. If a person with Type O marries a person with Type AB blood, what fraction of their children will have Type A blood?
38. Why is human eye color considered polygenic?
39. Define pleiotropy and provide the example of a pleiotropic genetic disorder discussed in class. Explain the symptoms of this disorder.

GATTACA

40. Know what each of the three quotes from the front page of your movie guide mean with respect to genetics.
41. What is a de-gene-erate? A borrowed ladder? An in-valid? A God-child? A faith-birth?
42. What event causes Vincent to realize he can do whatever he sets his mind to, in spite of his shortcomings?
43. What does GATTACA stand for?

