

Practice Questions for Inheritance as well as Chromosomal disorders

Write your answer right on this document and also bold the correct answer in the multiple choice section and then submit.

Short Answer Questions:

What is meant by sex-linked inheritance?

Give an example of a sex-linked trait in humans.

Explain why sex-linked traits are more commonly observed in males than in females.

Describe what chromosomal disorders are and explain how they occur. Provide one specific example of a chromosomal disorder, including its genetic cause, symptoms, and how it affects individuals.

Multiple Choice Section:

The first question is an example:

1. Purple and white petals in peas are external characteristics of appearance and are referred to as

- | | |
|----------------------|-----------------|
| A. genotypes | C. gametophytes |
| B. phenotypes | D. heterotypes |

2. In shorthorn cattle, red color (RR) and white color (WW) are of equal dominance or (codominance). The offspring from a mating of these two genotypes would be roan in color. Cattle that are roan in color have an orange fur. What would the genotype be?

- | | |
|-------|--------|
| A. RR | C. WW |
| B. RW | D. COW |

3. One hundred experimental matings of brown birds with white birds produced speckled offspring. The mating of two speckled birds will probably result in offspring that are
 - A. 75% white, 25% brown
 - B. 25% brown, 75% white
 - C. 25% brown, 50% speckled, 25% white
 - D. 100% speckled
 - E. 50% brown, 25% white, 25% speckled
4. An allele whose effect remains hidden when it is paired with a different allele is called
 - A. codominant
 - B. dominant
 - C. mutant
 - D. recessive
5. Although genes are the same in homologous chromosomes, the nucleotide sequence may vary slightly, these contrasting forms of genes are called
 - A. alleles
 - B. factors
 - C. dominant
 - D. strains
6. Today much information is known regarding heredity. However, this modern knowledge of genetics began from the revolutionary research conducted by the famous Austrian monk
 - A. Father Franz Klammer
 - B. Arnold Schwarzenegger
 - C. Friar Hannes Reichelt
 - D. Gregor Mendel

Use the following information to answer the following 5 questions.

In fruit flies, the allele for long wings, L, is dominant to the allele for short wings, l in the gene for wing size. A male (Ll) and a female (ll) produce many offspring.

7. The possible genotype(s) among the long-winged offspring in the above cross is (are)
 - A. Ll only
 - B. ll only
 - C. LL and Ll
 - D. Ll and ll
8. The expected phenotypic ratio of long to short wings among the offspring is
 - A. 3:1
 - B. 1:1
 - C. 4:0
 - D. 2:3
9. The female parent is _____ for short wings.
 - A. heterozygous
 - B. monoploid
 - C. homozygous
 - D. constant
10. The expected genotypic ratio among the offspring is
 - A. 1 LL : 2 Ll : 1 ll
 - B. all Ll
 - C. 1 Ll : 1 ll
 - D. 1 LL: 1 Ll

11. The possible genotype(s) among the short-winged offspring is (are)
- A. Ll and ll
 - B. LL and ll
 - C. ll only
 - D. Ll only
-

12. As a result of crossing two heterozygous yellow garden peas, 120 offspring are produced. According to the laws of chance, the most probable number of yellow offspring is
- A. 30
 - B. 60
 - C. 90
 - D. 120

13. In human beings, brown eyes are usually dominant over blue eyes. Suppose that a blue-eyed man marries a brown-eyed girl who went to science summer camp in Waitsfield, whose father was blue-eyed. The percentage of their children with blue eyes would be closest to
- A. 25%
 - B. 50%
 - C. 75%
 - D. 100%

14. Tallness (T) is dominant to dwarfness (t), while red flower color is due to gene (R) and white is its allele (W). The heterozygous condition results in pink (RW) flower color. A dwarf red snapdragon is crossed with a plant homozygous for tallness and white flowers. What are the genotype and phenotype of the F1 individuals?
- A. ttRW : dwarf and pink
 - B. ttWW : dwarf and white
 - C. TtRW : tall and red
 - D. TtRW : tall and pink

15. In some cats, black color is due to a sex-linked (X-linked) gene (B); the black allele (O) produces orange color. The heterozygote (BO) is calico. What kinds of offspring would be expected from the cross of an orange male and black female?



- A. Black females; orange males
- B. Orange females; black males
- C. Calico females; black males
- D. Black females; calico males

16. Red-colored snakes (RR) bred to cream-colored cremello snakes (CC) produce orange (RC). From which of the following matings should one expect half the snakes to be orange?

- I. orange by Red II. orange by cremello III. orange by orange

- A. I only C. III only E. I, II, and III
B. II only D. I and II only

On ears of corn, each kernel can be considered as an offspring. The kernels on four ears were counted for the color trait, purple or white, and the sweetness trait, starchy or sweet. The counting gave these phenotypic ratios for the four ears:



Ear #1 3 purple: 1 white

Ear #2 3 starchy: 1 sweet

Ear #3 9 purple, starchy: 3 purple, sweet: 3 white, starch: 1 white, sweet

Ear #4 1 purple: 1 white

17. What alleles are **recessive**?
A. white and sweet C. purple and white
B. sweet only D. starchy and white
18. Which alleles are **dominant**?
A. purple and sweet C. purple only
B. purple and starchy D. purple and white
19. What must have been the parental genotypes that produced **ear 2**?
A. SS X Ss C. ss X ss
B. Ss X Ss D. SS X ss
20. What must have been the parental genotypes that produced **ear 4**?
A. Pp X Pp C. Pp X pp
B. PP X pp D. PP X Pp
21. What must have been the parental genotypes that produced **ear 3**?
A. PpSs X PpSs C. ppss X PPSS
B. PPSs X PpSs D. ppSS X PpSs

22. What must have been the parental genotypes that produced **ear 1**?
- A. PP X Pp
 - B. Pp X Pp
 - C. pp X pp
 - D. PP X pp

23. Let us say that being a werewolf is a **seX-linked recessive trait**. Your father's mother was a werewolf, and so is your husband. Your grandmother on your mother's side is homozygous normal, and your grandfather on your mother's side is normal. What is the probability that your daughters will be a carrier **or** a werewolf?



- A. 0%
 - B. 25%
 - C. 50%
 - D. 100%
 - E. Cannot tell; need more information
24. Which of the following is associated with Down's syndrome?



- A. Trisomy 21
- B. The inheritance of a mutant gene
- C. Diploidy
- D. An extra sex chromosome
- E. A point mutation

In geraniums, the alleles for red flowers, R, and white flowers, W, show incomplete dominance. If you crossed a red geranium with a pink one:



25. What is the expected genotypic ratio?
- | | |
|---------------------|---------------------|
| A. 3 RR: 1 WW | D. 1 RR: 1 RW |
| B. 1 RR: 1 WW: 1 RW | E. 1 RW: 2 RR: 1 WW |
| C. 1 RW: 1 RR: 2 WW | |
26. What is the expected phenotype ratio?
- | | |
|---------------------------|---------------------------|
| A. 3 Red: 1 white | D. 1 Red: 1 pink |
| B. 1 Red: 1 white: 1 pink | E. 1 pink: 2 Red: 1 white |
| C. 1 pink: 1 Red: 2 white | |

In fruit flies, the gene for brown body color, B, is dominant to the gene for yellow body color, b. The gene for long wings, L, is dominant to the gene for short wings, l. A brown, short-winged male is bred to a yellow, long-winged female. Of the offspring produced, half are brown, long-winged and half are yellow, long-winged.

27. What is the most probable genotype of the female parent?
- | | |
|---------|---------|
| A. bbLL | C. BBLL |
| B. Bbll | D. bbll |
28. What is the most probable genotype of the male parent?
- | | |
|---------|---------|
| A. bbLL | C. BBLL |
| B. Bbll | D. bbll |

29. In guinea pigs, black is dominant. One half of a particular litter is white. If it is assumed that the laws of chance operate, the parent cross was

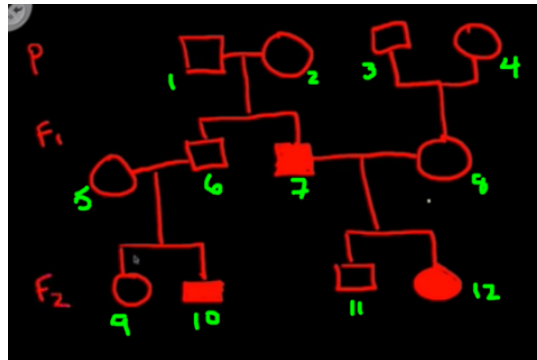
- A. BB X Bb
- B. Bb X Bb
- C. Bb X bb
- D. bb X bb
- E. BB X bb



30. During amniocentesis, **cells** that are to be karyotyped are taken from the

- A. red blood cells of the mother
- B. cells in the fluid surrounding the fetus
- C. uterus of the mother
- D. mother's urine
- E. blood of the mother

The next three questions are based upon the following pedigree chart below. It diagrams the inheritance of red-green color-blindness which is a sex-linked trait.



Use the genotypes in the key to classify the individuals in the following items. XC is the normal gene and Xc is the color-blind gene.

Answer Key:

- A. XC Xc
- B. Xc Xc
- C. XC Y
- D. Xc Y

- 31. Individual #2 ?
- 32. Individual #8 ?
- 33. Individual #12 ?