

Monohybrid Genetics: Genotypes and Phenotypes

1. What is the easiest way to determine if an organism is heterozygous or homozygous for a particular gene if self-fertilization is not possible?
 - a. Outcross
 - b. Reciprocal cross
 - c. Testcross
 - d. Backcross
2. Two black female guinea pigs are crossed with a white male. In several litters female A produced 64 blacks; female B produced 15 blacks and 17 whites. What is the inheritance of black and white coat color in guinea pigs?
 - a. Black and white are co-dominant
 - b. Black is dominant to white
 - c. White is dominant to black
 - d. Black and white are incompletely dominant
3. In certain Norwegian families there is an inherited condition known as “wooly hair”. Those showing this character have hair which resembles sheep’s wool. A study of family pedigrees shows that a person never has wooly hair unless at least one parent also has wooly hair. How would this character most likely be inherited?
 - a. A dominant allele
 - b. A recessive allele
 - c. Does not skip generations because it is a double recessive
 - d. Inverse double-hidden recessive
 - e. Cannot determine because not enough background or immediate information has been provided
4. Two black female mice are crossed with a brown male. In several litters, female A produced 9 blacks and 7 browns; female B produced 17 blacks. What is the inheritance of black and brown coat color in mice?
 - a. Black is dominant to brown
 - b. Brown is dominant to black
 - c. Black and brown are incompletely dominant
 - d. Black and brown are co-dominant
 - e. Cannot determine because not enough background or immediate information has been provided
5. Thalassaemia is a type of human anemia rather common in Mediterranean populations but relatively rare in other peoples. The disease occurs in two forms, called minor and major; the latter is much more severe. Severely affected individuals are homozygous for an aberrant gene; mildly affected persons are heterozygous. Persons

free of this disease are homozygous for the normal allele. The following question concerns Thalassemia and heredity. T =Thalassemia, t =normal allele. A child has Thalassemia major. What is his genotype?

- tt
 - Tt
 - TT
6. In peas, seed coat texture is determined by alleles S (smooth) and s (wrinkled). What gametes will be produced by a plant homozygous SS for seed coat texture?
- $1/2 S$ and $1/2 s$
 - $3/4 S$ and $1/4 s$
 - All S
 - All s
7. The following crosses were made among colored hamsters and white hamsters.

Crosses	Offspring
Colored A x white B	All colored
White B x colored C	1 colored: 1 white

The genotypes of animals A and B are:

A	B
a. Heterozygous	Homozygous recessive
b. Heterozygous	Heterozygous
c. Heterozygous	Homozygous dominant
d. Homozygous dominant	Homozygous recessive

8. Describe Mendel's Law of Segregation
- Separation into different gametes of two related genes
 - Separation into different gametes of each member of a pair of alleles
 - The formation of a gamete containing a pair of alleles
 - The dominance and recessive relationship alleles in a heterozygote
9. In a certain species of plant, a red flowered plant was crossed to a white flowered plant. The offspring were crossed back to a white flowered plant and the seeds produced 88 white and 92 pink. What is the most likely genetic mechanism?
- Red is dominant, white is recessive
 - Red is recessive, white is dominant
 - Red is dominant, pink and white are recessive
 - Red is incompletely dominant to white

10. In Andalusian fowls the heterozygous condition of the alleles for black plumage, B, and white, b, is blue. A black Andalusian bird is mated to a white bird and the F₁ is mated to a blue bird. What proportion of the progeny will be white.

- a. 0
- b. 1/4
- c. 2/4
- d. 3/4
- e. 1