

General Biology Mendelian Genetics Worksheet

What is a gene?

How many genes are there in a human cell?

How many copies of each gene exist in a human cell?

What are alleles?

How are genes passed among generations?

What is meant by dominant and recessive genes?

What is meant by homozygous and heterozygous?

What does homozygous dominant and homozygous recessive mean?

How do you indicate dominant and recessive genes?

What is the difference between genotype and phenotype?

What is the law of independent assortment? What does it mean?

What is a Punnett Square and how do you use it?

What are the P, F₁ and F₂ generations?

What is a monohybrid cross?

1. Given that a black tongue is observed any time the black gene is present and a white tongue is observed any time the black gene is absent:
 - If you cross a homozygous dominant female and a homozygous recessive male
 - Parental genotype? Parental phenotypes?
 - F₁ genotypes? F₁ phenotypes?
 - F₂ genotypes? F₂ phenotypes?
2. Given that tall is a dominant trait and short is recessive:
 - If you cross a homozygous tall male and a homozygous short female
 - Parental genotype? Parental phenotypes?
 - F₁ genotypes? F₁ phenotypes?
 - F₂ genotypes? F₂ phenotypes?
3. Given that green is a dominant color and yellow is recessive:
 - If you cross a homozygous green male and a homozygous yellow female
 - Parental genotype? Parental phenotypes?
 - F₁ genotypes? F₁ phenotypes?
 - F₂ genotypes? F₂ phenotypes?

What could you do if you don't know if an organism is carrying homozygous dominant genes or heterozygous genes (because the phenotype is the same for both)?

- Determine the parental genotypes following the rules above to determine the following:
 1. The F₁ generation is 100% black-tongued
 2. The F₁ generation are 50% tall and 50% short
 3. The F₁ generation is 100% yellow.

What is a dihybrid cross?

1. Given that you have a homozygous dominant tall green male and a homozygous recessive short yellow female:
 - Parental genotype? Parental phenotypes?
 - F₁ genotypes? F₁ phenotypes?

- F₂ genotypes? F₂ phenotypes?
2. Given that you have a homozygous black-tongued, tall female and a homozygous white-tongued, short male:
 - Parental genotype? Parental phenotypes?
 - F₁ genotypes? F₁ phenotypes?
 - F₂ genotypes? F₂ phenotypes?
 3. Given that you have a homozygous tall, green male and a homozygous short, yellow female:
 - Parental genotype? Parental phenotypes?
 - F₁ genotypes? F₁ phenotypes?
 - F₂ genotypes? F₂ phenotypes?

How would you do a testcross for a dihybrid trait?

- Determine the parental genotypes given the following information:
 1. The F₁ generation is 100% tall and green
 2. The F₁ generation is 50% tall and green, 50% is short and green
 3. The F₁ generation is 50% tall and green, 50% is tall and yellow
 4. The F₁ generation is 25% tall and green, 25% tall and yellow, 25% short and green, 25% short and yellow

What is the difference between an autosomal dominant and autosomal recessive trait?

What is meant by multiple allelic traits (codominance in particular)?

- What are the possible genotypes if you have type A blood?
- What are the possible genotypes if you have type B blood?
- What are the possible genotypes if you have type AB blood?
- What are the possible genotypes if you have type O blood?

How does incomplete dominance work?

1. If tall and short are incompletely dominant, what is the phenotype of the F₁ generation when a tall is crossed with a short?
2. If color is incompletely dominant, what is the phenotype of the F₁ generation when a red is crossed with a white?

What is the difference between an autosomal trait and a sex-linked trait?

How would you indicate a dominant and recessive trait in sex-linked traits?

How can you determine the sex of those individuals prone to color-blindness?

- Determine the genotype and phenotypes of the offspring including whether the affected is male or female.
 1. If the mother is colorblind and she mates with a normal male:
 2. If the male is colorblind and he mates with a homozygous normal female
 3. If the male is colorblind and he mates with a heterozygous normal female
 4. If the male is normal and mates with a heterozygous normal female
 5. If the mother and father are colorblind

What gene codes for maleness and what happens when it is present or absent?

- If the *SRY* gene is present in an XY genotype, the phenotype would be:
- If the *SRY* gene is absent in an XX genotype, the phenotype would be:
- If the *SRY* gene is absent in a XY genotype, the phenotype would be:
- If the *SRY* gene is present in a XX genotype, the phenotype would be:

What would be different if an organism was haploid and reproduced asexually?