What Are Gregor Mendel's Laws of Inheritance?

Worksheet

Mendel's laws state: (1) Alleles segregate equally to gametes, (2) different genes assort independently, and (3) dominant alleles mask recessive ones. These explain inheritance patterns in living organisms.

Questions

1. Law of Segregation means

A) genes blend together
B) alleles separate into different gametes
C) dominant traits disappear
D) recessive traits always appear

2. A heterozygous tall (Tt) homozygous short (tt) gives

A) all tall
B) all short
C) 50% tall, 50% short
D) 25% tall, 75% short

3. Independent assortment applies to

A) genes on the same chromosome
B) different chromosomes
C) alleles of the same gene
D) sister chromatids

4. In a 9:3:3:1 ratio, how many genes?

A) 1
B) 2
C) 3
D) 4

5. A tall pea plant (Tt) crosses with a short plant (tt). What are the possible offspring?

6. Two heterozygous tall plants (Tt Tt). What ratio of tall to short?

7. In a dihybrid cross (TtYy TtYy), how many phenotypes?

8. Define: What is Mendel's Law of Segregation?

9. Define: What is Mendel's Law of Independent Assortment?

10. Define: What is a dominant allele?

Answer Key

1. B) alleles separate into different gametes - Alleles separate during meiosis, so each gamete gets 1 of 2 alleles.

2. C) 50% tall, 50% short - Tt tt: 1 Tt (tall) and 1 tt (short).

3. B) different chromosomes - Different genes on different chromosomes assort independently.

4. B) 2 - Two genes, each showing 3:1 (dominant:recessive); 33 = 9 combinations.

5. Tall parent (Tt) produces gametes: T and t Short parent (tt) produces gametes: t and t Punnett square: | t | t | --+---+---| T | Tt| Tt| t | tt| tt| Result: 50% tall (Tt), 50% short (tt)

6. Each parent (Tt) produces gametes: T and t Punnett square: | T | t | --+---+---| T |TT | Tt| t | Tt| tt| Result: TT (1), Tt (2), tt (1) 3 tall : 1 short

7. Independently assort height (T/t) and color (Y/y). Each trait shows 3:1 ratio (tall:short and yellow:green). 3 3 = 9 phenotypic classes: 9 tall-yellow : 3 tall-green : 3 short-yellow : 1 short-green

8. During gamete formation, alleles separate so each gamete receives one allele.

9. Genes for different traits assort independently during gamete formation.

10. An allele that masks the expression of a recessive allele in heterozygotes.