

What is Genetic Inheritance?

Worksheet

Genetic inheritance is the transmission of alleles from parents to offspring; each parent contributes one allele per gene, and dominant alleles mask recessive ones in the resulting phenotype.

Questions

1. In a Tt Tt cross, what genotype ratio results?
A) 1 TT : 1 tt
B) 3 TT : 1 tt
C) 1 TT : 2 Tt : 1 tt
D) 2 TT : 2 tt
2. Which allele is expressed only when present in two copies?
A) Dominant
B) Recessive
C) Codominant
D) Linked
3. What tool predicts offspring genotype ratios from a cross?
A) Karyotype chart
B) Punnett square
C) Phylogenetic tree
D) Pedigree only
4. A tall pea plant (TT) is crossed with a short one (tt). What is the offspring's genotype?
A) All TT
B) All tt
C) All Tt
D) 1 TT : 1 tt
5. Two heterozygous pea plants (Tt Tt) are crossed for stem height, where T (tall) is dominant. What fraction of offspring will be tall?
6. A man with blood type AB (IAIB) and a woman with blood type O (ii) have children. What blood types are possible?
7. In humans, brown eyes (B) are dominant over blue eyes (b). Two Bb parents have 4 children. Statistically, how many are expected to have blue eyes?
8. Define: What is genetic inheritance?
9. Define: What is a Punnett square?
10. Define: Homozygous vs. heterozygous?

Answer Key

1. C) 1 TT : 2 Tt : 1 tt - A monohybrid heterozygous cross gives a 1:2:1 genotype ratio.
2. B) Recessive - Recessive alleles are masked by a dominant allele and need two copies to show.
3. B) Punnett square - A Punnett square lays out all possible allele combinations from a cross.
4. C) All Tt - TT tt gives 100% Tt offspring, all tall (T is dominant).
5. Genotype ratio from Tt Tt = 1 TT : 2 Tt : 1 tt TT and Tt are both tall (dominant allele present) 3 out of 4 offspring carry a T allele Fraction tall = $\frac{3}{4} = 75\%$
6. Father's gametes: IA or IB Mother's gametes: only i Possible offspring genotypes: IAi or IBi Offspring will be type A or type B, each with 50% probability
7. Bb Bb cross 1 BB : 2 Bb : 1 bb Probability of bb (blue eyes) = $\frac{1}{4}$ 4 children $\frac{1}{4} = 1$ Expected: 1 out of 4 children with blue eyes
8. The passing of traits from parents to offspring via genes/alleles on chromosomes.
9. A grid tool used to predict the possible genotypes and ratios of offspring from a genetic cross.
10. Homozygous has two identical alleles (TT or tt); heterozygous has two different alleles (Tt).

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