**Dihybrid Cross Worksheet**

1. In mice, the ability to run normally is a dominant trait. Mice with this trait are called running mice (R). The recessive trait causes mice to run in circles only. Mice with this trait are called waltzing mice (r). Hair color is also inherited in mice. Black hair (B) is dominant over brown hair (b). For each of the following problems, determine the parent genotypes, possible gametes, and then construct a Punnett square to solve.

Cross a heterozygous running, heterozygous black mouse with a homozygous running, homozygous black mouse

Parental genotypes \_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_

Possible gametes: Parent 1: \_\_\_\_\_ \_\_\_\_\_ \_\_\_\_\_ \_\_\_\_\_ Parent 2: \_\_\_\_\_ \_\_\_\_\_ \_\_\_\_\_ \_\_\_\_\_

Offspring genotypic ratio \_\_\_\_\_\_\_\_\_\_\_\_\_\_ Offspring phenotypic ratio \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What is the probability of having a running black mouse? \_\_\_\_\_\_\_\_

1. Cross a homozygous running, homozygous black mouse with a heterozygous running, brown mouse

Parental genotypes \_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_

Possible gametes: Parent 1: \_\_\_\_\_ \_\_\_\_\_ \_\_\_\_\_ \_\_\_\_\_

Parent 2: \_\_\_\_\_ \_\_\_\_\_ \_\_\_\_\_ \_\_\_\_\_

Offspring genotypic ratio \_\_\_\_\_\_\_\_\_\_\_\_\_\_ Offspring phenotypic ratio \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What is the probability of having a running brown mouse? \_\_\_\_\_\_\_\_

1. In peas, the gene for tall plants (T) is dominant over its short allele (t). The gene for smooth seeds (A) is dominant over its recessive allele for wrinkled (a). Show the Punnett squares for the following crosses. Indicate the phenotypic ratios for each cross.
2. TtAa x TtAa

1. Ttaa x ttAA
2. Ttaa x Ttaa
3. ttAa x Ttaa
4. In humans, broad lips (B) are dominant over thin lips (b) and curly hair (H) is dominant over straight hair (h). A man who is heterozygous for both broad lips and curly hair marries a woman with the same genotype. What are the possible genotypes and phenotypes (ratio) of the offspring of that marriage?
5. In man, assume that spotted skin (S) is dominant over non-spotted skin (s) and that wooly hair (W) is dominant over non-wooly hair (w). Cross a marriage between a heterozygous spotted, non-wooly man with a wooly-haired, non-spotted woman. Give genotypic and phenotypic ratios of offspring.
6. Assume the following:
   * Dominate allele for tall plants = D
   * Recessive allele for dwarf plants = d
   * Dominate allele for purple flowers = W
   * Recessive allele for white flowers = w

Cross a homozygous tall white parent with a dwarf heterozygous purple parent.

1. What is the probability of producing tall plants with purple flowers?
2. What is the probability of producing dwarf plants with white flowers?
3. In garden peas, tallness (T) is dominant to shortness (t) and axillary flowers (A) are dominant to terminal flowers (a).

What are the expected genotypes and phenotypes of the offspring if a heterozygous tall, heterozygous axillary plant is crossed with a heterozygous tall, terminal plant?

Give your answers in probabilities (%).

1. In horses, the coat color black is dominant (B) over chestnut (b). The trotting gait is dominant (T) over the pacing gait (t). If a homozygous black pacer is mated to a homozygous chestnut, heterozygous trotter, what will be the probabilities for genotype and phenotype of the F1 generation?
2. In rabbits, the coat color black dominant (B) over brown (b). Short hair is dominant (S) over long (s). In a cross between a homozygous black short-haired male and a brown homozygous long-haired female, what would be the probabilities for genotype and phenotype of the F1 generation?
3. Imagine that a couple is planning to have children. The male is heterozygous for tongue rolling and homozygous dominant for unattached earlobes. The female is homozygous recessive for tongue rolling and heterozygous for unattached earlobes. The couple is curious about the possibility and probability of their offspring inheriting these traits. The ability to roll one’s tongue is dominant (R) over the “non-rolling” condition (r.) Unattached earlobes (U) are dominant over attached earlobes (u).

Complete a Punnett square for this cross and record the probabilities for genotypes and phenotypes of the offspring as ratios.

1. About 70% of Americans get a bitter taste from the substance called phenylthiocarbamide (PTC). It is tasteless to the rest. The "taster" allele is dominant to non-taster. Also, normal skin pigmentation is dominant to albino. A normally pigmented woman who is taste-blind for PTC has an albino-taster father. She marries an albino man who is a taster, though the man's mother is a non-taster.

Show the expected offspring of this couple