Dihybrid Cross Worksheet

1. Set up a punnett square using the following information:
   - 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 dominate parent (DDWW) with a homozygous recessive parent (ddww)

2. Using the punnett square in question #1:
   a. What is the probability of producing tall plants with purple flowers?

      Possible genotype(s)?

   b. What is the probability of producing dwarf plants with white flowers?

      Possible genotype(s)?

   c. What is the probability of producing tall plants with white flowers?

      Possible genotype(s)?

   d. What is the probability of producing dwarf plants with purple flowers?

      Possible genotype(s)?

3. Set up a punnett square using the following information:
   - Dominate allele for black fur in guinea pigs = B
   - Recessive allele for white fur in guinea pigs =b
   - Dominate allele for rough fur in guinea pigs = R
   - Recessive allele for smooth fur in guinea pigs = r
   - Cross a heterozygous parent (BbRr) with a heterozygous parent (BbRr)

4. Using the punnett square in question #3:
   a. What is the probability of producing guinea pigs with black, rough fur?

      Possible genotype(s)?

   b. What is the probability of producing guinea pigs with black, smooth fur?

      Possible genotype(s)?

   c. What is the probability of producing guinea pigs with white, rough fur?

      Possible genotype(s)?

   d. What is the probability of producing guinea pigs with white, smooth fur?

      Possible genotype(s)?

5. Set up a punnett square using the following information:
- Dominate allele for purple corn kernels = R
- Recessive allele for yellow corn kernels = r
- Dominate allele for starchy kernels = T
- Recessive allele for sweet kernals = t
- Cross a homozygous dominate parent with a homozygous recessive parent

7. Set up a punnett square using the following information:
- Dominate allele for normal coat color in wolves = N
- Recessive allele for black coat color in wolves = n
- Dominant allele for brown eyes = B
- Recessive allele for blue eyes = b
- Cross a heterozygous parent with a heterozygous parent

6. Using the punnett square in question #5:
   a. What is the probability of producing purple, starchy corn kernels?

   Possible genotype(s)?

   b. What is the probability of producing yellow, starchy corn kernels?

   Possible genotype(s)?

   c. What is the probability of producing purple, sweet corn kernels?

   Possible genotype(s)?

   d. What is the probability of producing yellow, sweet corn kernels?

   Possible genotype(s)?

8. Using the punnett square in question #7:
   a. What is the probability of producing a wolf with a normal coat color with brown eyes?

   Possible genotype(s)?

   b. What is the probability of producing a wolf with a normal coat color with blue eyes?

   Possible genotype(s)?

   c. What is the probability of producing a wolf with a black coat with brown eyes?

   Possible genotype(s)?

   d. What is the probability of producing a wolf with a black coat with blue eyes?

   Possible genotype(s)?

9. A tall pea plant with **terminal** flowers (flowers on the ends of the stems) is crossed with a **short** plant that has axial flowers. All 72 offspring are tall with axial flowers. This is a dihybrid cross with the height and flower position traits showing independent assortment.

    a. Name the dominant and recessive alleles. (hint see textbook pg. 262)

    b. Give the genotypes of the parents and offspring in this cross.

    c. Predict the F_2 offspring when the tall-axial F_1's are allowed to self pollinate.

10. Suppose a white, straight haired guinea pig mates with a brown, curly-haired animal. All five babies in their first litter have brown fur, but three are curly and two have straight hair. The second litter consists of six more brown offspring, where two are curly and four are straight haired.

    a. Assuming curly is dominant to straight, what are the genotypes of the parents and the offspring?

    b. What is the probability of getting two female guinea pigs with straight hair in a row?

11. 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.

12. In pigeons the checkered pattern is caused by a dominant allele. A plain (non-checkered) pattern is recessive. Red color is also caused by a dominant allele and brown color by a recessive allele.

    a. Show the expected offspring of a cross between a homozygous checkered red bird and a plain brown one. Carry out this cross through the F_2 generation.

    b. Carry out to the F_2 generation a cross between a homozygous plain red bird and its homozygous checkered brown mate.

    c. A plain brown female pigeon laid five eggs. The young turned out to be: 2 plain red, 2 checkered red, and 1 checkered brown. Describe the father pigeon. Give the genotypes of all birds in this cross. Could any other types of offspring have been produced by this pair?