Dihybrid Cross Worksheet

1. Set up a punnett square using the following information:
   - Dominant allele for tall plants = D
   - Recessive allele for dwarf plants = d
   - Dominant allele for purple flowers = W
   - Recessive allele for white flowers = w
   - Cross a homozygous dominant parent (DDWW) with a homozygous recessive parent (ddww)

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   All will be DwWw

2. Using the punnett square in question #1:
   a. What is the probability of producing tall plants with purple flowers? 100% or 16/16
      Possible genotype(s)? DdWw
   b. What is the probability of producing dwarf plants with white flowers? 0%
      Possible genotype(s)? None
   c. What is the probability of producing tall plants with white flowers? 0%
      Possible genotype(s)? None
   d. What is the probability of producing dwarf plants with purple flowers? 0%
      Possible genotype(s)? None

3. Set up a punnett square using the following information:
   - Dominant allele for black fur in guinea pigs = B
   - Recessive allele for white fur in guinea pigs = b
   - Dominant 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)

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   BbRr x BbRr

   4 possible outcomes for each gamete:
   1. BR
   2. Bb
   3. Br
   4. br

4. Using the punnett square in question #3:
   a. What is the probability of producing guinea pigs with black, rough fur? 9/16
      Possible genotype(s)? BbRR
   b. What is the probability of producing guinea pigs with black, smooth fur? 3/16
      Possible genotype(s)? BbRr
   c. What is the probability of producing guinea pigs with white, rough fur? 3/16
      Possible genotype(s)? bbrR
   d. What is the probability of producing guinea pigs with white, smooth fur? 1/16
      Possible genotype(s)? bbrr
5. Set up a punnett square using the following information:
- Dominant allele for purple corn kernels = R
- Recessive allele for yellow corn kernels = r
- Dominant allele for starchy kernels = T
- Recessive allele for sweet kernels = t
- Cross a homozygous dominate parent with a homozygous recessive parent

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100%, -> RrTt Heterozygous

6. Using the punnett square in question #5:
   a. What is the probability of producing purple, starchy corn kernels?
      100%
      Possible genotype(s): RrTt
   b. What is the probability of producing yellow, starchy corn kernels?
      0%
      Possible genotype(s): None
   c. What is the probability of producing purple, sweet corn kernels?
      0%
      Possible genotype(s): None
   d. What is the probability of producing yellow, sweet corn kernels?
      0%
      Possible genotype(s): None

7. Set up a punnett square using the following information:
- Dominant 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

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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?
      9/16
      Possible genotype(s): NNBb, NnBb, NNBb, NnBb
   b. What is the probability of producing a wolf with a normal coat color with blue eyes?
      3/16
      Possible genotype(s): NnBB, NnBB
   c. What is the probability of producing a wolf with a black coat with brown eyes?
      3/16
      Possible genotype(s): nnbb
   d. What is the probability of producing a wolf with a black coat with blue eyes?
      1/16
      Possible genotype(s): nnbb
#9  

a) Dominant - Tall, Axial  
Recessive - Short, Terminal

b) Tall + Terminal × Short + Axial
P: TTaa × ttAA

F₁: Tall + Axial
   Tt Aa

c) TtAa × TtAa

F₂: 9:3:3:1 Ratio
- 9 Tall + Axial (9/16) T_ A_
- 3 Tall + Terminal (3/16) T_ aq
- 3 Short + Axial (3/16) tt A_
- 1 Short + Terminal (1/16) ttaa

#10  

A_ curly  aa brown

a)  
   p) aa × Aa
      Litter #1
      f₁) 3 Aa
           2 aa

   Litter #2
   4 aa
   2 Aa

b)  
   ♀ aa ♀ aa
   1/2 × 1/2 × 1/2 × 1/2 = 1/16
# 11

Woman ♀ Aatt x aaTt ♂ Husband

4 Possible Genotypes

AaTt
Aatt
aaTt
aatt

# 12

a) HHRR x hhrr
   all F₁ - HhRr
   $F₂$ - 9:3:3:1 Ratio
   9 H₁R₁
   3 H₁rr
   3 hhR₁
   1 hhrr

b) hhRR x Hhrr
   all F₁ - HhRr
   $F₂$ - Same as part A

(c) p: hhrr x ?
   $F₁$: 2 H₁R₁
   2 H₁rr
   1 H₁rr
   $♂$ Must be HhRr

Possible genotypes (4)
P: hhrr x HhRr

$F₁$: HhRr hhRr
  Hhrr hhrr