**Biology 9: Unit 6 Genetics - Monohybrid & Dihybrid Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Punnett Squares- Crosses Involving One Trait**

1. In a certain species of animal, black fur (B) is dominant over brown fur (b). Using the following Punnett square, predict the genotypes and phenotypes of the offspring whose parents are both Bb or have heterozygous black fur.

|  |  |  |
| --- | --- | --- |
|  | **B** | **b** |
| **B** |  |  |
| **b** |  |  |

1. Genotypes:
   * 1. \_\_\_\_% homozygous black fur (BB)
     2. \_\_\_\_% heterozygous black fur (Bb)
     3. \_\_\_\_% homozygous brown fur (bb)
   1. Phenotypes:
      1. \_\_\_\_% black fur
      2. \_\_\_\_% brown fur
2. Repeat the process when one parent is homozygous black and the other is homozygous brown.
   1. Genotypes:
      1. \_\_\_\_% homozygous black fur (BB)
      2. \_\_\_\_% heterozygous black fur (Bb)
      3. \_\_\_\_% homozygous brown fur (bb)
   2. Phenotypes:
      1. \_\_\_\_% black fur
      2. \_\_\_\_% brown fur
3. Repeat this process again when one parent is heterozygous black and the other is homozygous brown.
   1. Genotypes:
      1. \_\_\_\_% homozygous black fur (BB)
      2. \_\_\_\_% heterozygous black fur (Bb)
      3. \_\_\_\_% homozygous brown fur (bb)
   2. Phenotypes:
      1. \_\_\_\_% black fur
      2. \_\_\_\_% brown fur
4. In peas, the color yellow (Y) is dominant to the color green (y). A homozygous yellow pea plant is crossed with a homozygous green pea plant. What will the genotypes and the phenotypes of all the possible offspring?
   1. List Genotypes and Ratios of all offspring:
   2. List Phenotypes and Ratios of all offspring:
5. In fruit flies, long wings (L) are dominant to short wings (l). Two heterozygous long-winged fruit flies are crossed.
   1. List Genotypes and Ratios of all offspring:
   2. List Phenotypes and Ratios of all offspring:
6. A homozygous tall pea plant (TT) is crossed with a heterozygous tall pea plant (Tt). Make a Punnett square to show that possible combinations that will be seen in the offspring.
   1. List Genotypes and Ratios of all offspring:
   2. List Phenotypes and Ratios of all offspring:

**Punnett Squares- Crosses Between Two Traits**

1. Suppose that black hair (B) is dominant over blonde hair (b) and brown eyes (E) is dominant over blue eyes (e). The father has black hair (heterozygous) and brown eyes (heterozygous) and the mother has blonde hair and blue eyes. Genotype for father**: BbEe**  Genotype for mother: **bbee**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **BE** | **Be** |  |  |
| **be** |  |  |  |  |
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|  |  |  |  |  |

* List Phenotypes and Ratios of all offspring:

1. Repeat the process when both parents have black hair (heterozygous) and brown eyes (heterozygous).

Genotype for father: \_\_\_\_\_\_\_\_\_\_\_ Genotype for mother: \_\_\_\_\_\_\_\_\_\_\_\_

Complete the Punnett square below.

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* List Phenotypes and Ratios of all offspring:
* In each dihybrid cross, the phenotype ratio of individuals with black hair and brown eyes, black hair and blue eyes, blonde hair and brown eyes and blonde hair and blue eyes is

\_\_\_\_:\_\_\_\_:\_\_\_\_:\_\_\_\_\_

**BIO 9: Unit 6 Genetics -- Dihybrid Crosses Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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) | Using the Punnett square in question #1:   1. What is the probability of producing tall plants with purple flowers?   Possible genotype?   1. What is the probability of producing dwarf plants with white flowers?   Possible genotypes?   1. What is the probability of producing tall plants with white flowers?   Possible genotypes?   1. What is the probability of producing dwarf plants with purple flowers?   Possible genotypes? |

1. Set up a Punnett square using the following information:

|  |  |
| --- | --- |
| * Dominant allele for black fur (B) * Recessive allele for white fur (b) * Dominant allele for rough fur (R) * Recessive allele for smooth fur (r) * Cross a heterozygous parent (BbRr) with a heterozygous parent (BbRr) | Using the Punnett square in question #2:   1. What is the probability of producing guinea pigs with black, rough fur?   Possible genotype?   1. What is the probability of producing guinea pigs with black, smooth fur?   Possible genotypes?   1. What is the probability of producing guinea pigs with white, rough fur?   Possible genotypes?   1. What is the probability of producing guinea pigs with white, smooth fur?   Possible genotypes? |

1. Set up a Punnett square using the following information:

|  |  |
| --- | --- |
| * Dominant allele for purple kernels (R) * Recessive allele for yellow kernels (r) * Dominant allele for starchy kernels (T) * Recessive allele for sweet kernels (t) * Cross a homozygous dominant parent with a homozygous recessive parent | Using the Punnett square in question #3:   1. What is the probability of producing purple, starchy corn kernels?   Possible genotype?   1. What is the probability of producing purple, sweet corn kernels?   Possible genotypes?   1. What is the probability of producing yellow, starchy corn kernels?   Possible genotypes?   1. What is the probability of producing yellow, smooth corn kernels?   Possible genotypes? |

1. Set up a Punnett square using the following information:

|  |  |
| --- | --- |
| * Dominant allele for normal coat (N) * Recessive allele for black coat (n) * Dominant allele for brown eyes (B) * Recessive allele for blue eyes (b) * Cross a heterozygous parent with a heterozygous parent | Using the Punnett square in question #4:   1. What is the probability of producing a wolf with a normal coat color with brown eyes?   Possible genotype?   1. What is the probability of producing a wolf with a normal coat color with blue eyes?   Possible genotypes?   1. What is the probability of producing a wolf with a black coat color with brown eyes?   Possible genotypes?   1. What is the probability of producing a wolf with a black coat color with blue eyes?   Possible genotypes? |