Name: Date:

Class Period:

# Monster Genetics Lab

You have learned about many different patterns of inheritance. Some are simple dominant or recessive, as in Mendelian traits. Some are more complex, such as incomplete dominant or codominant traits. In this lab you will investigate how a combination of these genes work together to create an organism.

**Part 1 Procedure**:

1. Flip a coin twice to determine the **genotype** for each trait and record it in the data table. Heads = allele 1, Tails = allele 2 (*Example: if you flipped heads twice, your monster will have two copies of allele 1 for her genotype.*)You will use this information for the Mother’s genotypes
2. Use the existing Allele 1 and Allele 2 for the father’s genotypes
3. Determine the genotype (what the parent’s female offspring will inherit) and the **phenotype** (the name of the trait) by creating a Punnett Square (use notebook paper) for each trait based on the father’s and the mother’s genotypes. You may pick any of the likely traits from your Punnett Square for your genotype/phenotype
4. Fill out Table 1.

**TWO DOMINANTS ALLELES = DOMINANT GENOTYPE = Dominant Phenotype**

 **(example = EE = 2 small eyes)**

**ONE DOMINANT ALLELE + ONE RECESSIVE ALLELE = DOMINANT GENOTYPE = Dominant Phenotype**

**(example: Ee = 2 small eyes)**

**TWO RECESSIVE ALLELES = RECESSIVE PHENOTYPE = Recessive Phenotype (example: ee = 1 large eye)**

**Table 1: Genotypes & Phenotypes for Female Monster**

**Father’s Genotype (Allele 1 & Allele 2)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Trait**  | **Allele 1** **HEADS**DOMINANT | **Allele 2** **TAILS**RECESSIVES | **Genotype (Mother’s)** | **Genotype****Female Offspring** **(Use for mom for new family)** | **Phenotype****Female****Offspring** |
| Eye   | Two small eyes (E)  | One large eye (e)  |  |   |  |
| Eye Color (incomplete)  | Red (R)  | White (R’)  |   |   |  |
| Skin Color (codominant)  | Green (G)  | Blue (B)  |   |   |  |
| Tail Shape   | Curly (C)  | Straight (c)  |   |   |  |
| Tail Color   | Purple (P)  | Orange (p)  |   |   |  |
| Tail (regulatory gene)  | Have tail (T)  | No tail (t)  |   |   |  |
| Teeth   | Sharp (S)  | Round (s)  |   |   |  |
| Feet (incomplete)  | Four toes (F)  | Two toes (F’)  |   |   |  |
| Horn Color   | Purple (W)  | White (w)  |   |   |  |
| Ear shape   | Pointy (Y)  | Round (y)  |   |   |  |
| Ears (regulatory)  | No ears (N)  | Two ears (n)  |   |   |  |
| Claws   | Long (L)  | Short (l)  |   |   |  |

**Part 2 Procedure:**

The female monster (Use the Phenotype Column described in Table 1) is married to a male monster (see Table 2 below) and they plan to have baby monsters. They are interested in finding out the probabilities of which traits their offspring will have.

1. Fill in the missing genetic information in the table for the male monster.

**Table 2: Genotypes & Phenotypes for Male Monster (Use for Dad for creating new family)**

|  |  |  |
| --- | --- | --- |
| **Trait**  | **Genotype**  | **Phenotype**  |
| Eyes  | ee  | One Large Eye  |
| Eye Color (incomplete)  |  | White  |
| Skin Color (codominant)  |  | Green  |
| Tail Shape  | cc  |  |
| Tail Color  | Pp  |  |
| Tail (regulatory)  | tt  |  |
| Teeth  |   | Round  |
| Feet (incomplete)  | FF’  |   |
| Horn Color  | ww  |   |
| Ear shape  | yy  |   |
| Ears (regulatory)  |   | Have 2 ears  |
| Claws  |   | Short   |

1. Create Punnett squares (attach your Punnett Squares to your drawings) to predict what traits would result from a cross between the two monsters for each trait.
2. Based on the Punnett squares, answer the following questions:
	1. Eyes – What percent of offspring will have only one eye? \_\_\_\_\_\_\_\_\_
	2. Eye Color – What percent of offspring will have red eyes? \_\_\_\_\_\_\_\_\_
	3. Skin Color – What percent of offspring will have green skin? \_\_\_\_\_\_\_\_\_
	4. Tail – What percent of offspring will have a tail? \_\_\_\_\_\_\_\_\_
	5. Feet – What percent of offspring will have three toes? \_\_\_\_\_\_\_\_\_
	6. Horn Color – What percent of offspring will have purple horns? \_\_\_\_\_\_\_\_\_
	7. Ears – What percent of offspring will have ears? \_\_\_\_\_\_\_\_\_
	8. Claws – What percent of offspring will have long claws? \_\_\_\_\_\_\_\_\_

**Part 3 – Monster Family Outcome**

Based on the genotypes/phenotypes for each member of this monster family, draw a color picture of the new Monster Family (Mom is the Female Offspring from Table 1; Dad is the Male from Table 2; Child is based on the outcomes of your Punnett Squares from Part 2). (The Monster Family Portrait will be used as EXEMPLARY option for this assignment.

**Part 4 – Turn in your work**

1. Upload this Word document to CANVAS

2. Take a picture of your Punnett Squares (be sure that you label each Punnett Square as to whether it is for the mother monster or the female offspring monster and what trait it is) AND the drawings of your monster family members and upload your pictures to CANVAS as well.