**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 works 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 his genotype.*)

1. Determine the **phenotype** resulting from the allele pair for each trait.
2. Repeat steps 1-2 for each trait and complete the female monster’s Table 1.

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Trait** | **Allele 1** | **Allele 2** | **Genotype** | **Phenotype** |
| 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 (described in Table 1) and a male monster (see Table 2 below) plan to have baby monsters. They are interested in finding out for each trait the probability that their offspring will have that trait.

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

**Table 2: Genotypes & Phenotypes for Male Monster**

|  |  |  |
| --- | --- | --- |
| **Trait** | **Genotype** | **Phenotype** |
| Eyes | ee |  |
| Eye Color  (incomplete) |  | White |
| Skin Color  (codominant) |  | Green |
| Tail Shape |  | Straight |
| Tail Color | Pp |  |
| Tail  (regulatory) |  | No tail |
| Teeth |  | Round |
| Feet  (incomplete) | FF’ |  |
| Horn Color | ww |  |
| Ear shape | yy |  |
| Ears (regulatory) |  | Have 2 ears |
| Claws |  | Short |

1. Create Punnett squares (attach your work to this handout) to predict what traits would result from a cross between the two monsters for each trait, and answer the following questions:

a. Eyes – What percent of offspring will have only one eye? \_\_\_\_\_\_\_\_\_

b. Eye Color – What percent of offspring will have red eyes? \_\_\_\_\_\_\_\_\_

c. Skin Color – What percent of offspring will have green skin? \_\_\_\_\_\_\_\_\_

d. Tail – What percent of offspring will have a tail? \_\_\_\_\_\_\_\_\_

e. Feet – What percent of offspring will have three toes? \_\_\_\_\_\_\_\_\_

f. Horn Color – What percent of offspring will have purple horns? \_\_\_\_\_\_\_\_\_

g. Ears – What percent of offspring will have ears? \_\_\_\_\_\_\_\_\_

h. Claws – What percent of offspring will have long claws? \_\_\_\_\_\_\_\_\_