**The Inheritance of Genes**

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Today we will be looking at how traits are inherited. As you already know, genes are sections of DNA that code for proteins and its these proteins that determines your traits. You receive one copy of each gene from your mom and one from your dad during sexual reproduction. There are the versions of the genes that you receive from your parents are called **alleles**. Alleles can be **dominant** (strong) or **recessive** (weak). Dominant alleles are written using uppercase letters; recessive alleles are written using lowercase letters. Because you inherit two copies of these alleles, there are three possible combinations:

**Homozygous dominant**- in this combination, you receive two dominant alleles (i.e., RR)

**Homozygous recessive**- in this combination, you receive two recessive alleles (i.e., rr)

**Heterozygous**- in the combination, you receive one dominant and one recessive allele (i.e., Rr)

**Homo**zygous means the ‘same’ (homo-means one or the same), and **hetero**zygous means ‘different’.

Today, we are going to look at three characteristics: dimples, PTC tasting, and gender and how they are inherited. You will pick your genotype for each of the three characteristics and determine your traits. You will record your genotype (letter combination, i.e., Dd) and phenotype (**ph**ysical **f**eature). Then you will ‘mate’ with a member of the opposite sex and predict what your offspring will look like using Punnett Squares.

Directions:

1. Select a copy of chromosome 16 from the mom and dad bags. The gene for dimples is located on gene 16. Dimples are a dominant trait and can be written as D.

Record your genotype \_\_\_\_\_\_\_\_\_\_

Record your phenotype \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Select a copy of chromosome 7 from the mom and dad bags. The gene for PTC tasting is located on chromosome 7. PTC tasting is a dominant trait and can be written as T.

Record your genotype \_\_\_\_\_\_\_\_\_\_

Record your phenotype \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Select a copy of your sex chromosome from the mom (you will always receive an X from mom) and dad bags (you could receive an X or a Y).

Record your genotype \_\_\_\_\_\_\_\_\_\_

Record your phenotype (gender) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Find a person from the opposite gender to ‘mate’ with. (Remember, we aren’t talking about your gender, we are referring to what you selected from the bag).
2. Use your genotypes from all three characteristics to predict what traits your children may have.

**Dimples:**

Your genotype \_\_\_\_\_\_\_\_\_\_\_ Your mate’s genotype \_\_\_\_\_\_\_\_\_\_

Punnnett square for dimples:

|  |  |
| --- | --- |
|  |  |
|  |  |

What are your offspring’s possible genotypes? \_\_\_\_\_\_\_\_\_\_\_\_\_\_

What are your offspring’s possible phenotypes? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What is the chance (or probability) that your child(ren) will have dimples? (% or fraction). \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**PTC tasting:**

Your genotype \_\_\_\_\_\_\_\_\_\_\_ Your mate’s genotype \_\_\_\_\_\_\_\_\_\_

Punnnett square for PTC tasting:

|  |  |
| --- | --- |
|  |  |
|  |  |

What are your offspring’s possible genotypes? \_\_\_\_\_\_\_\_\_\_\_\_\_\_

What are your offspring’s possible phenotypes? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What is the chance (or probability) that your child(ren) will be able to taste PTC? (% or fraction). \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Gender:**

Your genotype \_\_\_\_\_\_\_\_\_\_\_ Your mate’s genotype \_\_\_\_\_\_\_\_\_\_

Punnnett square for gender:

|  |  |
| --- | --- |
|  |  |
|  |  |

What are your offspring’s possible genotypes? \_\_\_\_\_\_\_\_\_\_\_\_\_\_

What are your offspring’s possible phenotypes? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What is the chance (or probability) that your child(ren) will be a boy? A girl? (% or fraction). Boy:\_\_\_\_\_\_\_\_\_\_\_ Girl:\_\_\_\_\_\_\_\_\_\_