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

Student ID: \_\_\_\_\_\_\_\_\_\_

Period: \_\_\_\_\_\_\_\_\_\_

Teacher: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date: \_\_\_\_\_\_\_\_\_\_\_

**Lesson 5: Genetics Terminology**

**Practice 1:** These new terms will help us describe the relationship between genes and traits.

**Phenotype**: an organism’s physical appearance caused by a genetic trait

**Genotype**: an organism’s genetic makeup or a representation of an organism’s genetic makeup

**Circle** or **Write** in the correct description below to indicate if a trait is a phenotype or genotype.

1. A person’s dimples phenotype or genotype

2. A person’s DNA for dimples phenotype or genotype

3. A bird’s green feathers phenotype or genotype

4. A bird’s gray feathers phenotype or genotype

5. A cat’s fur color \_\_\_\_\_\_\_\_\_\_\_ 6. A bird’s DNA for gray feathers \_\_\_\_\_\_\_\_\_\_\_

7. A dog’s fur color\_\_\_\_\_\_\_\_\_\_\_ 8. Genes for tasting PTC (yuck!) \_\_\_\_\_\_\_\_\_\_

**Practice 2:** We show alleles, which are different versions of the same gene, with pairs of letters.

**Heterozygote:** an organism with **two different alleles**. We show this with an upper and a lower case letter For example: Aa, Bb, Zz are all heterozygous.

**Homozygote:**  an organism with **two of the same alleles**. For example: AA, BB, ZZ, aa, bb, zz are all homozygous.

**Circle** or **Write** in the correct description to indicate if the genotype is heterozygous or homozygous.

1. Aa Heterozygote Homozygote 5. Bb \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. AA Heterozygote Homozygote 6. YY \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. Hh Heterozygote Homozygote 7. Yy \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. Ff Heterozygote Homozygote 8. dd \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Practice 3:** We show alleles, which are different versions of the same gene, with pairs of letters.

**Heterozygote:** an organism with **two different alleles**. Examples: Aa, Bb, Zz

**Homozygote:**  an organism with **two of the same alleles**. Examples: AA, BB, bb, zz

For each term below **circle** the correct genotype (pair of letters) below.

1. Homozygous Bb bb 4. Homozygous ff Ff

2. Heterozygous Nn nn 5. Homozygous GG Gg

3. Homozygous Yy YY 6. Heterozygous RR Rr

**Practice 4:** Some alleles are stronger than others. Some are dominant (strong) some are recessive (weak).

**Dominant:** A genetic trait that will show up as the phenotype even if there is only one allele. These are shown as upper case letters like A, B, Z.

**Recessive:**  A genetic trait that will show up as the phenotype only if there are two alleles of the same kind. These are shown by lower case letters like a, b, z.

For each term below **circle** or **write** the correct genotype (pair of letters) below.

1. The allele A is Dominant Recessive 4. The allele G is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. The allele F is Dominant Recessive 5. The allele g is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. The allele z is Dominant Recessive 6. The allele D is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Practice 5:** Now we are going to put two sets of vocabulary words together.

Remember that homozygous means that both letters are upper case or lower case. Heterozygous means that one is upper case and one is lower case. Remember, the genotype is a pair of letters like,

**Homozygous dominant = AA Homozygous recessive = aa Heterozygous = Aa**

**Circle** the correct genotype

1. Homozygous dominant BB Bb 5. Homozygous recessive nn Nn

2. Heterozygous BB Bb 6. Homozygous dominant GG Gg

3. Homozygous recessive bb Bb 7. Heterozygous RR Rr

**Practice 6:** Now we are going to tie it all together.

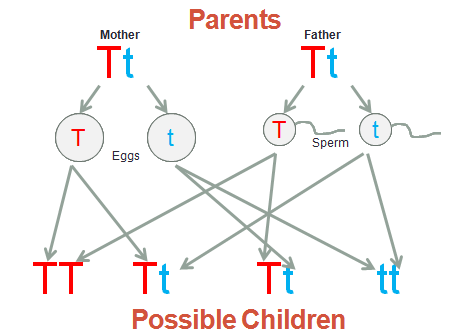
In humans, having dimples is dominant (D) and not having dimples is recessive (d).

1. A mother has a genotype of Dd, what is her phenotype? \_\_\_\_\_\_\_\_\_\_\_
2. A father does not have dimples, what is his genotype? \_\_\_\_\_\_\_\_\_\_\_\_\_
3. Their child is homozygous recessive for the dimples trait. What is her genotype and phenotype? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. Will a person that is heterozygous for the dimples trait actually have dimples? \_\_\_\_\_\_
5. Explain your answer for question 4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

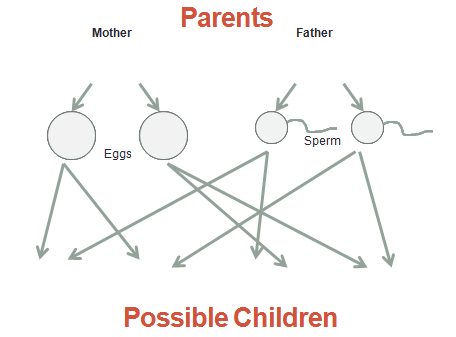
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**Lesson 5: Line Diagrams**

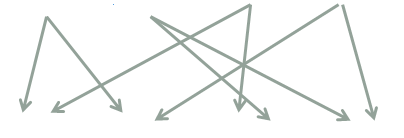
Everyone has two alleles for a gene. We get one allele from our mother and one from our father.



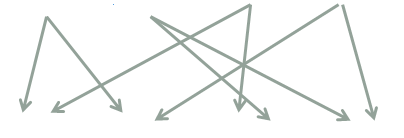
1. Using the model above as an example, fill out the chart below to determine the possible combination of alleles for children if their mother is homozygote dominate for freckles (FF) and their father is homozygote recessive for no freckles (ff).



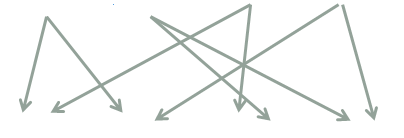
1. Use the lines below to help you answer the following questions.
   1. Jimmy’s mom has dimples (Dd) and his dad does not have dimples (dd). What are the chances that Jimmy has dimples?



* 1. Sara’s mom has round eyes (Ee) and her dad also has round eyes (Ee). Round eyes is dominant over almond shaped eyes. What are the chances that Sara has almond shaped eyes.



* 1. Two pea plants cross breed, one is short (tt) and one tall (TT). What will the genotype of the offspring be?



1. Drawing your own lines (or any other method) answer the following questions.
   1. All white fur is a recessive trait in mice. If two all white mice are bred together, what are the chances that one of the baby rats will be black?
   2. Jenny has a widow’s peak. Her mom also has a widow’s peak (Hh) and her dad does not have a widow’s peak (hh). What are Jenny’s alleles?
   3. Parth can’t roll his tongue (tt) and he married a woman who also cannot roll her tongue (tt). If being able to roll your tongue is dominant what are the chances of them having a child who can roll their tongue?
   4. In dogs, deafness is a recessive trait. If two heterozygote hearing dogs (Dd) are bred, then what are the chances that their puppy will be deaf?
   5. Immunity to poison ivy is dominant. Darrell’s mom is homozygote dominat (NN) and his dad is heterozygote (Nn). What are the chances that Darrell is also immune to poison ivy?
   6. In dogs, perked ears are dominant over floppy ears. If a dog with floppy ears was bred with a dog that was homozygote for perked ears, what are the chances their offspring will have perked ears?
2. Drawing the lines to determine the possible allele combinations can be messy. Can you think of an easier way to determine the possible combination of alleles from two parents? Discuss with your partner and write your solution below.

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