**PRACTICE: MENDELIAN GENETICS**

FAMILIAR QUESTIONS

***Complete statements #1-7 using the word bank below. Not all words will be used, and no words are repeated.***

**Alleles**

**Capital**

**Chromosomes**

**Dominant**

**Heterozygous**

**Homozygous**

**Lowercase**

**No**

**Recessive**

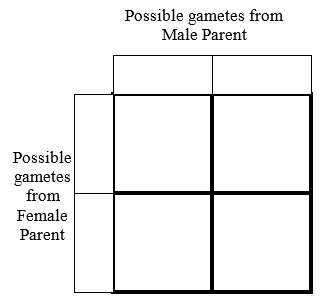
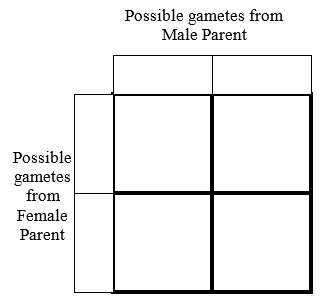
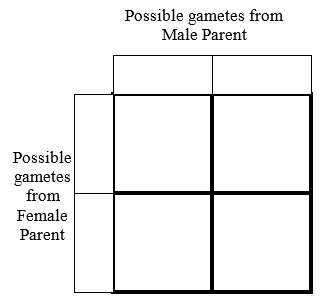
**Short**

**Tall**

**Yes**

1. On each of the homologous chromosomes, there is a version of a gene for a certain trait. These versions are called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Alleles can either be ***dominant*** or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. In a pea plant, the allele (gene) for tallness is dominant over the allele for shortness. If a pea plant has one allele for tallness and one for shortness, will the plant be tall or short?
4. In humans, the ability to taste a type of paper called PTC is carried by a dominant allele. If a person has one allele for “tasting” and one for “non-tasting”, will the person be able to taste PTC? \_\_\_\_\_\_\_\_\_\_\_\_. The gene for tasting is shown by the person, so it is said to be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. The allele for non- tasting is recessive.
5. In alleles which are dominant and recessive, the dominant allele is represented by a \_\_\_\_\_\_\_\_\_\_\_\_\_ letter, while the recessive allele is represented by a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ letter.
6. An individual who has a pair of alleles that are the same type (both dominant or both recessive) is said to be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ for that gene.
7. An individual who has a pair of alleles that are different types (one dominant and one recessive) is said to be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ for that gene.
8. Peas have a gene for tallness (t). The dominant allele is Tall (T) and the recessive allele is short (t). The combination of alleles (genotypes) for some individuals are given below. Determine whether each of the individuals is homozygous or heterozygous and determine whether each plant is tall or short:

|  |  |  |
| --- | --- | --- |
| **Genotype** | **Homozygous or Heterozygous?** | **Tall or Short Plant?** |
| TT |  |  |
| Tt |  |  |
| Tt |  |  |

1. What is meant by the ***genotype*** of an individual?
2. What is meant by the ***phenotype*** of an individual?
3. In humans, dimpled cheeks (D) are dominant and smooth cheeks (d) are recessive. A father is who is ***heterozygous dimpled***, and a mother who is ***homozygous smooth*** have children.
   1. What is the genotype of the father? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  
      What is the genotype of the mother? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   2. Fill in the Punnett Square showing the cross and the combinations of   
      genes possible in the children.
   3. According to chance, what fraction of their children will have dimples?
   4. What fraction of the children should be homozygous smooth?
   5. If these two people have four children, is it safe to assume that two will be dimpled and two will not?
4. A father is who is ***homozygous dimpled***, and a mother who is ***homozygous smooth*** have children.
   1. What is the genotype of the father? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  
      What is the genotype of the mother? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   2. Fill in the Punnett Square showing the cross and   
      the combinations of genes possible in the children.
   3. According to chance, what fraction of their children will have dimples?
   4. What fraction of the children should be homozygous smooth? (if any)
   5. What fraction of the children should be heterozygous dimpled? (if any)
   6. What fraction of the children should be homozygous dimpled? (if any)
5. A father is who is ***homozygous dimpled***, and a mother who is ***heterozygous dimpled*** have children.
   1. What is the genotype of the father? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  
      What is the genotype of the mother? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   2. Fill in the Punnett Square showing the cross and the combinations of   
      genes possible in the children.
   3. According to chance, what fraction of their children will have dimples?
   4. What fraction of the children should be ***homozygous smooth***? (if any)
   5. What fraction of the children should be ***heterozygous dimpled***? (if any)
   6. What fraction of the children should be ***homozygous dimpled***? (if any)