

## Genetics Worksheet 3

**1. Tallness (T) is dominant to short (t) in pea plants.**

- a) Show a cross between a homozygous tall and a hybrid plant.
- b) What possible phenotypes will the F<sub>1</sub> generation have from the cross in part a)?
- c) What is the probability of the offspring from part a) having genotype Tt?
- d) In another cross, ½ of their offspring are tall and ½ are short. What are the genotypes and phenotypes of the parents?

**2. In guinea pigs, the colour black is dominant.**

- a) What are the possible genotypes for a black guinea pig?
- b) If you have a black pig, show how to determine its genotype.

**3. The ability to roll your tongue is dominant over the inability.**

- a) If your parents are both hybrid, what is the possibility that you will be a tongue roller?
- b) Is it possible for both parents to be tongue rollers, and a child a non-roller?

**4. Human earlobes may be attached or free. Attached is recessive.** What is the probability of the genotype Ff appearing in the offspring of an attached lobe female and heterozygous male?

**5. Brown eyes are dominant to blue eyes.** A brown-eyed man whose mother has blue eyes marries a brown-eyed woman whose father has blue eyes. Show the genotypic and phenotypic ratios to be expected in their children.

**6.** In rabbits, black fur and white fur are **co-dominant** and a hybrid genotype produces mottled fur (black and white patches). Show the inheritance through the F<sub>1</sub> and F<sub>2</sub> generations if a black rabbit is mated with a white rabbit.

**7.** In some cattle, the gene for fur colour is **semi-dominant** with the gene for white fur. A heterozygous combination produces an intermediate fur colour called roan. What percentage of calves would be roan if two roan cattle were bred?

Recall that type A and type B blood are **co-dominant** and are both dominant over type O.

**8.** A man with type B blood has a type O father. This man marries a woman with type AB blood. Show the possible blood types of their children.

**9.** A couple has type O blood. Their son marries a woman with type AB blood. Show the possible blood types of the grandchildren.

The Rhesus factor is a 2<sup>nd</sup> gene which determines blood type and is responsible for the + or – often listed as a part of the blood type of a person. **Rh+ is dominant over Rh-.** (The Rh factor is actually much more complex than this).

**10.** A man with Rh+ blood marries a woman with Rh- blood. If their child has Rh- blood, what is the genotype of the father?

**11.** A man with type O+ blood marries a woman with type AB-. Show the possible blood types of their children.