

Genetics Worksheet 3

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

- Show a cross between a homozygous tall and a hybrid plant.
- What possible phenotypes will the F₁ generation have from the cross in part a)?
- What is the probability of the offspring from part a) having genotype Tt?
- 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.

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

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

- If your parents are both hybrid, what is the possibility that you will be a tongue roller?
- 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 F₁ and F₂ 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 2nd 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.