

# Inheritance Patterns Study Guide

## Dominant/Recessive Basics

1. The shape of human earlobes is an inherited trait. Jana and her father have detached earlobes, while her mother's earlobes are attached. Jana's ear shape is determined by \_\_\_\_\_ which contain the information for the earlobe trait.



Detached



Attached

2. A certain species of rose can be dark yellow ( $r$ ), or light yellow ( $R$ ). If a rose has the alleles  $Rr$  and is light yellow in color, which allele is dominant?

3. The round pea seed trait is dominant over the wrinkled pea seed trait. If a pea seed is wrinkled, which combination of alleles must it have?

4. An organism's \_\_\_\_\_ describes its genetic composition. An organism's \_\_\_\_\_ describes its appearance or observable characteristics.

5. A rabbit is carrying a dominant allele for brown fur ( $B$ ) and a recessive allele for white fur ( $b$ ). What is the rabbit's phenotype?

6. Being tall is a dominant trait. Being short is a recessive trait. What can you determine about the parents of a tall plant?

7. Green pod color is a dominant trait, while yellow pod color is recessive. How would you write a heterozygous genotype?

8. Tall plant height is dominant over short plant height. What genotypes could represent a tall plant?

## Punnett Squares

9. Freckles ( $F$ ) are a dominant trait. The Punnett square for a non-freckled parent and a heterozygous freckled parent is shown. What is the probability that their children will have freckles?

	<b>F</b>	<b>f</b>
<b>f</b>	Ff	ff
<b>f</b>	Ff	ff

10. The Punnett square shows the cross between cabbage butterflies.  $B$  = white and  $b$  = yellow. Why are all the offspring white?

## Cabbage Butterflies

	<b>B</b>	<b>B</b>
<b>b</b>	Bb	Bb
<b>b</b>	Bb	Bb

11. In humans, the ability to roll one's tongue is dominant over the allele for non-tongue-rolling. If two homozygous parents can roll their tongues, what is the probability their child will also be able to roll their tongue?

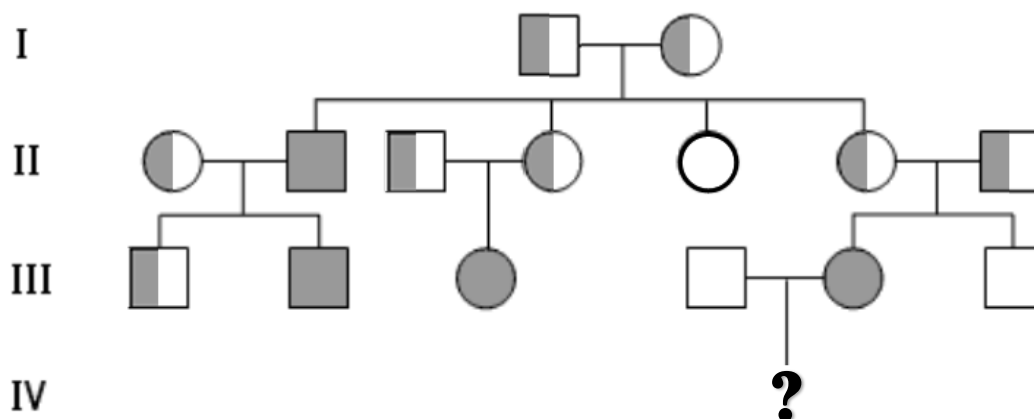
12. Having smooth seeds is a dominant trait. Having wrinkled seeds is a recessive trait. What do you know about the offspring of two plants with wrinkled seeds?
13. In a gerbil population, the allele for coarse fur (F) is dominant, while the allele for smooth fur (f) is recessive. One pet store found that most of their customers want coarse-furred gerbils. Which cross would produce the greatest number of coarse-haired offspring?
- Ff X Ff
  - ff X ff
  - Ff X ff
  - FF X Ff
14. A red flower (RR) is crossed with a white flower (rr) and produces plants with red flowers – if two of these red flower **offspring** are crossed together, what color offspring would be produced? (**Hint:** this is a TWO step problem. First you have to cross the parents: RR X rr, then you have to choose two of the **offspring** to cross.)
15. In rabbits, long ears (L) are dominant over short ears (l). The diagram shows the cross of a homozygous dominant parent (LL) with a parent of an unknown genotype for ear length. What is the unknown genotype and phenotype for the parent?

	L	L
?	Ll	Ll
?	Ll	Ll

### Pedigrees

Use the pedigree pictured below to answer the following questions.

The pedigree below shows the inheritance of albinism in a particular family. The shaded symbols represent individuals with albinism. People with albinism have little or no pigment in their skin, eyes, and hair color. The allele for normal pigmentation (A) is dominant over the allele for albinism (a).



16. What are the genotypes of the parents in the 1<sup>st</sup> generation?
17. What will be the genotype of the offspring in the 4<sup>th</sup> generation?
18. How many **people** in this family will have the recessive phenotype?

19. How many **blood-related grandchildren** do the parents in the 1<sup>st</sup> generation have?  
(**Hint:** Do not count people who married into the 3<sup>rd</sup> generation.)
20. Which of the following is NOT true about symbols in a pedigree?
- Circles represent males and squares represent females.
  - A square and circle connected at the sides indicate marriage (offspring was produced).
  - Shaded shapes have the recessive trait.
  - Half shaded shapes are carriers (heterozygous) for the trait.
21. How many females are carriers for albinism in this family?
22. The unmarried person in the 2<sup>nd</sup> generation is worried about having offspring with albinism. Who should this person marry to ensure the offspring will NOT have albinism?
- homozygous person with albinism (bb)
  - heterozygous person without albinism (Bb)
  - homozygous person without albinis (BB)
  - any of the above – the dominant allele will take over