

Incomplete Dominance & Complete Dominance

Inheritance (Unit 4) – Biology

Name: _____

Date: _____

First, you need to know the basic terms.

Term	Definition/Description
Genotype	The two alleles in your genetic code for a trait. A dog's genotype for eye color could be BB (brown), Bb (brown), or bb (blue). A dog's genotype for fur color could be GG (golden), Gg (golden), or gg (tan).
Phenotype	The physical expression of your genotype. For example, BB and Bb might give you brown eyes, while bb gives you blue eyes.
Dominant	When an allele is completely dominant, it 'masks' or 'hides' the other allele. Dominant alleles are written with a capital letter. So if someone has the genotype Bb, they have the dominant phenotype (brown eyes).
Recessive	The allele that gets masked or hidden by the dominant allele. Recessive alleles are written with a lowercase letter. To have the recessive trait, you must have two recessive alleles (zero dominant alleles). So if someone has the genotype bb, they have the recessive phenotype (blue eyes).
Homozygous dominant	The genotype with two dominant alleles (BB). This person has the dominant phenotype (brown eyes).
Homozygous recessive	The genotype with two recessive alleles (bb). This person has the recessive phenotype (blue eyes).
Heterozygous	The genotype with one dominant allele and one recessive allele (Bb). This person carries a recessive allele but has the dominant phenotype (brown eyes) because the dominant one wins.

Exceptions...

Term	Definition/Description
Incomplete dominance	The dominant allele can't completely mask the recessive one. If the genotype is heterozygous, then the phenotype will be an even blend of the dominant and recessive traits. Example: In a flower, red (R) is dominant over white (r). RR = Red... rr = White... but Rr = Pink. It can also be written like this: Red (R) is dominant. White (r) is recessive. RR = Red... Rr = Pink... rr = White. Remember: In <u>in</u> complete dominance, the heterozygous phenotype is <u>in</u> between the dominant and recessive ones.
Codominance	Both phenotypes are dominant. There's no recessive phenotype. If the genotype is heterozygous, then the phenotype will have both traits. Example: In a flower, red (R) and white (W) are both dominant. RR = Red ... WW = White... but RW = Red with white spots or white streaks/strips. It can also be written like this: Both flower colors are dominant – Red (C ^R) and White (C ^W). C ^R C ^R = Red ... C ^W C ^W = White ... C ^R C ^W = Red with white spots or white streaks/strips. Remember: In <u>co</u> dominance, <u>bo</u> th traits are dominant, and so <u>bo</u> th are visible.

Let's practice the terms.

1. Write a genotype for someone with a recessive disorder if the dominant trait is completely dominant. _____
2. Write a genotype for the carrier of a recessive disorder if the dominant trait is completely dominant. _____
3. Write a heterozygous genotype for an incompletely dominant trait. _____
4. In squirrels, long tails are dominant and short tails are recessive. If this was an incompletely dominant trait, what kind of tail would a squirrel with a heterozygous genotype have? _____
5. Write a heterozygous genotype for a codominant trait. _____
6. In cows, white color and brown color are both dominant. What would a cow with a heterozygous genotype look like? _____
7. Is this genotype – BB' – homozygous dominant, heterozygous, or homozygous recessive? _____
8. Is this genotype – B'B' – homozygous dominant, heterozygous, or homozygous recessive? _____
9. Is this genotype – KM – homozygous dominant, heterozygous, or homozygous recessive? _____

Let's look at an example in a monster couple.

R = Red eyes ... R' = White eyes

10. Which trait is dominant? (red eyes or white eyes) _____
 11. What phenotype does a heterozygous monster have? (what color eyes?) _____

Mom Monster has red eyes.

12. What's her genotype? _____

Dad Monster has pink eyes.

13. What's his genotype? _____

14. Complete the Punnett square for this couple.
 15. What is the likelihood that their children will have pink eyes? ____ / 4

Let's do another example.

G = Green skin ... B = Blue skin

16. What phenotype does a heterozygous monster have?
 (green skin, blue skin, or green skin with blue spots)

Mom Monster has blue skin.

17. What's her genotype? _____

Dad monster is heterozygous for skin color. Complete the Punnett square for this couple.

18. What is the genotypic ratio for their offspring? ____ : ____ : ____
 19. What is the phenotypic ratio for their offspring? ____ : ____ : ____
 20. What is the likelihood that a baby of theirs will have the same skin color as mom? ____ %
 21. What is the likelihood that a baby of theirs will have the same skin color as dad? ____ %

Questions? Ask your teacher!