

## 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 <b>genetic</b> 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 <b>physical</b> 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 <b>carries</b> a recessive allele but <b>has</b> 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... R'R' = White... RR' = Pink<br><b>Remember:</b> In <u>in</u> complete dominance, the heterozygous phenotype is <u>in</u> between the dominant and recessive ones.                                                                                                                                                           |
| Codominance          | <b>Both</b> 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 <sup>R</sup> ) and White (C <sup>W</sup> ). C <sup>R</sup> C <sup>R</sup> = Red ... C <sup>W</sup> C <sup>W</sup> = White ... C <sup>R</sup> C <sup>W</sup> = Red with white spots or white streaks/strips.<br><b>Remember:</b> 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? \_\_\_\_\_

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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? \_\_\_\_\_

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**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!