**Mendelian Genetics – Above and Beyond**

You are a champion my friend!

|  |  |
| --- | --- |
| **Incomplete Dominance**  ***AKA Partial Dominance*** | **Co-Dominance** |
| **Definition:** Incomplete dominance is a form of intermediate inheritance in which one [allele](http://biology.about.com/od/geneticsglossary/g/alleles.htm) for a specific trait is not completely dominant over the other allele. This results in a third [phenotype](http://biology.about.com/od/geneticsglossary/g/phenotype.htm) in which the expressed physical trait is a combination of the dominant and recessive phenotypes.  Incomplete dominance is similar to, but different from co-dominance. In co-dominance, an additional phenotype is produced, however both alleles are expressed completely. | **Definition: Co-dominance** is defined as a type of non-Mendalian inheritance pattern that finds the traits expressed by the [alleles](http://biology.about.com/od/geneticsglossary/g/alleles.htm) to be equal in the [phenotype](http://biology.about.com/od/geneticsglossary/g/phenotype.htm). There is neither a complete dominance or [incomplete dominance](http://evolution.about.com/od/Evolution-Glossary/g/Incomplete-Dominance.htm) of one trait over the other for that given characteristic. Codominance would show both alleles equally instead of a blending of the traits as is seen in incomplete dominance.  In the case of co-dominance, the [heterozygous](http://biology.about.com/od/geneticsglossary/g/heterozygous.htm) individual expresses both alleles equally. There is no mixing or blending involved and each is distinct and equally shown in the phenotype of the individual. Neither trait masks the other like in simple or complete dominance, either. |
| **Example:** Incomplete dominance is seen in cross-pollination experiments between red and white snapdragon plants. The dominant allele that produces the red color is not completely expressed over the recessive allele that produces the white color. The resulting offspring are pink.   |  | | --- | | **RED Flower x WHITE Flower ---> PINK Flower** | | |  | | --- | | **red x white**  **---> red & white spotted** |   **Example:** A typical example showing codominance is the ABO blood group system. For instance, a person having A [allele](http://www.biology-online.org/dictionary/Allele) and B [allele](http://www.biology-online.org/dictionary/Allele) will have a [blood type](http://www.biology-online.org/bodict/index.php?title=Blood_type&action=edit) AB because both the A and B [alleles](http://www.biology-online.org/dictionary/Alleles) are codominant with each other. |
| **Trick is to recognizing:**  There are two steps to this:  1) Notice that the offspring is showing a 3rd phenotype.  The parents each have one, and the offspring are different from the parents.  2) Notice that the trait in the offspring is a blend (mixing) of the parental traits. | **Trick is to recognizing:**  Rather than one trait (allele) dominating the other, both traits appear together in the phenotype.  Wa-la, codominance. |

|  |  |
| --- | --- |
| **Questions**:  1. A cross between a blue blahblah bird & a white blahblah bird produces offspring that are silver.  The color of blahblah birds is determined by just two alleles.    a) What are the genotypes of the parent blahblah birds in the original cross?  b) What is/are the genotype(s) of the silver offspring?  c) What would be the phenotypic ratios of offspring produced by two silver blahblah birds?  2.  The color of fruit for plant "X" is determined by two alleles.  When two plants with orange fruits are crossed the following phenotypic ratios are present in the offspring: 25% red fruit, 50% orange fruit, 25% yellow fruit.  What are the genotypes of the parent orange-fruited plants? | **Questions:**  1. Predict the phenotypic ratios of offspring when a homozygous white cow is crossed with a roan bull.  2. What should the genotypes & phenotypes for parent cattle be if a farmer wanted only cattle with red fur?  3. A cross between a black cat & a tan cat produces a tabby pattern (black & tan fur together).  a) What pattern of inheritence does this illustrate?  b) What percent of kittens would have tan fur if a tabby cat is crossed with a black cat? |