

## Review

Normal dominant and recessive alleles for a trait are shown as upper case and lower case letters. The dominant gene, if it is present in the genotype, always determines the phenotype.

### An example

R = red flower color  
r = white flower color

RR = red flowers  
Rr = red flowers  
rr = white flowers

Sometimes, however, when a red flower is bred with a white flower the next generation is pink! This is an example of codominant genes at work.

## Punnett Squares - Codominant

1. What does codominant mean?

The two alleles in a genotype "share" determining the phenotype.

2. How does codominant work?

In order to tell the difference from genes which work in the dominant-recessive style from the codominant style, codominant alleles are always shown as upper case letters with a super script. For flower color with red and white codominant alleles it could be shown as  $F^R$  and  $F^W$ .  $F^R$  is the red allele and  $F^W$  is the white allele. Together they produce pink flowers ( $F^R F^W$ ). When  $F^R$  and  $F^R$  are together the flowers are red and when  $F^W$  and  $F^W$  are together in a genotype the flowers are white.

3. How do human blood types work?

Human blood types are a mixture of the two styles - dominant and recessive and codominant.

A and B blood types are codominant while O is recessive.

$I^A$  = A blood type

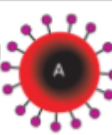
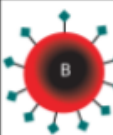
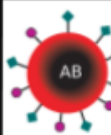
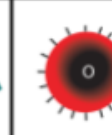






$I^B$  = B blood type

$i$  = O blood type

The genotypes  $I^A i$ , and  $I^A I^A$  both produce the phenotype A blood.

$I^B i$  and  $I^B I^B$  both produce the phenotype B blood.

$I^A I^B$  produces AB blood while  $ii$  produces O blood.

	Group A	Group B	Group AB	Group O
Red blood cell type				
Antibodies present	 Anti-B	 Anti-A	None	 Anti-A and Anti-B
Antigens present	 A antigen	 B antigen	 A and B antigens	None

**Sample problem:**

Body color in python snakes is codominant.  $C^N$  = normal color while  $C^P$  = pale color. The codominant combination results in a pastel python body color.

$$C^N C^P \times C^N C^P$$

$C^N$	$C^N C^N$	$C^N C^P$
$C^P$	$C^N C^P$	$C^P C^P$

Phenotype results as percentages

25% normal color  
50% pastel  
25% pale



normal



pale



pastel

Use the Punnett Squares to make the following codominant crosses. (1 point each)

- a. Periwinkle flower color  
 $F^R$  = red, pink,  $F^W$  = white

$F^R F^R \times F^R F^W$


Phenotype results as percentages



$F^R$  = red, pink,  $F^W$  = white

The pink in the middle of the two codominant genes is the phenotype when the two codominant genes work together.

