

Codominance, Multiple Alleles & Blood Types

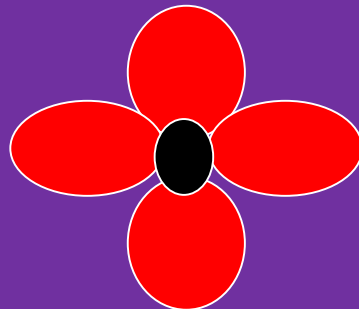
CODOMINANCE

- ❖ in the heterozygous condition, both alleles are expressed equally with NO blending!
- ❖ Example: Ex - **Red (R)** + **White (W)** = Hybrid **Red/White (RW)**. Determine the genotypes and phenotypes.

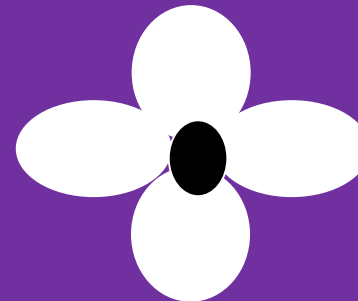
Use **TWO** capital letters for both because they are both dominant.

They don't want to give up being dominant, so they "share"

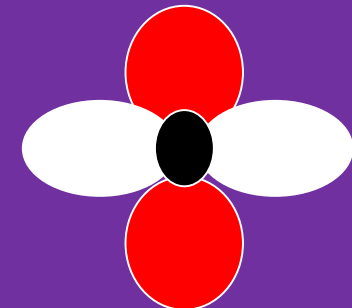
RR = red



WW = white



RW = Red/White



CODOMINANCE PROBLEM: SPECKLED CHICKENS

SHOW A CROSS BETWEEN TWO HETEROZYGOUS CHICKENS

- ❖ BB = black feathers
- ❖ WW = white feathers
- ❖ BW = black & white speckled feathers



GENOTYPES:

- BB (25%)
- BW (50%)
- WW (25%)
- ratio 1:2:1

PHENOTYPES:

- black (25%);
- white (25%)
- Black/white (50%)
- ratio 1:2:1

	B	W
B	BB	BW
W	BW	WW

CODOMINANCE PROBLEM:



- Coat color in cattle can be **red (R)**, white (W) or the heterozygous condition **roan (RW)** (red hairs mixed with white).

- **Determine the genotypes & phenotypes** **RR = Red** **WW = White** **RW = Roan**

- A roan bull (male) is mated with a white cow (female). What are the possible offspring?

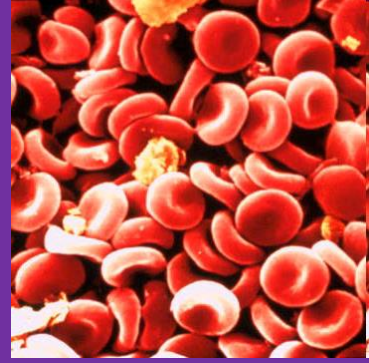
- **Bull's Genotype:** **RW**

- **Cow's Genotype:** **WW**

- **Possible Offspring:**
 - **Genotype (w/ %)** – **WW = 50%**
 - **Phenotype – (w/ %)** - **Roan = 50%**
White = 50%

	R	W
W	RW	WW
W	RW	WW

MULTIPLE ALLELES



❖ there are more than two alleles for a gene.

❖ Ex – blood type

❖ A humans blood type is determined by a single gene that has three different alleles.

❖ Blood types are A, B, O, and AB.

❖ AB blood is a co-dominant trait.

❖ Both the A blood and the B blood need to be dominant in order to make a combination of co-dominant blood types, which is AB.

Blood Type	Genotype		Can Receive Blood From:
A	$i^A i$ $i^A i^A$	AA AO	A or O
B	$i^B i$ $i^B i^B$	BB BO	B or O
AB	$i^A i^B$	AB	A, B, AB, O
O	ii	OO	O

Isoagglutinogen another word for *antigen*

- something that triggers an immune response in the body

PROBLEM: MULTIPLE ALLELES & BLOOD TYPE

- A woman with Type O blood and a man who is Type AB are expecting a child. What are the possible blood types of the kid?

	I^A	I^B
i	$I^A i$	$I^B i$
i	$I^A i$	$I^B i$

or

	A	B
O	AO	BO
O	AO	BO

50% = heterozygous with blood Type A

50% = heterozygous with blood Type B

PROBLEM: MULTIPLE ALLELES & BLOOD TYPE

- **A man with AB blood is married to a woman with AB blood. What blood types could their children be?**

25% = homozygous with blood Type A

25% = homozygous with blood Type B

50% = heterozygous with blood Type AB

	A	B
A	AA	AB
B	AB	BB