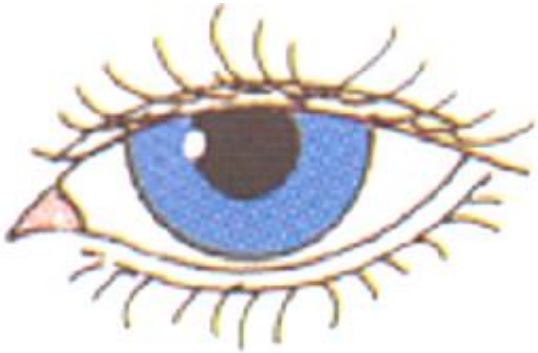
DI-HYBRID CROSS

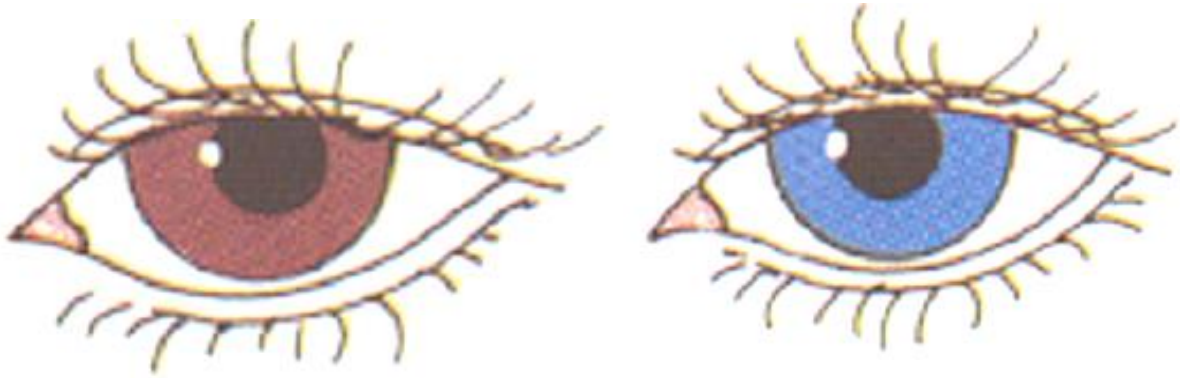
DI-HYBRID CROSS

2 CHARACTER CROSS

DI-HYBRID CROSS



EYE COLOR



EYE COLOR

HAIR CONDITION

DI-HYBRID CROSS EXAMPLE

HETEROZYGOUS INDIVIDUAL

X

HETEROZYGOUS INDIVIDUAL

DI-HYBRID CROSS

P1 = BbCc x BbCc

GAMETE NUMBER PER PARENT

GAMETE NUMBER FORMULA

$$2^N$$

N = NO. OF CHARACTERS

GAMETE NUMBER FORMULA

$$2^2$$

N = NO. OF CHARACTERS

4

GAMETES/PARENT PUNNETT-SQUARE

DI-HYBRID CROSS

P1 = BbCc x BbCc

1ST PARENT

PUNNETT SQUARE

= GAMETE

PUNNETT SQUARE

1ST PARENT	
1ST PARENT	
1ST PARENT	
1ST PARENT	

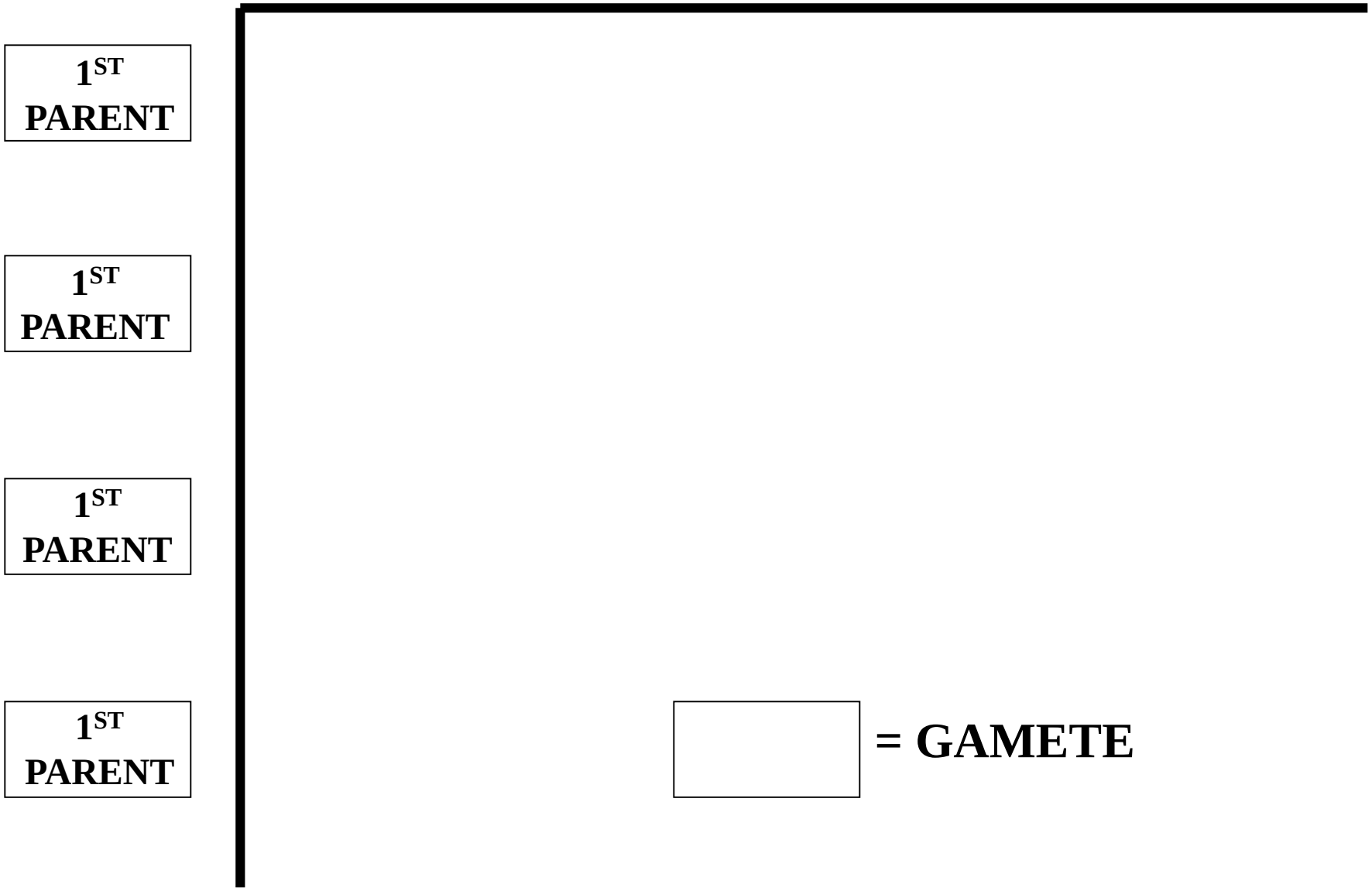
= GAMETE

DI-HYBRID CROSS

P1 = BbCc x BbCc

2ND PARENT

PUNNETT SQUARE



PUNNETT SQUARE

	2ND PARENT	2ND PARENT	2ND PARENT	2ND PARENT
1ST PARENT				
1ST PARENT				
1ST PARENT				
1ST PARENT				

= GAMETE

DI-HYBRID CROSS

GAMETE ALLELE FORMATION

!!! CONSULT HANDOUT !!!

RIA

DI-HYBRID CROSS GAMETE ALLELE FORMATION

!!! CONSULT HANDOUT !!!

RANDOM INDEPENDENT ASSORTMENT

DI-HYBRID CROSS
GAMETE ALLELE FORMATION

RANDOM
INDEPENDENT ASSORTMENT

BbCc

GAMETE	GAMETE	GAMETE	GAMETE

DI-HYBRID CROSS
GAMETE ALLELE FORMATION

RANDOM
INDEPENDENT ASSORTMENT

BbCc

GAMETE	GAMETE	GAMETE	GAMETE

DI-HYBRID CROSS
GAMETE ALLELE FORMATION

RANDOM
INDEPENDENT ASSORTMENT

BbCc

1 **BC** GAMETE	GAMETE	GAMETE	GAMETE

RANDOM INDEPENDENT ASSORTMENT

DI-HYBRID CROSS
GAMETE ALLELE FORMATION

RANDOM
INDEPENDENT ASSORTMENT

BbCc

1 **BC** GAMETE	GAMETE	GAMETE	GAMETE

DI-HYBRID CROSS
GAMETE ALLELE FORMATION

RANDOM
INDEPENDENT ASSORTMENT

BbCc

1 **BC** GAMETE	GAMETE	GAMETE	GAMETE

DI-HYBRID CROSS
GAMETE ALLELE FORMATION

RANDOM
INDEPENDENT ASSORTMENT

BbCc

1	2		
BC GAMETE	**Bc** GAMETE	GAMETE	GAMETE

RANDOM INDEPENDENT ASSORTMENT

DI-HYBRID CROSS
GAMETE ALLELE FORMATION

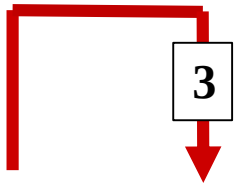
RANDOM
INDEPENDENT ASSORTMENT

BbCc

1	2		
BC GAMETE	**Bc** GAMETE	GAMETE	GAMETE

DI-HYBRID CROSS
GAMETE ALLELE FORMATION

RANDOM
INDEPENDENT ASSORTMENT

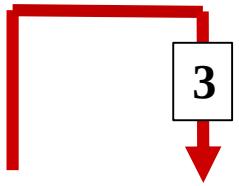


BbCc

1 **BC** GAMETE	2 **Bc** GAMETE	**GAMETE**	**GAMETE**

DI-HYBRID CROSS
GAMETE ALLELE FORMATION

RANDOM
INDEPENDENT ASSORTMENT



BbCc

1	2	3	
BC GAMETE	Bc GAMETE	bC GAMETE	GAMETE

RANDOM INDEPENDENT ASSORTMENT

DI-HYBRID CROSS
GAMETE ALLELE FORMATION

RANDOM
INDEPENDENT ASSORTMENT

BbCc

1 **BC** GAMETE	2 **Bc** GAMETE	3 **bC** GAMETE	**GAMETE**

DI-HYBRID CROSS
GAMETE ALLELE FORMATION

RANDOM
INDEPENDENT ASSORTMENT

BbCc

1	2	3	GAMETE
BC	Bc	bC	
GAMETE	GAMETE	GAMETE	

DI-HYBRID CROSS
GAMETE ALLELE FORMATION

^
1

RANDOM
INDEPENDENT ASSORTMENT

BbCc

1 **BC** GAMETE	2 **Bc** GAMETE	3 **bC** GAMETE	4 **bc** GAMETE

DI-HYBRID CROSS

?

2

P1 = BbCc x BbCc

GAMETE ALLELE FORMATION

1ST PARENT GAMETE ALLELES

BC	**Bc**	**bC**	**bc**

DI-HYBRID CROSS

P1 = BbCc x BbCc

GAMETE ALLELE FORMATION

1ST PARENT GAMETE ALLELES

BC	**Bc**	**bC**	**bc**
?	**?**	**?**	**?**

2ND PARENT GAMETE ALLELES

DI-HYBRID CROSS

P1 = BbCc x BbCc

GAMETE ALLELE FORMATION

1ST PARENT GAMETE ALLELES

BC	**Bc**	**bC**	**bc**

BC	**Bc**	**bC**	**bc**

2ND PARENT GAMETE ALLELES

PUNNETT SQUARE

	2ND PARENT	2ND PARENT	2ND PARENT	2ND PARENT
1ST PARENT				
1ST PARENT				
1ST PARENT				
1ST PARENT				

= GAMETE

PUNNETT SQUARE

	2ND PARENT	2ND PARENT	2ND PARENT	2ND PARENT
BC				
Bc				
bC				
bc				

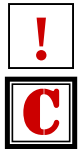
= GAMETE

PUNNETT SQUARE

	BC	**Bc**	**bC**	**bc**
BC				
Bc				
bC				
bc				

= **GAMETE**

PUNNETT SQUARE	BC	Bc	bC	bc
BC	BBCC	BBCc	BbCC	BbCc
Bc	BBCc	BBcc	BbCc	Bbcc
bC	BbCC	BbCc	bbCC	bbCc
bc	BbCc	Bbcc	bbCc	bbcc



!!! CONSULT HANDOUT !!!

G

DI-HYBRID CROSS

GENOTYPE

PHENOTYPE

!!! CONSULT HANDOUT !!!

DI-HYBRID CROSS

F1 GENERATION GENOTYPE RATIO

F1 GENOTYPE	BC	Bc	bC	bc
BC	BBCC	BBCc	BbCC	BbCc
Bc	BBCc	BBcc	BbCc	Bbcc
bC	BbCC	BbCc	bbCC	bbCc
bc	BbCc	Bbcc	bbCc	bbcc

F1 GENOTYPE	BC	Bc	bC	bc
BC	BBCC	BBCc	BbCC	BbCc
Bc	BBCc	BBcc	BbCc	Bbcc
bC	BbCC	BbCc	bbCC	bbCc
bc	BbCc	Bbcc	bbCc	bbcc

^
+

F1 GENOTYPE	BC	Bc	bC	bc
BC	BBCC	BBCc	BbCC	BbCc
Bc	BBCc	BBcc	BbCc	Bbcc
bC	BbCC	BbCc	bbCC	bbCc
bc	BbCc	Bbcc	bbCc	bbcc

F1 GENOTYPE	BC	Bc	bC	bc
BC	BBCC	BBCc	BbCC	BbCc
Bc	BBCc	BBcc	BbCc	Bbcc
bC	BbCC	BbCc	bbCC	bbCc
bc	BbCc	Bbcc	bbCc	bbcc

F1 GENOTYPE	BC	Bc	bC	bc
BC	BBCC	BBCc	BbCC	BbCc
Bc	BBCc	BBcc	BbCc	Bbcc
bC	BbCC	BbCc	bbCC	bbCc
bc	BbCc	Bbcc	bbCc	bbcc

F1 GENOTYPE	BC	Bc	bC	bc
BC	BBCC	BBCc	BbCC	BbCc
Bc	BBCc	BBcc	BbCc	Bbcc
bC	BbCC	BbCc	bbCC	bbCc
bc	BbCc	Bbcc	bbCc	bbcc

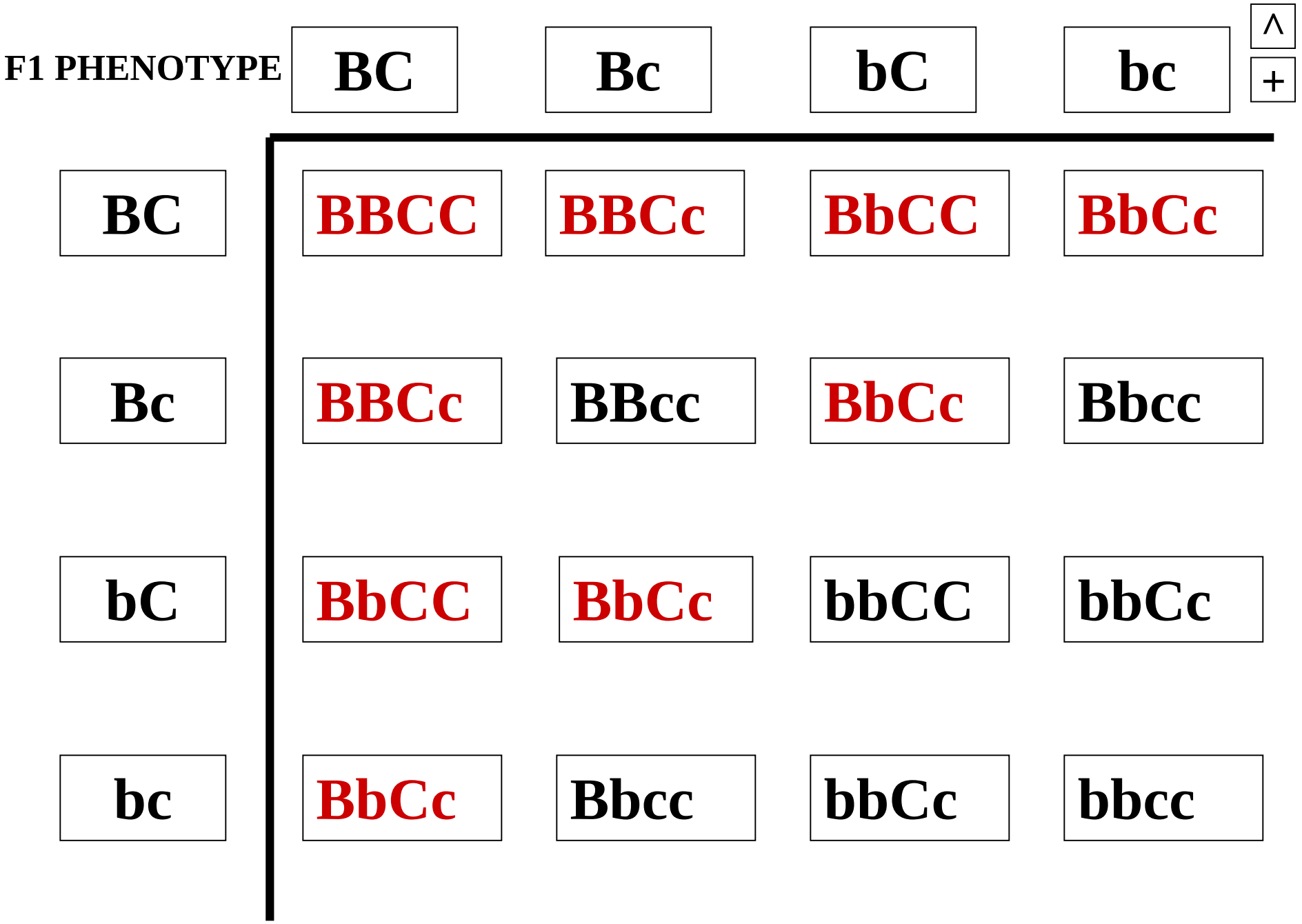
^
P

DI-HYBRID CROSS

F1 GENERATION PHENOTYPE RATIO

F1 PHENOTYPE	BC	Bc	bC	bc
BC	BBCC	BBCc	BbCC	BbCc
Bc	BBCc	BBcc	BbCc	Bbcc
bC	BbCC	BbCc	bbCC	bbCc
bc	BbCc	Bbcc	bbCc	bbcc

#


F1 PHENOTYPE
BC
Bc
bC
bc
^
+
BC
Bc
bC
bc
BBCC
BBCc
BbCC
BbCc
BBCc
BBcc
BbCc
Bbcc
BbCC
BbCc
bbCC
bbCc
BbCc
Bbcc
bbCc
bbcc

F1 PHENOTYPE	BC	Bc	bC	bc
BC	BBCC	BBCc	BbCC	BbCc
Bc	BBCc	BBcc	BbCc	Bbcc
bC	BbCC	BbCc	bbCC	bbCc
bc	BbCc	Bbcc	bbCc	bbcc

#

F1 PHENOTYPE	BC	Bc	bC	bc
BC	BBCC	BBCc	BbCC	BbCc
Bc	BBCc	BBcc	BbCc	Bbcc
bC	BbCC	BbCc	bbCC	bbCc
bc	BbCc	Bbcc	bbCc	bbcc

^
+

F1 PHENOTYPE	BC	Bc	bC	bc
BC	BBCC	BBCc	BbCC	BbCc
Bc	BBCc	BBcc	BbCc	Bbcc
bC	BbCC	BbCc	bbCC	bbCc
bc	BbCc	Bbcc	bbCc	bbcc

#

F1 PHENOTYPE	BC	Bc	bC	bc
BC	BBCC	BBCc	BbCC	BbCc
Bc	BBCc	BBcc	BbCc	Bbcc
bC	BbCC	BbCc	bbCC	bbCc
bc	BbCc	Bbcc	bbCc	bbcc

^
+

F1 PHENOTYPE	BC	Bc	bC	bc
BC	BBCC	BBCc	BbCC	BbCc
Bc	BBCc	BBcc	BbCc	Bbcc
bC	BbCC	BbCc	bbCC	bbCc
bc	BbCc	Bbcc	bbCc	bbcc

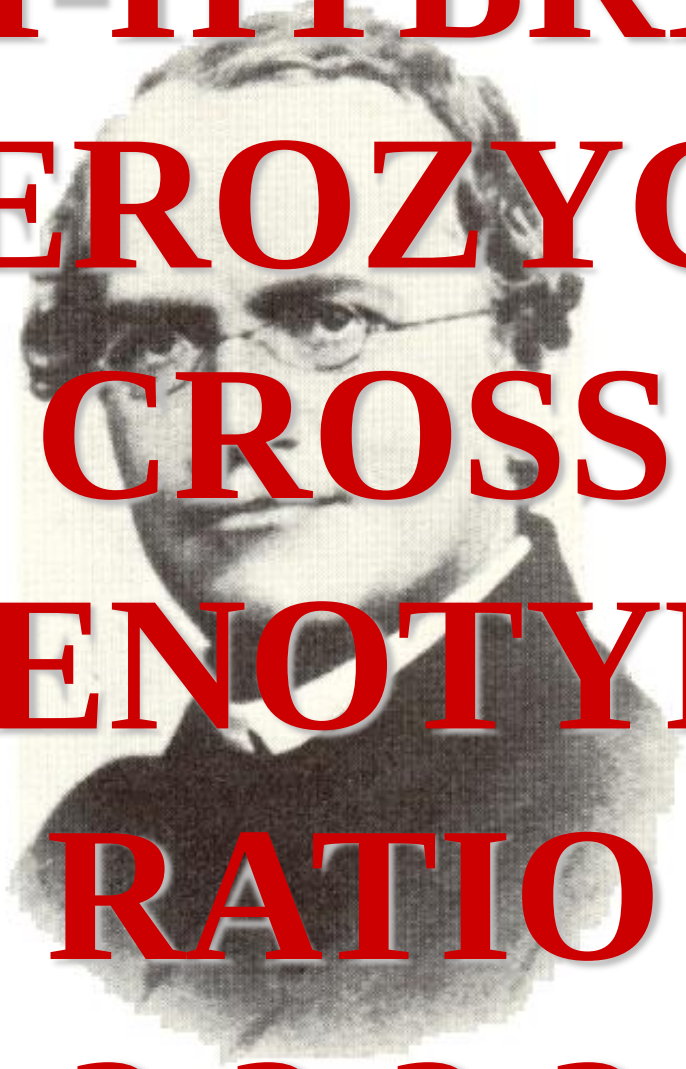
#

F1 PHENOTYPE	BC	Bc	bC	bc
BC	BBCC	BBCc	BbCC	BbCc
Bc	BBCc	BBcc	BbCc	Bbcc
bC	BbCC	BbCc	bbCC	bbCc
bc	BbCc	Bbcc	bbCc	bbcc

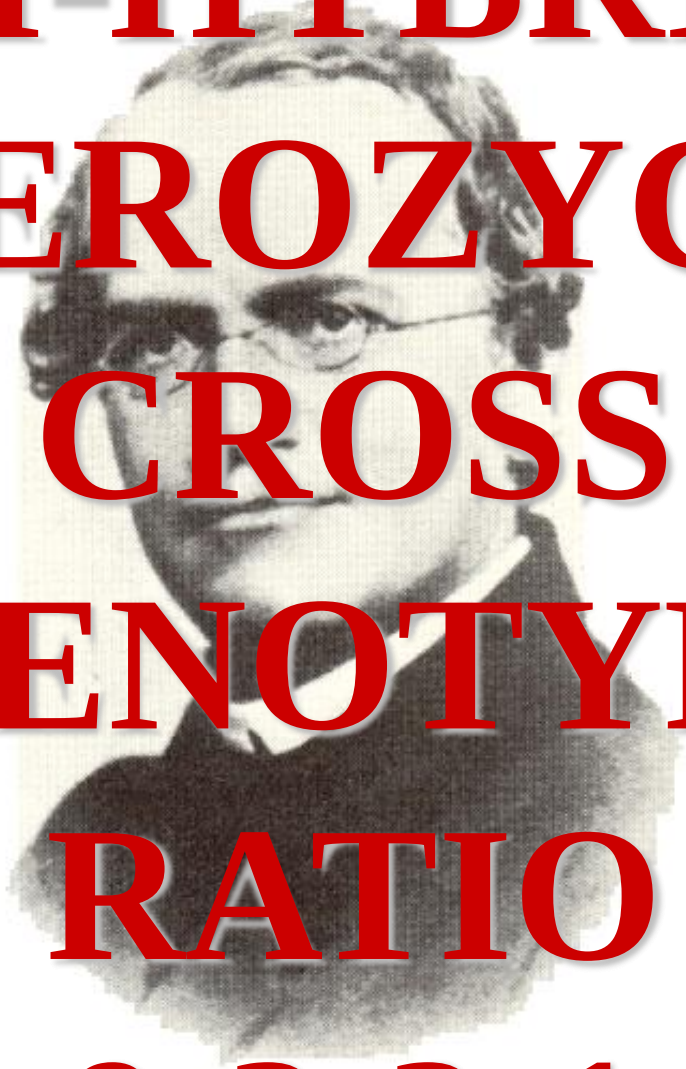
>

?

DI-HYBRID HETEROZYGOUS CROSS PHENOTYPIC RATIO ?:?:?:?



DI-HYBRID HETEROZYGOUS CROSS PHENOTYPIC RATIO 9:3:3:1



DOMINANCE RELATIONS

DOMINANCE RELATIONS

DIFFERENT DOMINANCE RELATIONS EXIST BETWEEN ALLELES

DOMINANCE RELATIONS

DOMINANCE RELATIONS TYPES

DOMINANCE RELATIONS

COMPLETE DOMINANCE

DOMINANCE RELATIONS

DOMINANCE RELATIONS

COMPLETE DOMINANCE
INCOMPLETE DOMINANCE

DOMINANCE RELATIONS

DOMINANCE RELATIONS

COMPLETE DOMINANCE
INCOMPLETE DOMINANCE
CO-DOMINANCE

DOMINANCE RELATIONS

C

COMPLETE DOMINANCE

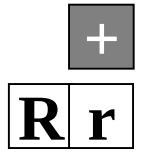
COMPLETE DOMINANCE

EG

COMPLETE DOMINANCE

DOMINANT ALLELE COMPLETELY MASKS RECESSIVE ALLELE

COMPLETE DOMINANCE



COMPLETE DOMINANCE EXAMPLE

FLOWER COLOR

COMPLETE DOMINANCE

X

FLOWER COLOR

R = RED FLOWER COLOR

r = WHITE FLOWER COLOR

COMPLETE DOMINANCE

R r

X

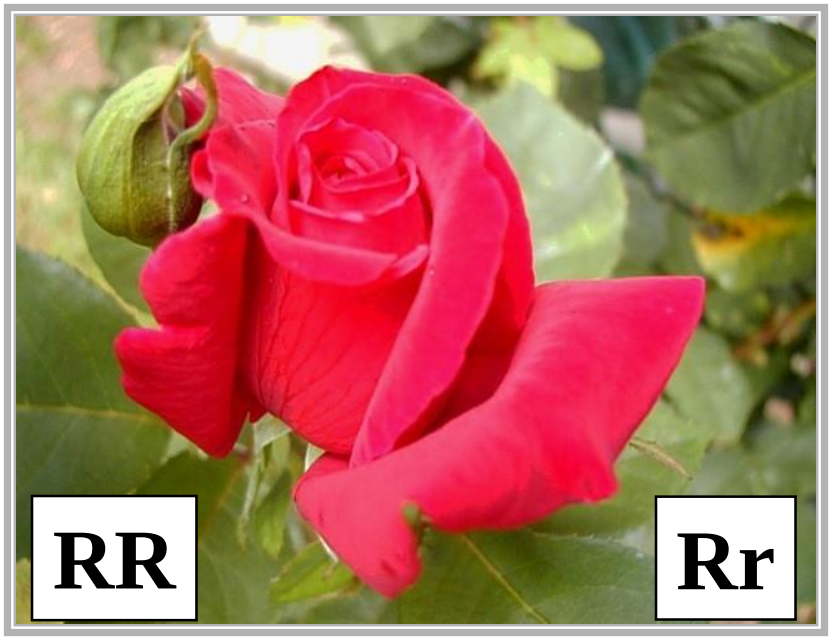
FLOWER COLOR

R = RED FLOWER COLOR

r = WHITE FLOWER COLOR

COMPLETE DOMINANCE

r r



X

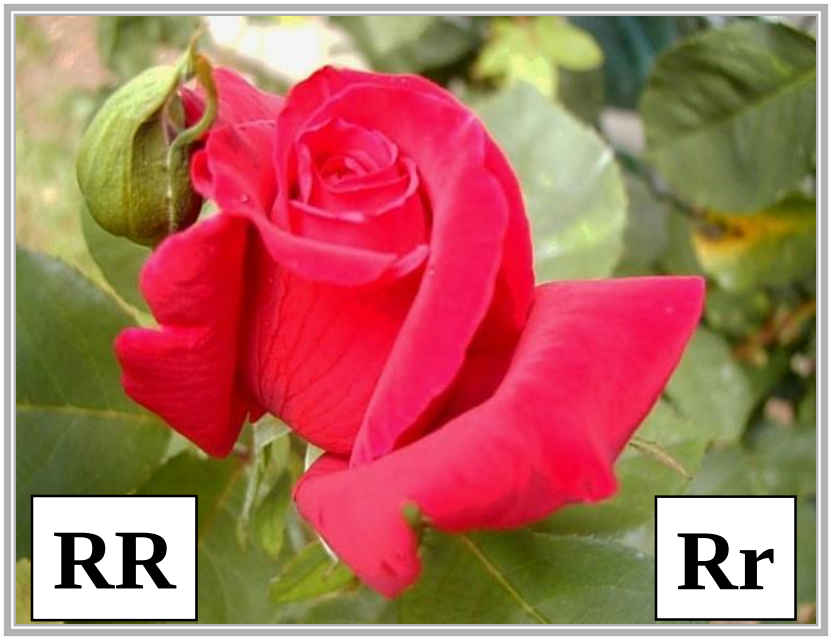
FLOWER COLOR

R = RED FLOWER COLOR

r = WHITE FLOWER COLOR

COMPLETE DOMINANCE

R R



X

FLOWER COLOR

R = RED FLOWER COLOR

r = WHITE FLOWER COLOR

COMPLETE DOMINANCE

?

G

X

COMPLETE DOMINANCE

R
r

X

GENOTYPE

?

COMPLETE DOMINANCE

?

P

X

GENOTYPE

Rr

COMPLETE DOMINANCE

X

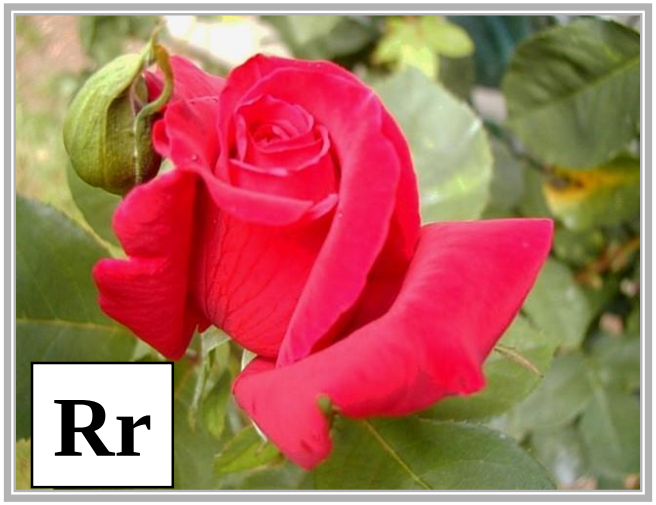
PHENOTYPE

?

Rr

COMPLETE DOMINANCE

X



INCOMPLETE DOMINANCE

INCOMPLETE DOMINANCE

EG

INCOMPLETE DOMINANCE

DOMINANT ALLELE DOES NOT COMPLETELY MASK RECESSIVE ALLELE

INCOMPLETE DOMINANCE

INCOMPLETE DOMINANCE EXAMPLE

FLOWER COLOR

INCOMPLETE DOMINANCE

+

R	R

X

FLOWER COLOR

R = RED FLOWER COLOR

r = WHITE FLOWER COLOR

INCOMPLETE DOMINANCE

?

G

X

INCOMPLETE DOMINANCE

R
r

X

GENOTYPE

?

INCOMPLETE DOMINANCE

?

P

X

GENOTYPE

Rr

INCOMPLETE DOMINANCE

X

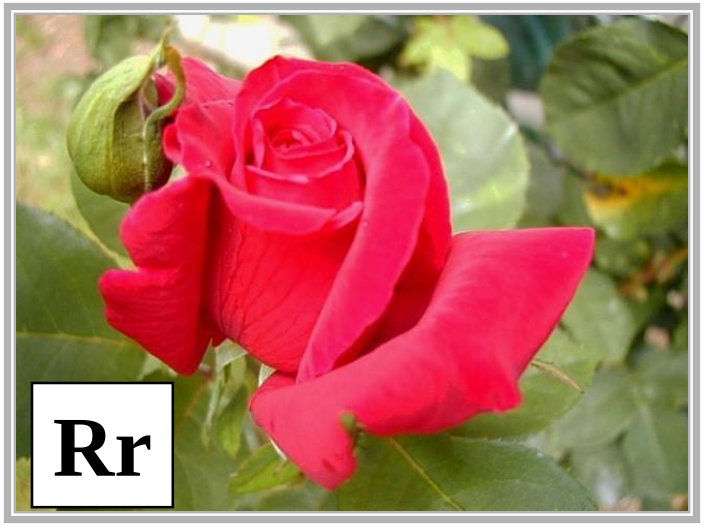
PHENOTYPE

?

Rr

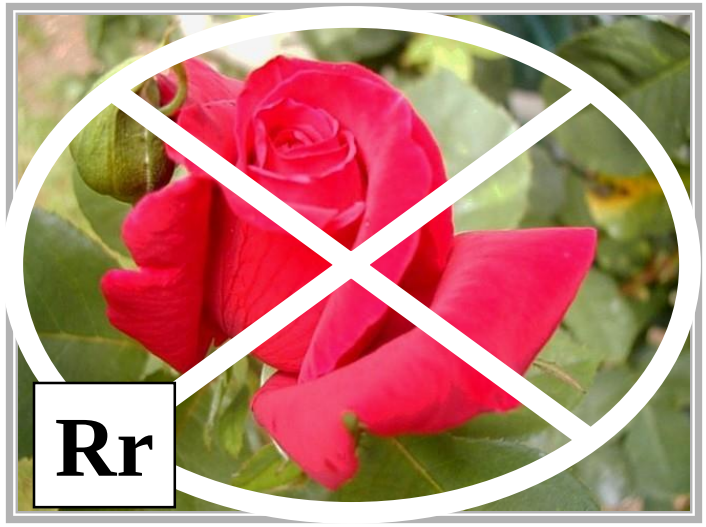
INCOMPLETE DOMINANCE

X



INCOMPLETE DOMINANCE

X



INCOMPLETE DOMINANCE

X

DOMINANCE RELATIONS

COMPLETE DOMINANCE

RED FLOWER

INCOMPLETE DOMINANCE

PINK FLOWER

MENDELIAN GENETICS

UNLESS STATED OTHERWISE ASSUME COMPLETE DOMINANCE

GREGOR MENDEL

C

CO-DOMINANCE

CO-DOMINANCE

CO-DOMINANCE

ALLELES EQUALLY DOMINANT & FULLY EXPRESSED

CO-DOMINANCE

EG

CO-DOMINANCE

MULTIPLE GENE ALLELES

CO-DOMINANCE

CO-DOMINANCE EXAMPLE

HUMAN BLOOD TYPES

?

HUMAN BLOOD TYPES