Genetic Variation Question Sheet

Information needed to answer these questions: (All dominant alleles are in capital letters)

Tall = T, Short = t Blonde hair = b, Brown hair = B Brown eyes = E, Blue eyes = e Red flowers = R, white flowers = r

- ^{1.} Using the genetic cross templates, work out the PHENOTYPE of the offspring of the following.
- a. A homozygous RED flower crossed with a homozygous WHITE flower.

Parents Phenotype	Red		Wh	ite
Parents Genotype	RR		rr	
Gametes	R	R	r	r

		From Mother		
		R	R	
F ro m F at h er	r	Rr	Rr	
	r	Rr	Rr	

The genotypes are Rr

The phenotypes are red flowers, because red is the dominant gene

What percentage of the flowers would be red? 100%

Give the ratio of red to white flowers 1:0

b. A heterozygous TALL plant crossed with a heterozygous TALL plant.

Parents Phenotype	tall		tall	
Parents Genotype	T†		T†	
Gametes	Т	+	Т	+

From Mother

		т	t
F ro m	т	тт	T†
F at h er	t	T†	††

The genotypes are Tt, TT, tt

The phenotypes are tall and short plants.

What percentage of the plants would be tall?75%

Give the ratio of tall to short plants 3:1

c. Two blue eyed parents having children

Parents Phenotype	Blue	2	Blue	2
Parents Genotype	ee		ee	
Gametes	e	e	e	e

		From Mother		
		e	e	
F ro m	e	ee	ee	
F at h er	e	ee	ee	

The genotypes are ee

The phenotypes are blue eyes

d. Two heterozygous brown eyed parents having children.

Parents Phenotype	Brow	wn	Bro	wn
Parents Genotype	Ee		Ee	
Gametes	E	e	E	e

From Mother

		E	e
F ro m	E	EE	Ee
F at h er	e	Ee	ee

The genotypes are EE, ee, Ee

The phenotypes are Brown eyes, blue eyes

What percentage of the eyes would be brown? 75%

Give the ratio of blue to brown eyes 3:1

<u>Challenge:</u>

Explain, using data from your genetic cross diagrams why two brown eyed parents can have blue eyed offspring but two blue eyed parents can never have brown eyed offspring.

Blue eyed parents have a homozygous gene meaning that they can only have blue eyed children. But brown eyed parents have a heterozygous gene, meaning that they have part of the blue eyes gene, giving them a 25% chance of having blue eyed off spring.