Genetics

1) The ability to curl your tongue up on the sides (T, tongue rolling) is dominant to not being able to roll your tongue. A woman who can roll her tongue marries a man who cannot. Their first child has his father's phenotype. What are the genotypes of the mother, father, and child?

	T	t
t	Tt	tt
t	Tt	tt

Genotypes

Mother Tt (heterozygous)

Father tt (homozygous)

Child tt (homozygous)

2) The mother is blood type O and the father is blood type A. What are the possible blood types of the offspring?

Mother oo

Father Ao or AA

	o	o
A	Ao	Ao
o	oo	oo

	o	o
A	Ao	Ao
A	Ao	Ao

Offspring bloodtype A or o

3) In mice, brown eyes (B) are dominant over blue (b). A homozygous brown-eyed male mouse mates with a blue-eyed female and they have offspring. What are the phenotypes and genotypes of their offspring? What are the genotypes of the parents?

	B	B
b	Bb	Bb
b	Bb	Bb

	Genotype	Phenotype
Offspring	Bb (heterozygous)	Brown eyes
Father (male)	BB	
Mother (female)	bb	

4) In some cats the gene for tail length shows incomplete dominance. Cats with long tails are homozygous dominant (TT) and cats with no tails are homozygous recessive (tt). Heterozygous cats have short tails (Tt). For each of the following construct a punnett square and give phenotypic and genotype ratios of the offspring.

a) a long tail cat and a cat with no tail b) a long tail cat and a short tail cat c) a short tail cat and a cat with no tail d) two short tail cats.

a)

	T	T
t	Tt	Tt
t	Tt	Tt

Genotype	Phenotype
100% Tt	Short tail

b)

	T	T
T	TT	TT
t	Tt	Tt

Genotype	Phenotype
50% TT	Long tail
50% Tt	Short tail
Ratio 1:1	

c)

	T	t
t	Tt	tt
t	Tt	tt

Genotype	Phenotype
50% Tt	Short tail
50% tt	No tail
Ratio 1:1	

d)

	T	t
T	TT	Tt
t	Tt	tt

Genotype	Phenotype
25% TT	Long tail
50% Tt	Short tail
25% tt	No tail
Ratio 1:2:1	