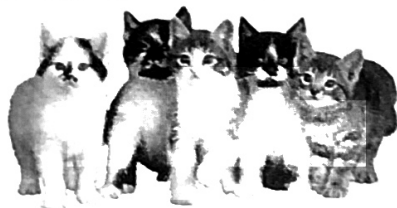


Sex Linkage

Sex linkage occurs when a gene is located on a sex chromosome (usually the X). The result of this is that the character encoded by the gene is usually seen only in one sex (the heterogametic sex) and occurs rarely in the homogametic sex. In humans, recessive sex linked genes are responsible for a number of heritable

disorders in males, e.g. hemophilia. Women who have the recessive alleles on their chromosomes are said to be **carriers**. One of the gene loci controlling coat color in cats is sex-linked. The two alleles, red and non-red (or black), are found only on the X-chromosome.



Allele types

X_o = Non-red (=black)
 X_O = Red

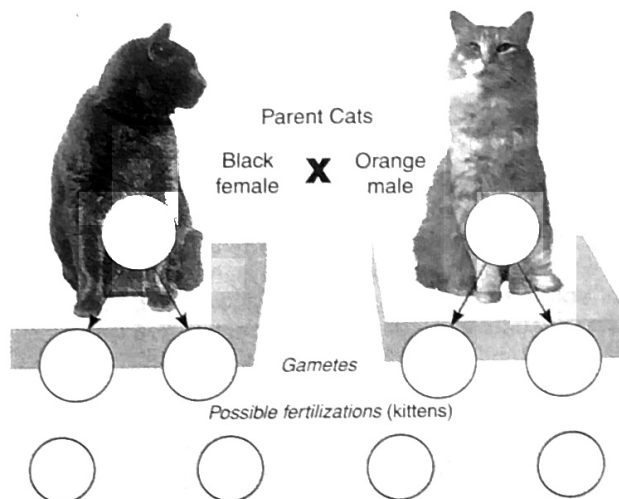
Genotypes

X_oX_o , X_oY = Black coated female, male
 X_OX_O , X_OY = Orange coated female, male
 X_oX_O = Tortoiseshell (intermingled black and orange in fur) in female cats only

Phenotypes

1. An owner of a cat is thinking of mating her black female cat with an orange male cat. Before she does this, she would like to know what possible coat colors could result from such a cross. Use the symbols above to fill in the diagram on the right. Summarize the possible genotypes and phenotypes of the kittens in the tables below.

	Genotypes	Phenotypes
Male kittens		
Female kittens		

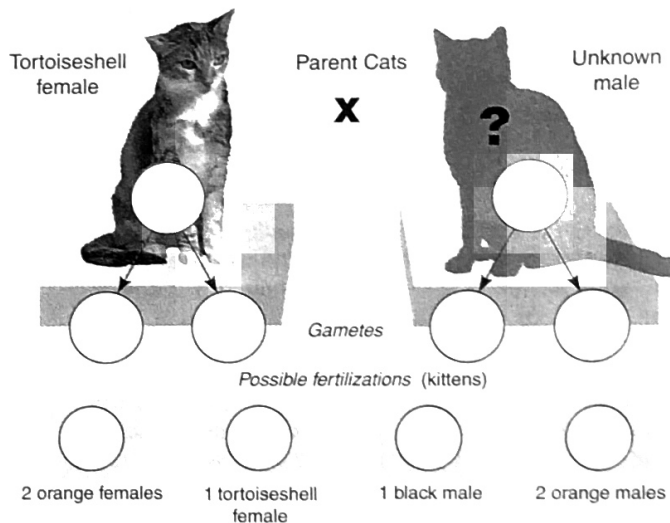


2. A female tortoiseshell cat mated with an unknown male cat in the neighborhood and has given birth to a litter of six kittens. The owner of this female cat wants to know what the appearance and the genotype of the father was of these kittens. Use the symbols above to fill in the diagram on the right. Also show the possible fertilizations by placing appropriate arrows.

Describe the father cat's:

(a) Genotype: _____

(b) Phenotype: _____



3. The owner of another cat, a black female, also wants to know which cat fathered her two tortoiseshell female and two black male kittens. Use the symbols above to fill in the diagram on the right. Show the possible fertilizations by placing appropriate arrows.

Describe the father cat's:

(a) Genotype: _____

(b) Phenotype: _____

- (c) Was it the same male cat that fathered both this litter and the one above?

YES / NO (delete one)

