

**SCIENCE 1.9**  
**WORKSHEET THREE**

**ANSWERS**  
**DNA, alleles, genes, chromosomes**

1. DNA, genes, chromosomes, cell nucleus, cell
2. An organism inherits one allele from each parent, so together these make two.
3. 

(a) Genotype	(1) A gene that has identical alleles
(b) Zygote	(2) The pattern of genes present in cells
(c) Phenotype	(3) An allele that is always expressed
(d) Recessive allele	(4) A pair of alleles that carry different forms of the same gene
(e) Homozygous	(5) A sex cell
(f) Heterozygous	(6) A allele that is expressed only if the dominant form is absent
(g) Gamete	(7) Fertilised egg cell
(h) Dominant allele	(8) The actual appearance produced by an organism's genes
4. A homozygous dominant cat would be RR, homozygous recessive rr and a heterozygous cat would be Rr.
5. To see if a cat is RR or Rr a test cross would have to be carried out. This is a mating with a homozygous recessive cat rr.

If the cat was RR all the kittens would show the dominant characteristic for fur colour.

	<i>R</i>	<i>R</i>
<i>r</i>	<i>Rr</i>	<i>Rr</i>
<i>r</i>	<i>Rr</i>	<i>Rr</i>

If the cat was Rr approximately half of the kittens would show the dominant characteristic and half the recessive characteristic for fur colour.

	<i>R</i>	<i>r</i>
<i>r</i>	<i>Rr</i>	<i>rr</i>
<i>r</i>	<i>Rr</i>	<i>rr</i>

6. A mutation is a random change in a gene or a chromosome.
7. Mutations can form as a result of radiation from UV rays from the sun or from X-rays or from nuclear contamination. It can also be caused by exposure to dangerous chemicals. The sequence of genes on a chromosome can be disturbed which gives rise to new alleles.