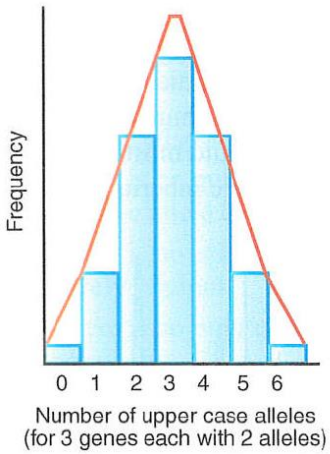
Key knowledge

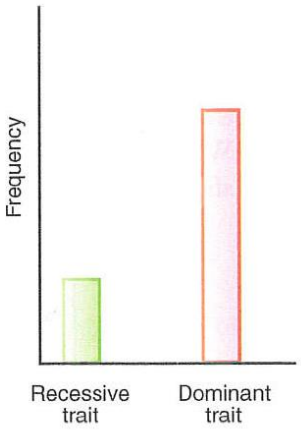
Genotypes and phenotypes

2.3.4 qualitative treatment of polygenic inheritance as contributing to continuous variation in a population, illustrated by the determination of human skin colour through the genes involved in melanin production or by variation in height.

2.3.4.1. Define polygenetic inheritance, using human height as an example

2.3.4.2. Use the graph provided to explain the difference between continuous and discontinuous variation in a phenotype.

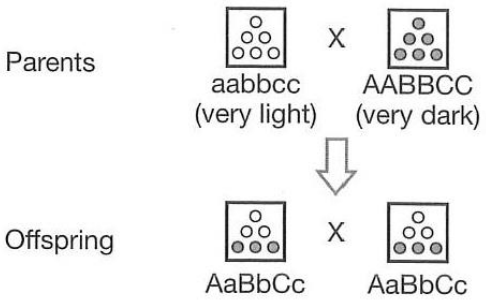




2.3.4.3. Why is discontinuous variation sometimes referred to as Mendelian Inheritance?

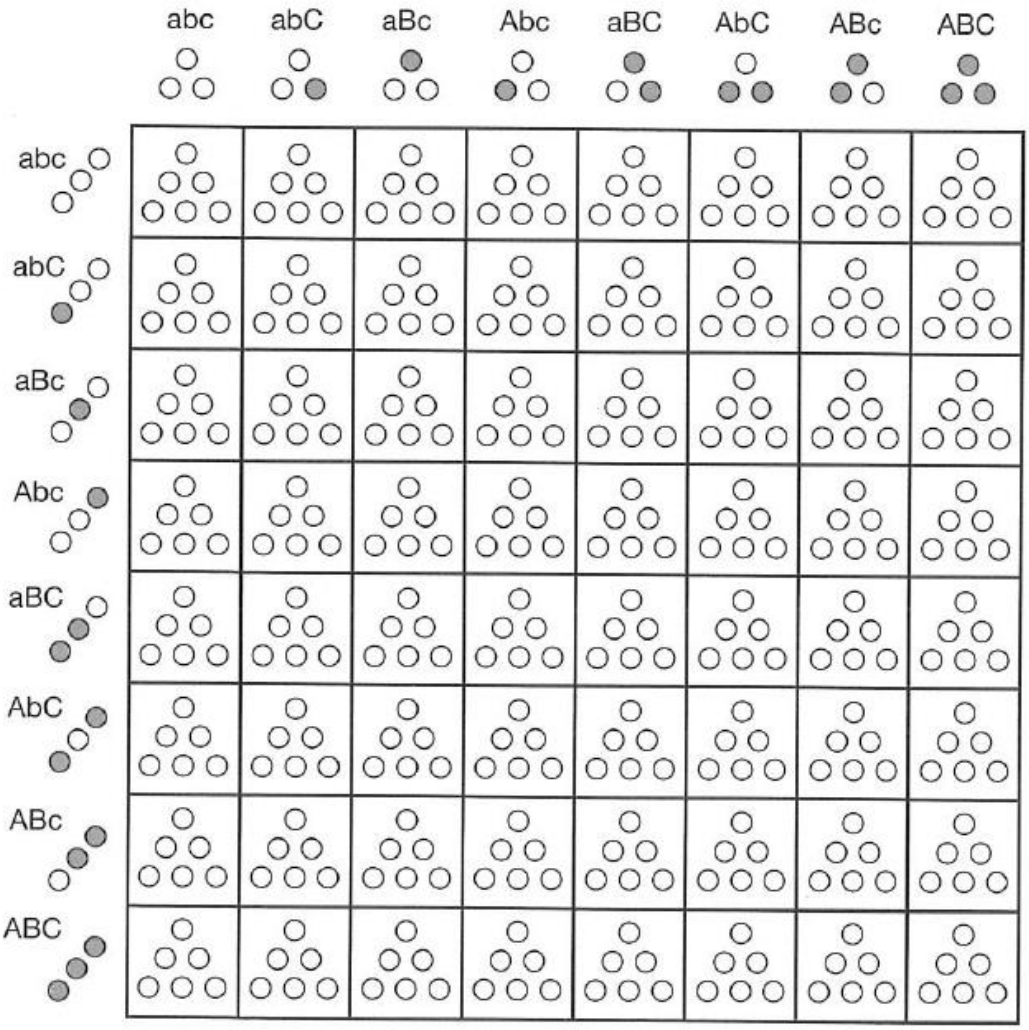
2.3.4.4. In humans skin colour is determined by at least three genes. If these genes are designated A,B,C (dominant alleles) and a,b,c (recessive) alleles, then skin colour will range from
AABBCC (very dark) to aabbcc (very light).

The diagram shows a cross between AABBCC and aabbcc

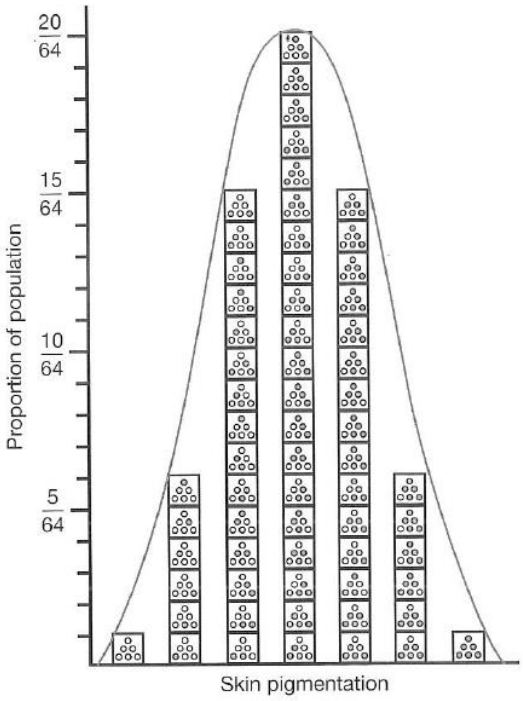


All the possible genotypes for the gametes are listed in the table below;

(a) Complete the following grid by colouring the circles to show the probability of a child having a particular skin colour.



(b) Using the results from (a) a graph was constructed to show the skin colour distribution. Discuss why this graph represents polygenetic inheritance.



(c) Draw a graph to show Mendelian inheritance of height of pea plants for heterozygous cross of Tt x Tt