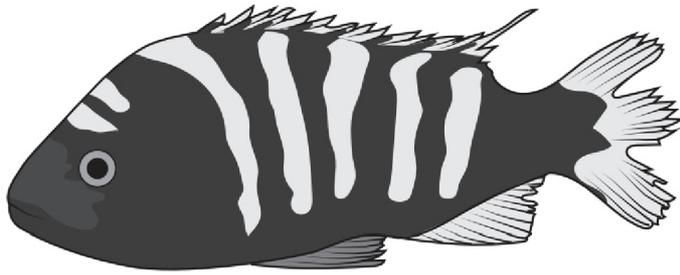
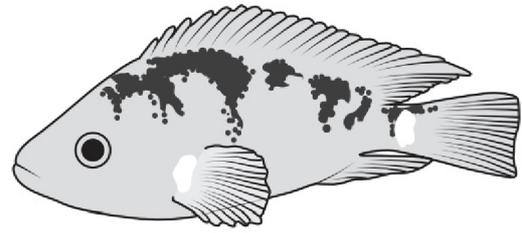


(d) The drawing shows two *A. citrinellus* cichlids.



melanic phenotype –
black with white stripes



gold phenotype –
orange with black mottling

The gold phenotype is caused by inheriting a dominant allele and the melanic phenotype is caused by two recessive alleles at the same locus.

A scientist studied the change in allele frequencies in the *A. citrinellus* population over time.

In the first study, the allele frequencies in the population were $p = 0.6$ and $q = 0.4$.

In a later study, 672 fish of this species were gold and 128 were melanic.

Determine if the allele frequencies have changed, using the equations:

$$p^2 + 2pq + q^2 = 1$$

$$p + q = 1$$

(3)

(Total for Question 7 = 14 marks)