

Answers for extension worksheet – Chapter 10

1 a The F_1 offspring are all AaBb, blue-flowered plants. (1)

b (4)

		Gametes			
		AB	Ab	aB	ab
Gametes	AB	AABB blue	AABb blue	AaBB blue	AaBb blue
	Ab	AABb blue	AAbb red	AaBb blue	Aabb red
	aB	AaBB blue	AaBb blue	aaBB white	aaBb white
	ab	AaBb blue	Aabb red	aaBb white	aabb white

c The phenotypic ratio in the F_2 generation is 9 blue-flowered : 3 red-flowered : 4 white-flowered. (1)

2 a i The drawing should show the six chromosomes (pairs of sister chromatids) lined up individually on the equator (not in homologous pairs). (2)

ii The pairs of chromatids should be shown at opposite ends of the cell attached to spindle fibres which have pulled them there. (2)

b condensed chromosomes and spindle fibres (2)

c random orientation (independent assortment) of maternal and paternal chromosomes on the spindle at prophase I; crossing over at metaphase I, which leads to the formation of recombinants (with new combinations of characteristics different from those of the parents) (3)

3 C (1)

4 a Genes are sorted into combinations that are different from those of the parents. (1)

b The black-bodied, long-winged flies and the grey-bodied, vestigial-winged flies were recombinants. (2)

c If genes are linked and found on the same chromosome, parental combinations stay together, unless there is a cross-over between the genes. (3)