



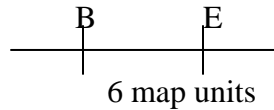
5) BbEe x bbee

If you make a punnett square, you see that you expect 1:1:1:1 but we get:

721 – BbEe  
751 – bbee  
49 – Bbee  
45 – bbEe  
1566 – Total

There is linkage when the ratios do not follow the punnett square's expectations. BbEe and bbee are parentals and Bbee and bbEe are recombinants

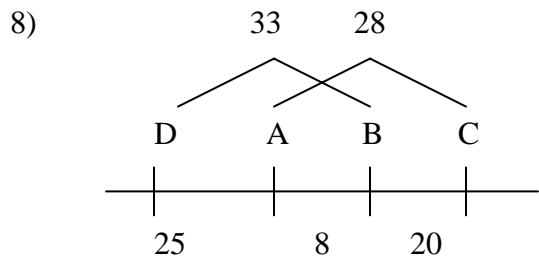
Find the percentage of crossovers:  $49 + 45 = 94$      $(94/1566) \times 100 = 6.0\%$



To determine the order of B, G, and E, we would need to know the distance between G and E now (we know B-G is 17 mu).

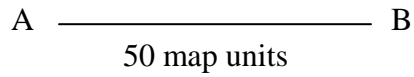
6) Mitochondria are only inherited from the egg (mother) – so if the gene is always inherited from moms to children and not dads to children, you can tell that the cell metabolism disorder could be a defective mitochondrial gene.

7) Aneuploid = abnormal chromosome number  
See appendix A for the answer



(or C B A D)

9)



A a B b      AB, Ab, aB, ab

50% of the time A pairs with B and 50% of the time A goes with b

50% will cross over resulting in AB or Ab, etc.

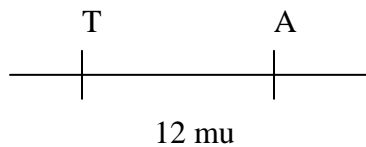
So these genes, being 50 m.u. apart will separate as if they are not linked

10) The “unintelligent” alien question

TtAa x ttaa (test cross)

Make a punnett square... you expect to get 1:1:1:1 but we get:

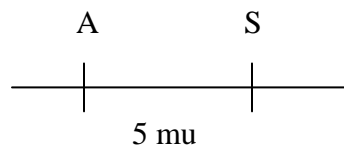
46 – TtAa (Parental)  
7 – ttAa (recombinant)  
42 – ttaa (parental)  
5 – Ttaa (recombinant)  
100 Total



$$7+5 = 12 \quad (12/100) \times 100 = 12.1\%$$

AaSs x aass

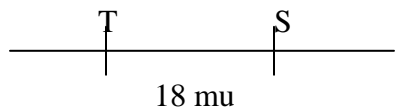
47 – AaSs (parental)  
2 – Aass (recombinant)  
48 – aass (parental)  
3 – aaSs (recombinant)  
100 – Total



$$2+3 = 5 \quad (5/100) \times 100 = 5\%$$

11) TtSs x ttss

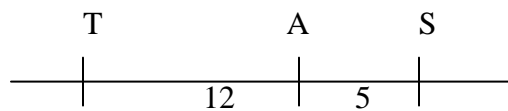
40 – TtSs  
 9 – ttSs  
 42 – ttss  
9 – Ttss  
 100 total



$$9+9 = 18 \quad (18/100) \times 100 = 18\%$$

So since  $T - S = 18$   
 $A - T = 12$   
 $S - A = 5$

the best solution is =



18 total mu between T - S

Since we only counted 300 aliens we may not have exactly the right numbers – but we have pretty close numbers.  
 12 + 5 is pretty close to 18

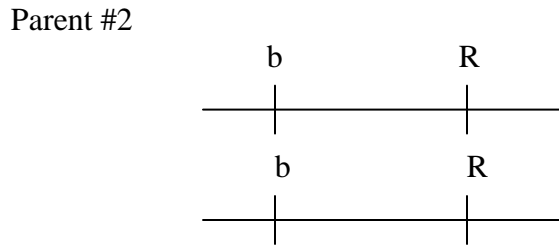
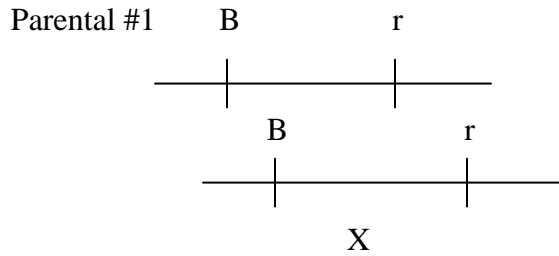
- 12) See the answer in appendix A at the back of your book  
 (non-disjunction: is a mutation that occurs when the sister chromatids of a chromosome fail to separate).

13) P= BBrr x bbRR

F1 = BbRr

Cross BbRr x bbr

(remember that the B--R are linked so visualize the P-generation above as having chromosomes like this:

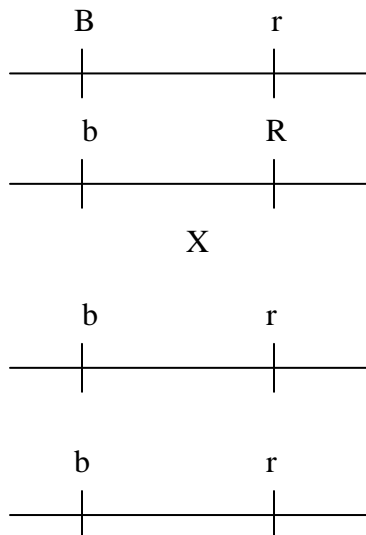


If crossing over occurs between the 2 homologous chromosomes of parent 1 then

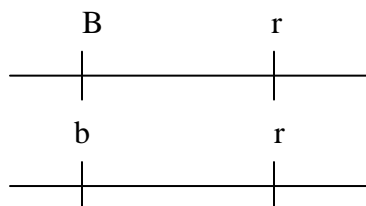


will still result since they are both the same and similarly for parent #2.

The F1 BbRr x bbr would have chromosomes like this:

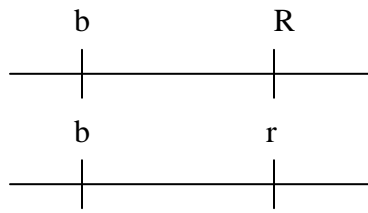


Therefore the resulting gametes (without crossing over) would create organisms with the following chromosomal combinations:



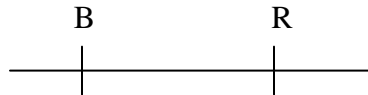
(Bbrr) (blue, oval)

and



(bbRr) (white, round)

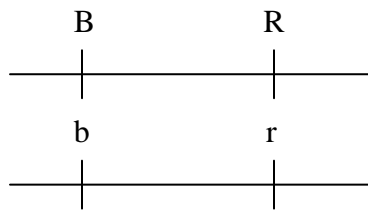
If crossing over occurs in the F1 generation with BbRr parent then this occurs:



(this is the result of a crossover event)

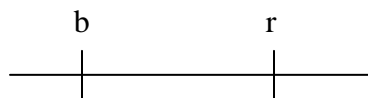
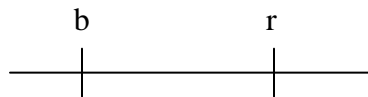
This would happen 10% of the time (or 100 out of 1000 times).

And the two types of offspring that were the result of a crossover between B & R would be



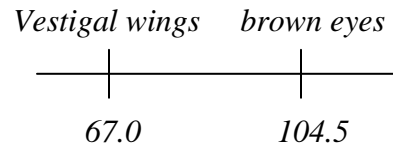
(BbRr) (blue round)

and



(bbrr) (white, oval)

14) From fig 15.8 p.281:



(Also read fig. 15.7 research method: constructing a linkage map)

If gene "a" shows a recombination frequency of 14.1 with vestigial that means "a" is 14 mu away from vg.

And since "a" shows a 26.1 recombination frequency with brown eyes – then "a" is 26 mu from brown eyes.

Since vg is about 37.5 mu from brown then "a" is between them –about 12-14 mu from vg.

(Why isn't it exactly 40 mu between vg & brown? See fig. 15.7!!!).