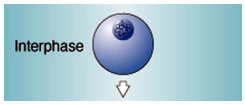
Describe the behaviour of the chromosomes in meiosis. &
Outline the formation of chiasmata in the process of crossing over.

Meiosis
- cell division to make 4 haploid gametes

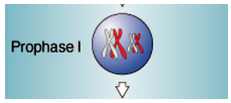
crossing-over mixes up linked alleles

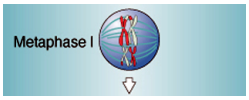
random orientation of chromosomes mixes up whole chromosomes of genes

the gametes are all different - they vary



Describe what is happening in each of these diagrams.





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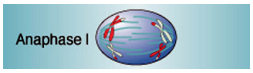

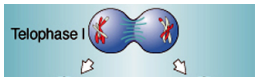

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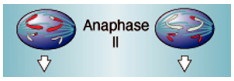

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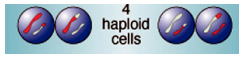
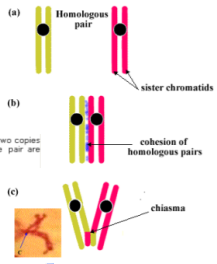


Crossing Over - part 1

Label the explanations of crossing over a), b), c) correctly.

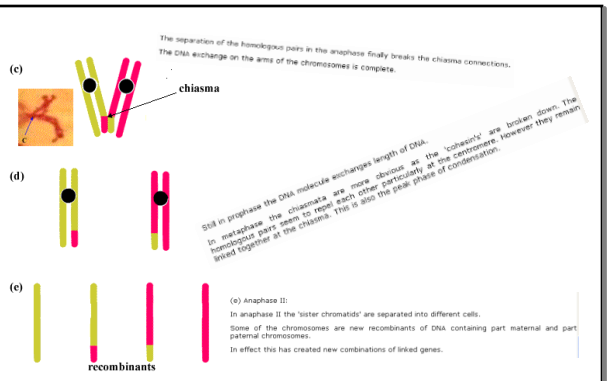


During the interphase each of the chromosomes in a homologous pair replicates. The two copies of a chromosome are held together by a centromere. The replicated chromosome pair are described as 'sister chromatids'.

Still in prophase the DNA molecule exchanges length of DNA.

In metaphase the chiasmata are more obvious as the 'cohesin's' are broken down. The homologous pairs seem to repel each other particularly at the centromere. However they remain linked together at the chiasma. This is also the peak phase of condensation.

Molecules, 'cohesin's', hold the homologous pairs close together. This facilitates the homologous pair joining to the same spindle microtubule. The exchange of DNA between parallel arms of the non-sister chromatids takes place.

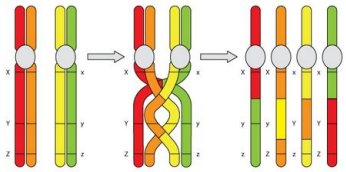


This organism has a simple karyotype of 1 chromosome pair

One pair of homologous chromosomes

Crossing over in Prophase 1

To make 4 different (varied) haploid gametes



Note three genes X, Y, and Z

Using linkage notation what would the genotype of this parent be?

How many crossing over points are there ?

Using linkage notation what would the genotypes of these 4 haploid alleles be?