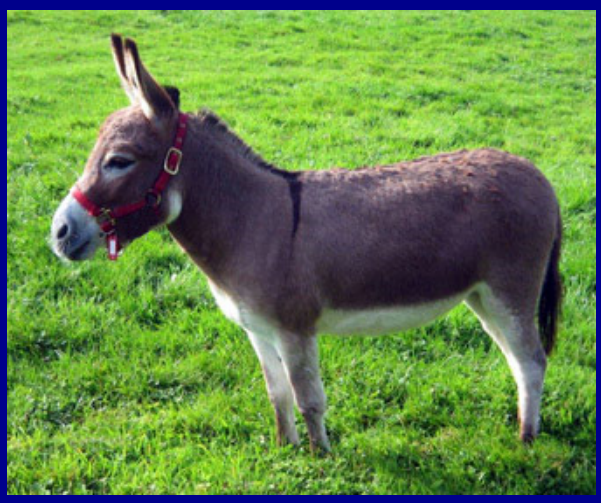
Horse

64 chromosomes

Sperm and Egg
32 Chromosomes

Donkey



62 chromosomes

Sperm and Egg
31 Chromosomes

Physical Similarities

They're both four-legged, hoofed mammals.

They have long faces, large ears and long backs with tails at the end of them.

Their eyes and ears are positioned in similar locations and

They both have manes running along the tops of their necks.

Physical Differences

Donkeys have visibly longer ears, while horses tend to have longer faces.

The hair making up donkeys' manes and tails is stiff and bristly, whereas horses' manes and tails have softer and more flowing hair.

Donkeys have smaller hoofs than horses of a comparable size,

Donkeys' backs are flatter than horses' and more often than not cannot hold a saddle.

Horse

Donkey

64 chromosomes

62 chromosomes

Egg
32 Chromosomes

Sperm
31 Chromosomes

When a horse is bred with a donkey to produce a mule or "Jack"

A mule has 63 chromosomes where that extra chromosome from its horse mother that is not paired. Many think that this extra non-paired chromosome is what makes the mule infertile.

Horse

Donkey

64 chromosomes

Sperm
32 Chromosomes

62 chromosomes

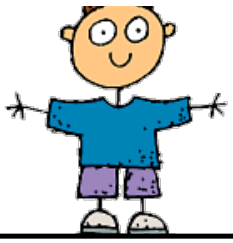
Egg
31 Chromosomes

Hinny

Has 63 chromosomes

Hinnies are on average slightly smaller than mules.

A mule has 63 chromosomes where that extra chromosome from its horse father that is not paired. Many think that this extra non-paired chromosome is what makes the Hinny infertile.



Classwork

page 207
Questions 4-8

Test Thursday
May 11

Read Page 222-223
Page 223
Question 1,3,4,5

1) How do somatic cells are reproductive cells differ from each other? How are they similar?

Somatic cells have a full complement of chromosomes(46 humans) vs. reproductive cells have half complement of chromosomes(23).
Similar - have some chromosomes incommon.

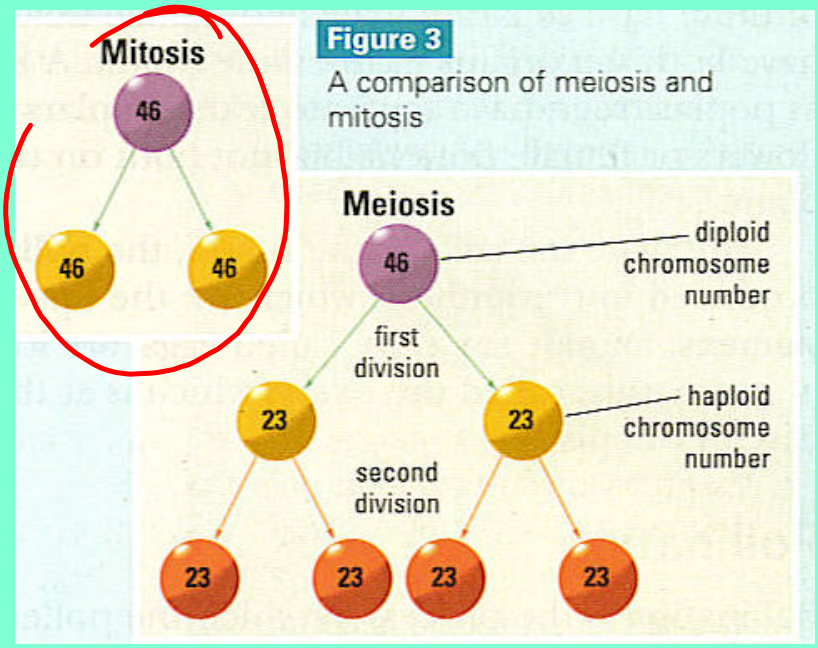
2) What are homologous chromosomes?

Homologous chromosomes - chromosomes that are similar in size, shape, and gene arrangements. Each one of the 23 chromosomes that you receive from your dad matches one from your mom.

3) Describe the two divisions of meiosis.

During the first division, called meiosis I, the homologous chromosomes move to opposite poles. It is during this division that diploid cells separate into two haploid cells. Meiosis I is often called reduction division because the chromosomes number is reduced by half. The diploid or 2n chromosome number following the first division. The second phase, called meiosis II, is marked by the division of the double-stranded chromosome.

4) Use Figure 3 to compare meiosis and mitosis.



Mitosis	Meiosis
One division	Two division
Two cells produced	Four cells produced
Cells are identical to parent	Cells contain half the chromosome number of the parent

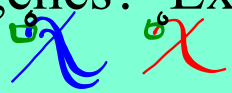
5) Why is meiosis necessary?

If meiosis didn't occur, the combination of sex cells would produce a zygote with double the chromosomes, next generation would double again and so on...

6) A dog has 78 chromosomes in each somatic cell. How many chromosomes would you find in each of its sex cells?

Dog cell 78 chromosomes -
sex cell 39 chromosomes

7) Do homologous chromosomes have the same number of genes? Explain why or why not.



Yes, they have the same number of genes. In addition, genes that code for the same characteristics are located in the same position along homologous chromosomes. Each parent contributes one of the homologous chromosomes.

8) Do homologous chromosomes have identical genes? Support your answer.

Genes code for the same characteristic but they may not be identical. For example, if the genes on homologous chromosomes of a fruit fly zygote are mapped, you find the gene coding for eye colour is located in the same position on a chromosome contributed by the male and female sex cells. However, the gene itself may be different. The male might contribute a gen for red eye-colour while the female contribute a gene for white eye-colour.

Read Page 222-223

Page 223

Question 1,3,4,5

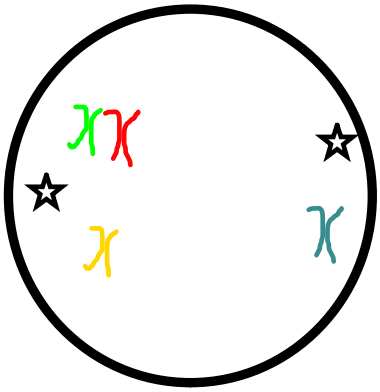
1) What causes nondisjunction?

Nondisjunction occurs when two homologous chromosomes move to the same pole during meiosis (don't separate). Daughter cells end up with one missing a chromosome and one having an extra chromosome.

2) Draw diagrams to show how nondisjunction could occur during

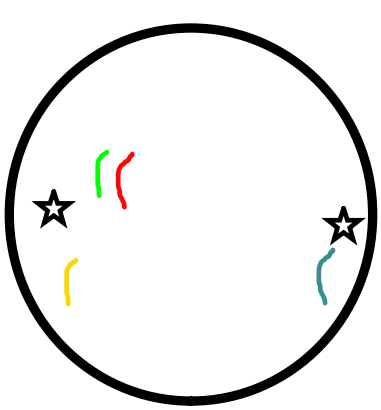
(i) meiosis I

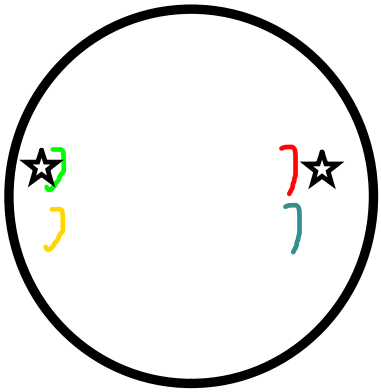
A diagram showing two homologous chromosomes moving to the same pole.



(ii) meiosis II

A diagram showing two chromatids moving to the same pole.





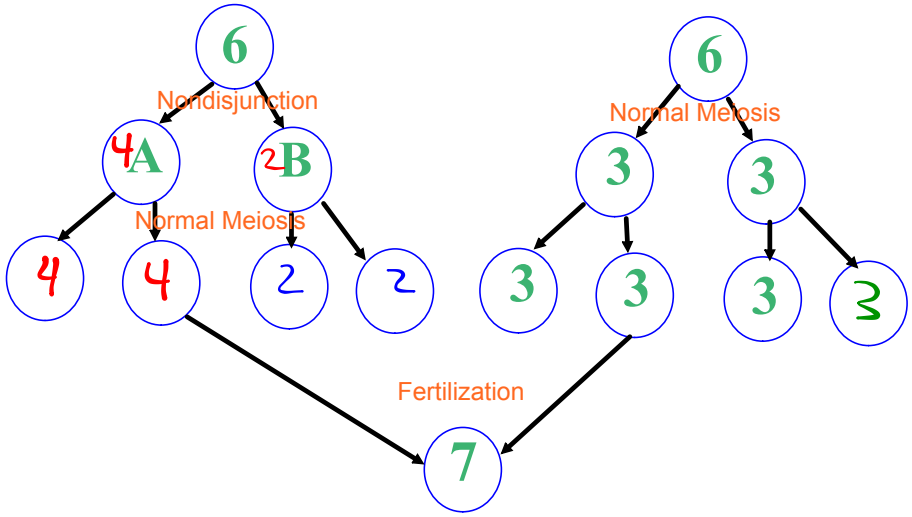
3) Explain how a human cell could have 47 chromosomes.

Result of nondisjunction - one sex cell would have 24 chromosomes and one sex cell would have 23 chromosomes.

4) If a zygote contains 45 chromosomes, how many chromosomes would you expect to find in nerve cells as they develope? Give reasons for your answer.

All cells would have 45 chromosomes because all cells come from the fertilized egg, which had 45. Once the zygote is formed the cells divided by mitosis causing all daughter cells to be identical the the mother cell.

5) Use the diagram of nondisjunction in Figure 5.



a) How many chromosomes would be found in cells "A" and "B"?

A= 4

B= 2

b) Which cells in the diagram have a normal diploid chromosome number?

The mother cell (6 chromosomes) from both parents. The zygote would have 7 chromosomes and therefore not the normal diploid chromosome number.

6) Provide a hypothesis that might explain why older women are much more likely to give birth to a child with Down Syndrome.

One answer could be older cells show deterioration and nondisjunction is more likely to occur.