#3 Draw and explain a diagram that illustrates crossing over.
as long as you did some version similar to Fig 10.3 on page 172, you are doing well

5) What accounts for (a) the genetic similarity between daughter cells and the parent cell
   following mitosis, and (b) the genetic dissimilarity between daughter cells and the parent cells
   following meiosis?
   a) Because in mitosis the parent cell doubles its genetic material, the daughter cells will have
      the exact genetic information. The original number of chromosomes is maintained. The
      duplicated sister chromatids line up at the centre and are pulled apart into two different cells
      with identical sister chromatids.

   b) Meiosis requires two nuclear divisions. Following meiosis, the four daughter cells are haploid
      and have half the chromosome number as the diploid parent cell. And meiosis brings about
      genetic variation in two ways: crossing-over and independent assortment of homologous
      chromosomes.

6) Explain the human (animal) life cycle and the roles of meiosis and mitosis.
The life cycle refers to all the reproductive events that occur from one generation to the next
similar generation. In animals, including humans, the individual is always diploid, and meiosis
produces the gametes, the only haploid phase of the life cycle. Animals are diploid and meiosis
occurs during the production of gametes (gametogenesis). In males, meiosis is a part of
spermatogenesis, which occurs in the testes and produces sperm. In females, meiosis is a part
of oogenesis, which occurs in the ovaries and produces eggs. A sperm and egg join at
fertilization, restoring the diploid chromosome number. The resulting zygote undergoes mitosis
during development of the fetus. After birth, mitosis is involved in the continued growth of the
child and repair of tissues at any time.

7) Compare spermatogenesis in males to oogenesis in females.
Spermatogenesis in males happens within the testes and produces sperm while oogenesis in
females happens in the ovaries and produces eggs. During oogenesis, there are two cells, one
which gets almost all the cytoplasm and the other disintegrates or divides. Both
spermatogenesis and oogenesis are similar in that the processes happen by meiosis and
maturation.

8) How does aneuploidy occur? Why is sex chromosome aneuploidy more common than
autosomal aneuploidy? What are some human syndromes associated with aneuploidy?
A change in the chromosome number resulting from nondisjunction during meiosis is called
aneuploidy. Sex chromosome aneuploidy is more common than autosomal aneuploidy because
extra copies of the sex chromosomes are much more easily tolerated in humans than are extra
copies of autosomes.

Sex chromosome aneuploidy is more common than autosomal aneuploidy because sex
chromosome aneuploidy is tolerated well because both males and females have one functioning
X chromosome. The other becomes inactive which helps in gene dosage compensation of the
sex chromosomes. These individuals who have it have a better chance of producing survivors.
Autosomal aneuploidy is generally more lethal with more health risks. Some human syndromes

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associated with aneuploidy include trisomy 13, 18, 21 (Down Syndrome), Turner Syndrome, Klinefelter Syndrome, Poly-X Females, and Jacobs Syndrome.

9) Name and explain four types of changes in chromosome structure.

Deletion: The loss of a piece of chromosome. This happens when an end of a chromosome breaks off or when two break off at the same time leading to the loss of a middle section. Often causes abnormalities.

Duplication: Happens when the same pieces is repeated within the same chromosome. This may or may not cause visible abnormalities.

Translocation: The exchange or movement of chromosome segments between nonhomologous pairs. Translocations can be balanced (reciprocal swap of one piece of the chromosomes) or unbalanced (one normal copy, one abnormal copy of chromosomes).

Inversion: This happens when a piece of chromosome breaks off and rejoins in the reverse direction or turned around 180 °. Most people with this show no abnormalities, but it can result in duplications or deletions.

10) Name some syndromes that occur in humans due to changes in chromosome structure.

Deletion syndromes: William syndrome occurs when chromosome 7 loses a tiny end piece. Cri du chat (cat’s cry) syndrome is seen when chromosome 5 is missing an end piece.

Translocation syndromes: Alagille syndrome is the translocation between c’somes 2 & 20, Burkitt Lymphoma; chromosomes 8 and 14 causes cancer in lymph gland near jaw.