Atypical Meiosis

Errors occurring during cell divisions may not harm an organism... but if something goes wrong during meiosis of reproductive cells, the resulting embryo is in serious trouble since all of its cells will be affected.

Recall: HUMANS have 23 pairs of chromosomes *Chromosome pair #23 are either called the XX chromosomes or the XY depending on the sex of the individual. Males have XY chromosomes and females have XX chromosomes for pair #23.
Non-Disjunction Disorders

Is an error that occurs when two homologous chromosomes move to the same pole during meiosis.

… the resulting sex cell may have 22 or 24 chromosomes.

… Therefore, the resulting zygote may have 45 or 47 chromosomes rather than 46.
Some Examples of Non-Disjunction Disorders

- In general, people with **Down Syndrome** have an extra chromosome in pair 21 (trisonomy 21). Children may have mental disabilities and some muscular weakness.
- **Klinefelter Syndrome:** The child is a male, but at puberty he begins producing high levels of female sex hormone and can not father children. (1 in every 1000 births.) Has XXY chromosomes, 47 total.
- **Turner Syndrome:** Females with T.S. do not mature sexually and are shorter in height. (1 in every 10000 births) XO chromosome (missing a chromosome, 45 chromosomes)
Non-Disjunction can also occur during meiosis and the formation of Female Gametes
Karyotypes
Before a baby is born, genetic disorders can be detected through Genetic Screening. Cells are stained and a picture of the chromosomes is taken. This is called a Karyotype. The Karyotype compares the size, shape and number of chromosomes.

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Human Karyotypes Answers

1. Chromosome size and the arrangement of bands
2. Pair #2 is longer with different amounts and arrangement of bands
3. Male
4. Down's Syndrome (3 chromosome 21s)

1. The X and Y chromosomes have a different shape
2. Broken chromosome fragments could be identified by this picture
3. Yes, all cells come from the fertilized egg
4. Yes, both could contribute one normal sex cell with one chromosome 21
5. Yes, if non-disjunction occurred in two different homologous pairs or in both parents in the same pair.