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|  | **\*Variations on a Theme**: Living organisms reproduce their own kind.  The transmission of traits from one generation to the next is called **\_\_\_\_\_\_\_\_\_\_\_** or inheritance.  \*Offspring acquire \_\_\_\_\_\_\_ from their parents by inheriting \_\_\_\_\_\_\_\_\_\_\_\_.  Your genome is made up of:  Genes are segments of *\_\_\_\_\_\_\_* .  What is the difference between gametes and somatic cells? Describe the difference of these cells in humans? | |
| \*A comparison of asexual and sexual reproduction.  Only organisms that reproduce \_\_\_\_\_\_\_ can produce offspring that are exact copies.  From a genetic perspective, what’s the difference between asexual and sexual reproduction?  In humans, each somatic cell has \_\_\_\_\_\_\_ chromosomes. Or, 2n = \_\_\_\_\_\_\_ .  \_\_\_\_\_\_\_ chromosome pairs carry genes that control the same inherited characters.  Two distinct sex chromosomes, the X and the Y, are an exception to the general pattern of homologous chromosomes in human somatic cells.  Human females have a homologous pair of \_\_\_\_\_\_\_ chromosomes; males have one \_\_\_\_\_\_\_ and one \_\_\_\_\_\_\_ chromosome.  The other 22 pairs of chromosomes are called \_\_\_\_\_\_\_ .  The occurrence of homologous pairs of chromosomes is a consequence of sexual reproduction.  We inherit one \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of each homologous pair from each parent. | |
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|  | The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of chromosomes in a single set is represented by n.  Any cell with two sets of chromosomes is called a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cell and has a diploid number of chromosomes, abbreviated as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.  Sperm cells or ova (gametes) have only one set of chromosomes—22 autosomes and an X (in an ovum) or 22 autosomes and an X or a Y (in a sperm cell).  A cell with a single chromosome set is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cell, abbreviated as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.  **\*Key Terms to Remember**  Label the following:  Homologous chromosomes  Sister chromatids  Nonsister chromatids  **\*The human life cycle** begins when a \_\_\_\_\_\_\_\_\_\_\_\_\_ sperm cell fuses with a \_\_\_\_\_\_\_\_\_\_\_\_\_ ovum.  The fertilized egg (\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_) is diploid because it contains two haploid sets of chromosomes bearing genes from the maternal and paternal family lines.  As a person develops from a zygote to a sexually mature adult, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ generates all the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cells of the body.  **\*Meiosis reduces the number of chromosome sets from diploid to haploid.**  In meiosis, there are two consecutive cell divisions, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, resulting in four daughter cells.  The first division, meiosis I, separates:  The second division, meiosis II, separates: | |
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|  | **\*Meiosis I** is preceded by interphase, in which the chromosomes are duplicated to form sister \_\_\_\_\_\_.  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ over occurs during prophase I.  Crossing over begins very early in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ I, as homologous chromosomes pair loosely along their lengths.  In a single crossover event, the DNA of two \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ chromatids—one maternal and one paternal chromatid of a homologous pair—is broken by specific proteins at precisely corresponding points.  As a result, individual chromosomes carry genes derived from two different \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.  **\*Mitosis versus Meiosis.**  Meiosis \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the total number of chromosomes, reducing the number of sets of chromosomes from two (diploid) to one (haploid), with each daughter cell receiving one set.  Meiosis produces cells that \_\_\_\_\_\_\_\_\_\_\_\_ genetically from the parent cell and from each \_\_\_\_\_\_\_\_\_\_.  Mitosis produces daughter cells that are genetically \_\_\_\_\_\_\_\_\_ to the parent cell and to each \_\_\_\_\_\_\_\_.  Three events unique to meiosis occur during meiosis I:  1. Synapsis and crossing over  2. Homologs on the metaphase plate  3. Separation of homologs |
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|  | **\*Origins of Genetic Variation**  Sexual life cycles produce genetic \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ among offspring.  Three mechanisms contribute to genetic variation arising from sexual reproduction: independent assortment of chromosomes, crossing over, and random fertilization.  1. Independent assortment of chromosomes:  If n = 3, there are 23 = \_\_\_\_\_\_\_\_\_ possible combinations.  For humans with n = 23, there are 223, or about 8.4 \_\_\_\_\_\_\_\_\_\_ possible combinations.  2. Crossing over produces \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ chromosomes:  3. The random nature of fertilization:  Any sperm can fuse with any egg.  The resulting zygote could contain any one of more than 70 trillion possible combinations of chromosomes. | |
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