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| **Following the Big Ideas** | |
| **Big Idea 1** | The variation introduced during meiosis followed by fertilization plays an important role in evolutionary changes. |
| **Big Idea 3** | In sexually reproducing organisms, meiosis followed by fertilization recombines genetic information from both parents; changes in chromosome structure and number can have consequences for an individual’s physiology |
| **Big Idea 4** | The variation produced by meiosis at the cellular level affects all of an organism’s physiology |

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| **Essential Questions** |
| * What are the similarities and differences between meiosis and mitosis? * How does the process of meiosis reduce the chromosome number from diploid to haploid * How does meiosis followed by fertilization increase genetic diversity |

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| **Vocabulary** | | |
| 1. gene 2. locus 3. somatic cell 4. gamete 5. male gamete 6. female gamete | 1. Zygote 2. asexual reproduction 3. sexual reproduction 4. Chromosome Karyotype 5. Homologous chromosomes 6. Homolog | 1. Alternation of generations 2. Synapsis 3. crossing over 4. chiasmata 5. Allele 6. Sister Chromatids 7. Synaptonemal complex, |

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| **Chapter Outline and Reading Guide** | |
| **Section 1**   1. Summarize in your own words.   **Section 2**   1. How is a karyotype prepared? 2. Using figure 10.3, discuss the information a karyotype can be used to determine. 3. Where are the gametes of an animal produced? Be specific as to male and female gametes. 4. By what process are gametes produced? 5. Your study of plants this year will include knowing that they exhibit alternation of generations.    1. What are the two generations?    2. Which is haploid, and which is diploid?   **Section 3**   1. How is the arrangement of chromosomes in meiosis 1 different from metaphase of mitosis? 2. There are 2 divisions in meiosis. What will separate in the first division in meiosis I? 3. Now study the chromosomes in anaphase I and telophase I carefully.    1. How many chromosomes are in each cell at the end of the first meiotic division?    2. Are the resultant daughter cells haploid, or diploid? 4. During meiosis I, homologous chromosomes separate. What separates during meiosis II? 5. What happens to the chromosome number in meiosis | **Section 4**   1. Explain what occurs in each, and how this increases genetic variation    1. independent assortment of chromosomes    2. random fertilization    3. crossing over 2. When you were conceived, what were the odds that of the many possibilities, your parents would come up with you? Use the following method to figure this out.    1. The number of different gametes that can be formed because of independent assortment is 2n, where n = the number of homologous pairs. Therefore, since humans have 46 chromosomes or 23 homologous pairs, what is the number of possible gametes that can be formed due to independent assortment of chromosomes?    2. Now, this is the number of unique gametes your mom could have made. Your father could have made the same number. To see the effect of random fertilization, multiply the number of gametes one parent could make by the number of unique gametes the other parent could make.    3. Your answer should be in the trillions, and all of this is without crossing over. See how special you are? Imagine what crossing over would do to this number…. |

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| **After You Have Read…** |

What happens to the chromosome number in meiosis?

During which division is the chromosome number reduced?

What is the purpose of meiosis?

How many times does the cell divide in meiosis?

How many times do the chromosomes duplicate?

How many daughter cells are formed?

What is the chromosome number?

What are homologs (homologous chromosomes)?

What occurs in synapsis?

What is crossing over? Why is it important?