# WINK SHEET— Meiosis and Genetics

**Theme:** Sex cells are formed by a process of cell division in which the number of chromosomes per cell is halved after replication. With the exception of sex chromosomes, for each chromosome in the body cells of a multicellular organism, there is a second similar, but not identical, chromosome. Although these pairs of similar chromosomes can carry the same genes, they may have slightly different alleles. During meiosis the pairs of similar chromosomes may cross and trade pieces. One chromosome from each pair is randomly passed on to form sex cells resulting in a multitude of possible genetic combinations. The cell produced during fertilization has one set of chromosomes from each parent.

## Expectations:

* Develop and use models of sex cell formation (meiosis) to explain why the DNA of the daughter cells is different from the DNA of the parent cell.
* Analyze data on the variation of traits among individual organisms within a population to explain patterns in the data in the context of transmission of genetic information.
* Construct explanations for how meiosis followed by fertilization ensures genetic variation among offspring within the same family and genetic diversity within populations of sexually reproducing organisms.

**Objectives:** On a scale of 0-5, with 0 being "I know absolutely nothing" and 5 being "I am exceptionally confident in my ability," please rank your understanding of each objective at the end of the unit.

- _____Illustrate and Interpret scientific diagrams of the phases of meiosis
- _____Compare Meiosis 1 and Meiosis 2 in terms of processes and outcomes
- _____Compare Haploid and Diploid Cells
- _____Compare Mitosis and Meiosis in terms of processes and outcomes
- _____Explain the effect of crossing over on the genetic variation of daughter cells
- _____Sequence the steps of Meiosis by pictures or descriptions
- _____ Students will understand the idea of probability
- _____ Students will be able to state the advantage of a large sample size
- _____Explain how there can be many varieties of one gene
- _____ Identify traits as either homozygous or heterozygous
- _____ Identify traits as either dominant or recessive
- _____ Illustrate differences between genotype and phenotype
- _____ Describe the patterns of inheritance in Mendel's data that led to the law of segregation
- _____ Summarize the law of segregation
- _____ Illustrate monohybrid crosses using a Punnett square
- _____ Describe the patterns of inheritance in Mendel's data that led to the law of independent assortment
- _____ Summarize the law of independent assortment
- _____Describe how Meiosis and Fertilization increase genetic variability

**Textbook:** We will be covering pages 161-165;170-191; 235-246 in your textbook. Please mark which statements apply to your use of the textbook on this unit.

- _____I read the entire reading for this chapter
- _____I read part of the reading for this chapter
- _____I used the textbook to assist in my understanding of vocabulary from this unit
- _____I used the textbook to assist in my understanding of the objectives
- _____We have a text book?
- _____Other_____

## Vocabulary:

- Daughter cells
- Diploid
- Haploid
- Gamete
- Zygote
- Meiosis 1
- Interphase
- Prophase 1
- Tetrad
- Crossing over
- Metaphase 1
- Anaphase 1
- Telophase 1
- Cytokinesis
- Meiosis 2
- Prophase 2
- Metaphase 2
- Anaphase 2
- Telophase
- Genetics
- Allele
- Dominant
- Recessive
- Homozygous
- Heterozygous
- Carrier
- Genotype
- Phenotype
- Principle of Segregation
- Principle of Independent assortment
- Probability
- Linked genes
- Monohybrid cross
- Dihybrid cross
- P Generation
- F1
- F2
- Chromosome theory of inheritance
- Incomplete dominance
- Codominance
- Multiple alleles
- Polygenic traits
- Sex-linked genes

## Activities

- Mendel—its all about Peas
- Coin Flip
- Dihybrid Corn Lab
- Monohybrid and Dihybrid Practice Problems
- Meiosis modeling Lab
- Pedigree creation Lab