

Dear Parent,

Your son's or daughter's science class will soon begin exploring the unit entitled "Heredity." Students will learn about the passing of traits from parents to offspring. By the end of the unit, students should demonstrate a clear understanding of the unit's main ideas and be able to discuss the following topics:

1. Results from experiments Gregor Mendel conducted
 - Heredity is the passing of traits from parents to offspring.
 - Gregor Mendel made carefully planned experiments using pea plants that could self-pollinate.
 - When parents with different traits are bred, dominant traits are always present in the first generation. Recessive traits are not visible in the first generation but reappear in the second generation.
 - Mendel found a 3:1 ratio of dominant-to-recessive traits in the second generation.
2. How genes and alleles are related to genotypes and phenotypes
 - Instructions for an inherited trait are called genes. For each gene, there are two alleles, one inherited from each parent. Both alleles make up an organism's genotype. Phenotype is an organism's appearance.
 - Incomplete dominance occurs when one allele is not completely dominant over the other allele.
 - Some genes influence more than one trait.
3. How to use the information in a Punnett square
 - Probability can be used to describe possible outcomes in offspring and the likelihood of each outcome.
 - Punnett squares show all possible offspring genotypes.
4. How asexual and sexual reproduction differ
 - Asexual reproduction requires only one parent and produces new cells via mitosis. In mitosis, chromosomes are copied once, and then the nucleus divides once. The resulting cell (s) of the offspring are identical to the parent cell (s).
 - Sexual reproduction requires two parents. Sex cells are produced by each parent which contain half the amount of chromosomes as the parent's body cells through the process of meiosis. In meiosis, chromosomes are copied once, and then the nucleus divides twice. The resulting cells are different than the parent cell and contain $\frac{1}{2}$ the genetic information. These two halves combine during reproduction producing variation in the offspring.
5. How male and female sex chromosomes differ
 - In humans, females have two X chromosomes. So, each egg contains one X chromosome. Males have both an X and a Y chromosome. So, each sperm cell contains either an X or a Y chromosome.
 - Sex-linked disorders occur in males more often than in females. Color blindness and hemophilia are examples of sex-linked disorders.
6. How and why do scientists selectively breed organisms
 - In selective breeding, organisms with *desirable* characteristics are mated.
 - Humans use animal breeding and plant breeding to selectively develop particular phenotypic traits (characteristics) by choosing which typically animal or plant males and females will sexually reproduce and have offspring together.

Questions to Ask Along the Way

You can help your child learn about these topics by asking interesting questions as he or she progresses through the chapter. For example, you may wish to ask your son or daughter the following questions:

- How do flowers reproduce?
- Do you look like either of your parents? If so, why do you think that is?
- What is a similarity you can recognize in at least three of your relatives?
- Why is it important that cells can divide

Thank you for your time and interest. Your participation in your child's education is a sure way to encourage learning

