Name_____

UNDERSTANDING GENETICS

Vocabulary

AMINO ACIDS: Chemical subunits that link-up with one another to form long molecular chains that are called proteins.

CHROMOSOMES: Wormlike cell structures that become visible before cells divide and that are the location of the genes that store genetic information for making proteins. In cells that are not undergoing cell division, the chromosomes cannot be seen and exist within the cell's nucleus in the form of threads or grains called CHROMATIN.

CROSS: In genetics, this is a shortened way of saying cross-pollination, or cross-fertilization.

CROSS-FERTILIZATION: A technique used by geneticists in which male sex cells from an organism possessing one set of traits are used to fertilize the female sex cells of an organism of the same species that can possess a different set of traits.

CROSS-POLLINATION: A technique used by geneticists in which pollen containing the male sex cells from the flowers of a plant possessing one set of traits is transferred to the pistils, containing the female sex organs, in the flowers of another plant of the same species that can possess a different set of traits.

CYSTIC FIBROSIS: A genetic disease that particularly affects the tissue of the lungs and pancreas.

DELETION MUTATION: A type of mutation that occurs when part of the DNA of a gene is deleted or lost.

DEOXYRIBONUCLEIC ACID: Commonly called DNA, this huge molecule is a major component of chromosomes. DNA functions to store information for making proteins. Distinct sections of DNA containing coded information for making particular proteins are called GENES.

DIPLOID: Possessing two complete sets of chromosomes. For example, humans have 23 different types of chromosomes, but since humans are diploid, each cell possesses 23 chromosome pairs for a total of 46 chromosomes.

DOMINANT GENE: A gene, such as the one for tallness in pea plants, that can overpower weaker recessive genes, like the pea's gene for shortness.

DNA: An abbreviation for DeoxyriboNucleic Acid.

ENZYME: A class of protein that controls the rate of chemical reactions.

FAVORABLE MUTATION: Wheras most genetic mutations cause living things to sicken or die, FAVORABLE MUTATIONS actually benefit organisms, improving their chances of survival.

FERTILIZATION: The fusion of a male sex cell (sperm) and female sex cell cell (egg) to produce a fertilized egg.

FIRST FILIAL GENERATION: The first generation of offspring resulting from a cross of two parent organisms, abbreviated the F1 generation.

GENE: The basic unit of inheritance. A distinct section of a DNA molecule that contains the instructions for building a particular protein.

Name_____

UNDERSTANDING GENETICS
Vocabulary (continued)

GENETICS: The study of heredity.

GENETIC DISEASES: Diseases such as Hemophilia, Downs Syndrome, Cystic Fibrosis and Sickle Cell Anemia that result when genetic instructions in the DNA become confused as a result of genetic mutations.

GENETIC MUTATION: A change in a gene or a chromosome that typically causes death or illness but can, in rare instances, be favorable and can result in new traits being passed on to offspring.

GENETIC CODE LANGUAGE: A language used by the cells of all living organisms. The instructions written in this language reside in the DNA library. Each sentence of instructions is called a GENE. Every genetic code word in a gene sentence is just three letters long and is almost always the name of an amino acid. The genetic code alphabet from which the genetic code words are written uses just four letters A, C, T, and G which represent the chemical subunits of DNA.

GENOTYPE: The actual genetic makeup of an organism; the genes that an organism possesses.

GERM CELL LINE: A unique class of cells that give rise to sperm and eggs that are found only in the ovaries of females and the testes of males. Germ cells are the only cells in the body that can undergo the process of MEOISIS OR REDUCTION DIVISION that causes their diploid number of chromosomes to be reduced by half.

HAPLOID: Half of the Diploid number of chromosomes. As a result of MEIOSIS, diploid germ cells are converted into haploid sex cells.

INHERITANCE: Heredity; traits that can be inherited. Genetics is the science of inheritance or heredity.

INHERITANCE FACTORS: The term used by Mendel to explain why the traits he studied in peas were inherited in pairs. Later, inheritance factors were re-named GENES.

INSERTION MUTATION: A class of genetic mutations that occur when extra DNA is inserted into a gene.

MENDEL, GREGOR: A monk who performed the first scientific experiments in genetics. Mendel is known as "The Father of Genetics."

MEIOSIS: Also known as REDUCTION DIVISION. Meiosis takes place when germ cells in the ovaries or testes undergo two cell divisions but the DNA is only replicated once. As a result of meiosis, diploid germ cells are converted into haploid sperm and eggs.

MITOSIS: The duplication and division of the nucleus and of the chromosomes before cell division.

OFFSPRING: This term can mean child, or children but also refers to the descendents of genetic crosses of both plants and animals.

PHENOTYPE: The observable, physical traits of an organism.

PISTIL: The female reproductive organs of a flower consisting of the *stigma*, *style*, and *ovary*.

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UNDERSTANDING GENETICS
Vocabulary (continued)

POLLEN: Material produced by the stamens in the male part of a flower and that contains the male sex cells.

POLLINATION: The transfer of pollen from the male part of the flower to the pistil, the female part of the flower.

PROTEINS: Chemical substances found in living things made up of long chains of amino acids: Most proteins function as enzymes but they can also serve structural and transport functions as well. Nearly every gene functions to store instructions for building proteins.

PUNNETT SQUARE: A digrammatic representation of a genetic cross used to determine the characteristics of the offspring of the cross.

RECESSIVE GENE: A gene whose trait is masked by the presence of a dominant gene; a recessive gene can be thought of as a (weaker) gene.

REDUCTION DIVISION: Another term for meiosis.

SECOND FILIAL GENERATION: The offspring that grow from the seeds resulting from a cross of First Filial Generation parent organisms, abbreviated the F2 generation.

SEX CHROMOSOMES: Chromosomes that can be found in non-identical pairs and whose distribution in a fertilized egg determines the sex of the offspring. For example, human males possess an XY pair of sex chromosomes whereas human females possess an XX pair of sex chromosomes.

SEX CELLS: Special haploid cells that can fuse together to form a diploid fertilized egg and from which an embryo will develop. In humans the male sex cells are called sperm and the female sex cells are called ova or eggs.

STAMEN: The male reproductive organ of a flower. Pollen is produced by the stamen.

SICKLE-CELL ANEMIA: A genetic disease that causes the red blood cells to become sickle, or cresent shaped.

SPECIES: A group of organisms capable of interbreeding to produce fertile offspring.

SUBSTITUTION MUTATION: A common type of genetic mutation that occurs when an incorrect genetic code letter is substituted for the correct letter in a gene.

TRUE-BREEDER: In Genetics, an organism whose genotype for a particular trait is composed of purely dominant or purely recessive genes. For example, all short pea plants have a pair of "t" shortness genes and are true-breeders for shortness. Some tall plants possess a pair of "T" genes for tallness and likewise are true breeders for tallness. Whereas other tall plants, those with a "T" gene on one chromosome of a diploid pair and a "t" gene on the other chromosome of the pair, are not true breeding for the tallness trait.

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