A105/A303 GENETICS STUDY GUIDE

This is a KEYWORD LIST, use it as a guide in determining what is important in the readings. You will need to learn this material in greater detail than what I have summarized here.

CHROMOSOMES. Each human body cell has 23 matched pairs of chromosomes (cells with 23 pairs - - that's 46 - - are called DIPLOID). It is always true that for each matched pair, you got one from your mom and one from your dad. This diploid set is maintained in cell division by mitosis; each daughter cell has the identical complete 23 matched pairs (46). The exception is the gamete (or sex cell) which has 23 chromosomes (called a HAPLOID set), no matched pairs, and is produced from diploid cells by meiosis.

Each of your gametes, then, can pass on only half of your genetic information (Principle of Segregation). Each chromosome in your gamete came either from your mom or from your dad (ignoring crossing over), and it's an independent 50/50 chance for each chromosome in each gamete (Principle of Independent Assortment), so it's mathematically almost impossible for you to produce two identical gametes. See http://anthro.palomar.edu/mendel/mendel_1.htm for more details and for diagrams of Mendel's work.

GENES. Each chromosome is made up of many segments of DNA; in general the DNA at the same place (LOCUS) on each chromosome of a matched pair codes for a similar protein with a similar function (a "gene"). If the two proteins at a locus are identical (each chromosome of the matched pair contains exactly the same DNA), then you are said to be HOMOZYGOUS for that gene. This means you got the same genetic code from both parents at this locus, since you must have inherited one chromosome of the pair from each parent. If the two genes at this locus are different, you are HETEROZYGOUS for that locus, and got a different ALLELE on the chromosome from each parent (allele - a different version of a gene, with DNA that produces a different version of the protein). "HYBRID" refers to the heterozygous state. Your GENOTYPE is the list of genetic information that you contain. Your PHENOTYPE is your physical appearance (due to genes AND environment), what can be detected by observation, blood tests, etc.

DOMINANCE. If you are homozygous for a gene, then you have two copies of the same allele, and it is always EXPRESSED or visible in your phenotype. If you are heterozygous, your alleles at a locus are different. Both may be expressed in your phenotype, and the alleles are said to be CO-DOMINANT; if only ONE allele is expressed, that allele is said to be DOMINANT, and the invisible allele is called RECESSIVE. **"DOMINANT" has nothing to do with how common or predominant an allele is in a population, only with its expression in the heterozygous individual; a rare allele can still be DOMINANT.** A CARRIER is a person who is heterozygous for a recessive.