BIOL 120 **Genetics Review**

What is the structure & function of DNA- Double Helix. DNA stores genetic information, duplicates info, transfers and decodes info
What is the relationship between DNA, chromosomes, genes, genome, and protein?
DNA wraps around protein to make chromatid and that makes chromosomes. Genes are located on the chromosones
Where is a genome located? Nucleus
What are the similarities and differences between DNA replication & protein synthesis?
Difference- DNA replication makes more DNA and Protein synthesis makes more proteins.
Similarity- DNA gets separated and happens during interphase
How are RNA and DNA different and similar?
Different because DNA has 2 strands RNA has 1, Different sugars, Different Bases
Similar- Both carry info, made of nucleotides, have phosphate backbone
Why are proteins important? Protein Synthesis

Know the following terms:
DNA- Molecule of heredity that stores info required for making proteins required in a cell
Chromosomes- long single molecule of DNA and associated proteins
Genes- Segment of a chromosome that carries specific info about a trait. A Series of base pairs of DNA. Instructions carried by DNA
Genome- An organisms complete set of DNA, including all genes
RNA- Information carrying molecule composed of nucleotides

When does DNA replication occur? Interphase
Are the chromosomes condensed during interphase?Uncondensed
What happens during interphase? DNA is copied
What happens during mitosis? DNA is split into two identical daughter cells
What happens during cytokenesis? Parent cell is cleaved in half
Are the chromosomes condensed or not during mitosis? Condensed
What's the difference between benign tumors and malignant tumors?
Benign Tumors have no effect on surrounding tissue (noncancerous), Malignant tumors invade surrounding tumors (cancerous)

Know the following terms:
Somatic cells- Body cells
Germ cells- Gonads, sex cells
Cancer- uncontrolled cell growth

<u>Inheritance, Meiosis</u>
What is the relationship between chromosome, locus, allele, and gene?
Genes are on chromosomes, the allele is on the gene, the place where the gene is located is called the locus
What are the similarities and differences between mitosis and meiosis?

Differences: Mitosis occurs in somatic cells, 2 identical Daughter cells, for growth/repair & Meiosis occurs in germ cells, 4 unidentical daughter cells, for reproduction
Similarities: Types of cell division & separates chromosomes
What happens in meiosis I & meiosis II?
In Meiosis I Homologous pairs separate.
In Meiosis II Sister chromatids of the replicated chromosomes are separated
What creates diversity? Sexual Reproduction & Independent Assortment
What is the difference, via meiosis, between identical twins and fraternal twins?
Identical twins 1 egg & 2 sperm, embryo splits into two
Fraternal twins 2 eggs & 2 sperm

Know the following terms:
Locus- Location of gene
Allele- Alternate versions of the same gene
Homologous chromosomes- One of the pair is inherited from dad and other from mom
Nonhomologous chromosomes
Karyotype- Pictoral arrangement of a full set of an organisms chromosomes
Autosomal chromosomes- numbers 1 through 22
Sex chromosomes- number 23
Diploid-23 pairs of chromosomes 1 from each parent
Haploid- Half the number of chromosomes 1 from each pair

<u>Mutations</u>
What are the 2 types of chromosomal mutations?
Chromosomal number (nondisjunction)- improper separation of chromosomes during cell division
Chromosomal structure:
deletion-missing a gene
inversion- upside down gene
duplication-extra gene
translocation-traded gene w/ other chromosome
What is the purpose of an amniocentesis? To detect genetic abnormalities

Know the following terms:
Non-disjunction- improper separation of chromosomes during cell division
Down's Syndrome- Trisomy 21 (3 chromosomes in slot 21)
Deletion-missing a gene
Inversion- upside down gene
Duplication-extra gene
Translocation-traded gene w/ other chromosome

<u>Mendel Inheritance</u>
Who was Mendel? The father of genetics
What are his two laws of genetics?
Law of Segregation- Each gamete receives only one copy(allele)

Law of Independent Assortment- Different traits are inherited independently of eachother
How are males & females affected differently by sex-linked traits?
Males are more likely to suffer because they only have one copy of the X-linked gene
Can genetics be effected by the environment?
Yes,The environment can have an effect on how the genes are expressed. It determines phenotypic pattern of expression.
- Malnutrition & Height
- Temperature/ altitude and plant growth

Know the following terms:
Heterozygous chromosomes- genotype where alleles are different
Homozygous chromosomes- genotype where alleles are the same
Genotype- Genetic composition of and individual
Phenotype- Physical traits
Dominant allele- When one allele completely covers up he other allele for a gene
Recessive allele- When one allele is completely covered up by the other allele in a gene
Co-dominance- Both alleles are fully seen in the phenotype
Ex: HbN=Normal HbS=Sickle
HbN HbN= all normal HbS HbS= All sickle HbN HbS= Half normal half sickle
Incomplete dominance- Aa genotype shows a mixture for phenotype
Ex: A-Straight, a-Curly AA-Straight aa-Curly Aa-Wavy
Lethal allele- mutated allele that fails to code for the production of a functional protein that is vital for life
Continuous variation- Several genes working together producing many phenotypes for that trait
5 types of genetic engineering
Recombinant Growth Hormones, Gene Therapy, Stem Cell, Cloning, GMOs