

Week 6

DNA/RNA/Chromosomes

September 23, 2013

- **DNA- Deoxyribonucleic Acid**
 - Major component of chromosomes
 - **DNA is found in nucleus in every cell!**
 - Two complimentary strands of DNA form a "double helix"
 - Sugar, phosphate, and a nucleotide (ATGC) over and over again
 - Nucleotides:
 - Base unit that makes up all DNA
 - Consists of:
 - Sugar- Deoxyribose
 - Phosphate- Phosphate
 - Base- 1 of 4 DNA bases
 - Adenine
 - Cytosine
 - Guanine
 - Thymine
 - -ine is nitrogen base!
 - Normally,
 - **A with T (has 2 hydrogen bonds)**
 - **C with G (has 3 hydrogen bonds)**
- **RNA- Ribonucleic Acid**
 - Has 1 more oxygen in it, than DNA
 - Not a permanent molecule and only exists for the time it is needed, then broken apart
 - RNA is found as a single strand and the strand is generally in a straight or "linear" configuration.
 - **RNA is found ALL throughout the cell!**
 - Three basic classes:
 - mRNA- Messenger RNA
 - tRNA- Transfer RNA
 - rRNA- Ribosomal RNA
 - Each has a specific function
 - **1. Sends messages to and from**
 - **2. Transfers things**
 - **3. Forms a Ribosome**
 - RNA is made of individual nucleotides:
 - Sugar- Ribose
 - Phosphate- Phosphate
 - Base- 1 of 4 RNA bases
 - Adenine
 - Cytosine

- o Guanine
 - o Uracil
- Normally,
 - A with U
 - C with G
- Chromosomes:
 - o Composed of DNA and protein
 - o Located in nucleus and contains genetic material
 - Proteins-Histones
 - DNA wraps around the Histones

September 25, 2013

- **Maternal Chromosome:**
 - o Any chromosome that was contributed to the offspring by the female parent.
- **Paternal Chromosome:**
 - o Any chromosome that was contributed to the offspring by the male parent.
 - o Paternity Test- looks at one cell's chromosomes and exposes it to a restriction enzyme. It chops the DNA and spread them out. Check mother's DNA with child's, and then see which parts the mom contributed to the child. Then check "father's" set of DNA and see if it matches the child's.
- Diploid:
 - o 2 sets of chromosomes
 - o One maternal and one paternal
 - o Diploid occurs in ALL cells **except** the gametes
 - o Human diploid number is 46!
- Haploid:
 - o 1 set of chromosomes
 - o Only occurs in GAMETES
 - o Human haploid number is 23!
- Polyploidy:
 - o Many sets of chromosomes
 - Tetraploid= 4 sets of chromosomes (wheat)
 - o An onion has 5 times more DNA than a human does.
- **Homologous chromosomes-**
 - o Chromosomes that carry the same genes and are a matched pair.
 - One maternal and one paternal
 - They are always the same size and same shape.
 - Except one pair in males!
- **Genes**
 - o Stretch of DNA that encodes for a specific trait
 - o Generally: One gene= One protein

- **Gene Locus:**
 - The physical location of a gene on a chromosome! "Gene location"
 - Human Genome Project
- Dominant Genes:
 - A gene that when present **will be expressed** in an individual
 - Brown eyes
 - Sickle cell anemia
- Recessive Genes:
 - A gene that will only be expressed if it occurs on BOTH of the homologous chromosomes!!
 - Blue eyes
- *Alleles*
 - The DNA code, which may be different, for the same gene.
 - Gene- hair color
 - Allele- brown, black, white, red, blonde
 - Gene- eye color
 - Allele- blue, brown, hazel, green

September 27, 2013

- Inheritance:
 - Autosomal Chromosomes
 - Sex Chromosomes
 - Homozygous: (autosomal) when two alleles on homologous chromosomes are the same. RR or rr
 - Heterozygous: (sex) when two alleles on homologous chromosomes are different. Rr
 - *Punnett Square*: simple grid used to record possible genetic makeup
 - Genotype- actual alleles an individual carries.
 - Phenotype- expression of the alleles an individual carries; the traits the individual has.
 - **Incomplete Dominance**: Occurs when heterozygous genes are both expressed.
 - Red and white flowers make PINKISH flowers