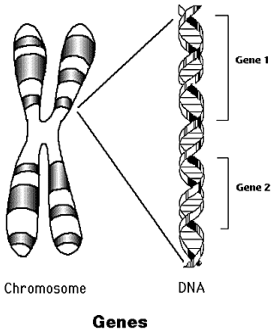
Heredity

I. Genetics is the study of Genes and how they work

A. Genes are made of chromosomes and are made of DNA

1. **The information about how a protein is to be made**
2. **During meiosis pairs of chromosomes split so each sex cell has one form of a gene for each trait.**
3. **Trait is the expressed gene**



B. The different forms a gene may have for a trait are called alleles.

C. Gregor Mendel – Studied peas an inherited traits

1. **Gregor cross pollinated a *purebred* tall pea plant with a *purebred* short Pea plant This is called the parental cross**
   a. **The results of this cross were all tall peas.**
   b. **These are called the *first generation* or f_1**
2. **Gregor crossed to tall pea plants from this first cross**
   a. **The results were 3 tall to one short**
   b. **These are called the *second generation* f_2**
3. **Gregor then crossed a purebred short with a crossed tall**
   a. **Gregor found that ½ of the offspring were Tall and ½ of the offspring were short**
4. **Gregor Mendel – came up with 3 conclusions**
   a. **Traits are inherited**
   b. **Each parent contributes one allele for each trait**
   c. **Dominant traits mask over recessive**
5. **Mendel said that the results were the result of dominant and recessive traits**
   a. **Dominant traits mask over the recessive**

   b. **Letters are used to represent the different alleles**
      1) **Dominant traits are represented by capital letters and recessive are represented by lower case letters**
      2) **Most cells have two alleles for every trait**
   c. **If both alleles that an organism possess for a certain trait are the same they are homozygous TT, tt**
   d. **If an organism has alleles that are different they are heterozygous Tt**

D. The use of probability to predict the possible results of a cross

1. **Probability is the mathematical likelihood that something will happen**
2. **Examples:**
   a. **1/6 chance that you will roll a six when you roll a dice**

b. When you flip a coin there is a 50% chance that you will roll heads and a 50% chance that you will roll tails

3. probability can be applied to genetics

4. We will us a punnett square to help us figure probabilities

a. Example: If a heterozygous Tall, Tt, plant was crossed with another heterozygous Tt plant

Tt x Tt

	T	**t**
T	**TT**	**Tt**
t	**Tt**	**tt**

b. Genotype is the genes that are present in the organism. Example TT, Tt or tt

c. Phenotype is how something looks on the outside, like Tall or short

E. Incomplete dominance – genes are neither dominant or recessive and they express themselves equally

1. Example would be when red and white four-o-clocks were crossed they produced pink four-o-clocks

a. RR x R'R'

	R'	**R'**
R	**RR'**	**RR'**
R	**RR'**	**RR'**

b. Equal expression of the genes

F. Blood type and incomplete dominance

1. Type A and Type B blood are dominant to Type O blood

AO x BO

	B	**O**
A	**AB**	**AO**
O	**BO**	**OO**

a. The resulting phenotypes would be one AB to one AO to one BO to one OO

G. Polygenic inheritance – occurs when a group of gene pairs act together to produce a single trait

1. **Example; height, body build, shape of eyes, lips, ears, hair color, finger prints**

II. Genetic Disorders,

A. Recessive genetic disorders

1. **Sickle Cell Anemia**
2. **Cystic Fibrosis**

B. Sex linked disorders

1. **These are disorders that are linked to the X sex chromosome**
2. **Males get the sex linked disorders most often**
3. **Examples of sex linked disorders are:**
   a. **Color blindness**
   b. **Hemophilia**
4. **You receive a sex chromosome from your father and a sex chromosome from your mother.**
5. **The mother gives an X sex chromosome and the Father gives an X or a Y sex chromosome**
6. **If you received an X chromosome from your dad you're a girl, if you received a Y chromosome from your dad you're a boy.**
7. **How sex linked characteristic work**
   a. **Example: Color blindness if a woman who caries color blindness marries a normal man, what is the chance that their boy will be colorblind?**

XX^c x XY

	X	**Y**
X	**XX**	**XY**
X^c	**XX^c**	**X^cY**

   b. **The results would be ½ of the boys would be color blind**

C. Pedigree – is a tool used for tracing the occurrence of a trait in a family

1. **Page 140 in your book gives examples of pedigree**