NAME: PERIOD: DATE:

GENETICS NOTES

These notes go in your 3-ring binder. Use them to do your homework and study for your Quiz.

Genetics – the study of how traits are passed from generation to generation

Gregor Mendel – the "Father of Genetics." Gregor Mendel was a monk who experimented with pea plants. He kept track of their traits, and over time he figured out the basic rules of genetics.

Gene – a piece of DNA that contains the information (alleles) for a specific trait.

Trait – a characteristic of an organism which is determined by their DNA.
Ex. hair color, eye color, gender, etc.

Allele (*uh–lee–uhl*) – are pieces of information that tell the different ways that a trait can be expressed. There are two alleles in each gene (1 from mom and 1 from dad.) We use letters to show different alleles.

Dominant Alleles – are alleles that are expressed in favor of other alleles. We use capital letters to show dominant alleles.

Ex. brown eyes (B) are dominant to blue eyes (b)

Recessive Alleles – are alleles that are only expressed when paired with a similar recessive allele. We use lowercase letters to show recessive alleles.

Ex. red hair (r) is recessive to brown hair (R)

Genotypes – are the combination(s) of alleles that and organism has for a specific trait.

Ex. a brown eyed person's genotype might be… BB or Bb

Phenotypes – are the expressed result of an organism's genotype. In other words, it's "what shows up" in an organism based on their genes.

Ex. a person with genotype RR would have a phenotype of "brown hair"

Homozygous – is when an organism has two of the exact same allele in a gene.

Ex. a person with red hair has two "r" alleles, and is therefore homozygous

Heterozygous – is when an organism has two different alleles for a gene.

Ex. a person with brown hair might have a genotype of Rr which is heterozygous.

Multiple Allele Traits – are traits that have more than 2 alleles

Ex. hair color – alleles include: B-black, R-Brown, b-Blonde, r-red

Incomplete Dominance – When two alleles are together and neither is dominant over the other. Instead both alleles show up in the phenotype.

Ex. imaginary flower color – alleles include: R-red, W-White, and g-green. Both R (red) and W (white) are dominant to g (green,) but when a flower has the genotype RW (or WR) the flower's phenotype ("shows up" as) pink. R and W are not dominant to each other and they both show up in the flower and red and white mix to make pink.

Polygenic Trait – a trait whose phenotype is determined by the information in more than one gene (polygenic means – "many genes")

Ex. (in real life) hair color and eye color

Rather than having just one place in their DNA (just one gene) with the code for hair or eye color, people have several (many genes.) The mix of the code from all those genes is a person's hair or eye color.

Sex-linked traits – Some information is linked to the gene that tells whether an organism is male or female. This can cause a person to have a greater chance to show a certain trait depending on whether they are male or female.

Ex. (in real life) baldness and colorblindness. Males are more likely to be both bald and colorblind.

Punnett Square – A tool for calculating the chance that the kids of two parents will have certain phenotypes.

Ex.   r = red flower
       B = blue flower (blue is dominant to red)

Parents are rr (red) and Br (blue) what can their kids be?
(each box of the Punnett square represents a 25% chance)

- The Punnett square shows that 50% of the kids will be
  and 50% will be blue

	B	r
r	Br (blue)	rr (red)
r	Br (blue)	rr (red)

How to make a Punnett Square:

	B	r
r		
r		

Put one parent's genotype on the top of the box and one on the side.

	B	r
r	B	r
r	B	r

Drop down the alleles of the parent on the top.

	B	r
r	Br	rr
r	Br	rr

Carry over the alleles of the parent on the side.

	B	r
r	Br	rr
r	Br	rr

Each "box" is a 25% chance. These parents have a 50% chance for **Br**, & a 50% chance for **rr** for any kid they have.