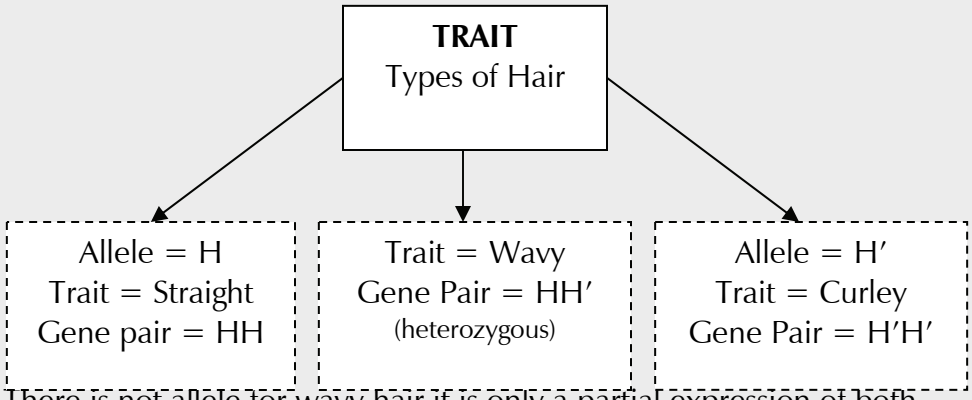
Name _____Period _____ Date_____

7:12 Reading Sheet 7.3

Mendel looked at traits that were either dominant or recessive. Scientists know that not all traits fall into a pattern of being either dominant or recessive. Many of the traits that are observed in nature are not able to be placed into theses groups and because of this genetics has expanded to explain other types of traits. Scientists now know about five other types of inheritance. Incomplete dominance, co-dominance, multiple alleles, sex-linked, and continuous variation are all ways to explain other traits that are found in nature.

Incomplete dominance is when the alleles for a trait are not dominant over each other. At the same time, neither trait is recessive. The result of incomplete dominance is a third phenotype. This third phenotype is when the organism is heterozygous and has both alleles. Instead of having one trait expressed or the other a different trait appears. Figure one shows an example of incomplete dominance.

Figure One: Incomplete Dominance



There is not allele for wavy hair it is only a partial expression of both alleles.

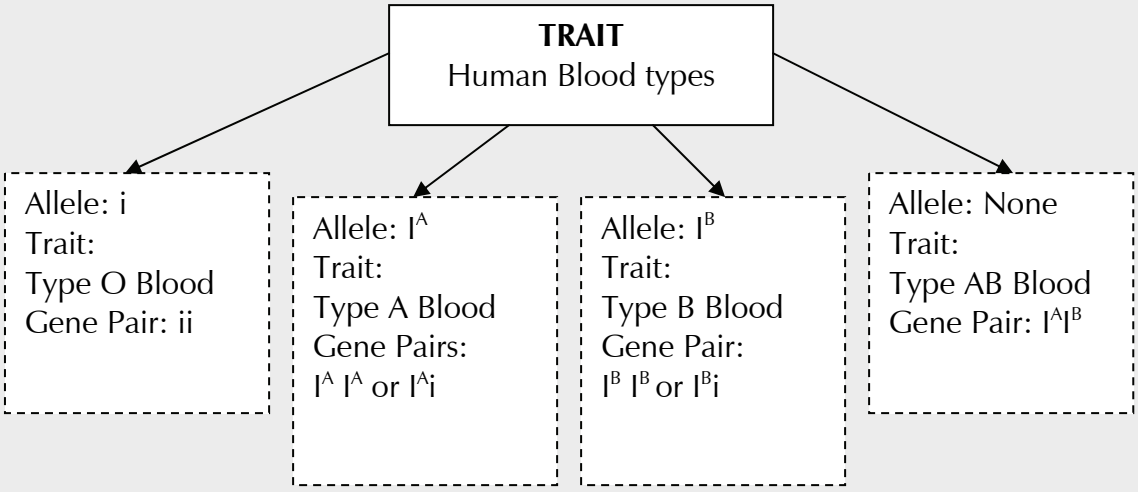
Co-Dominance is found when a trait that has two alleles in which both is expressed equally. Unlike, incomplete dominance there is no third phenotype. Rather both phenotypes of the alleles can be seen. For example, human blood types have two alleles that are co-dominant. A person can have a blood type of A or a blood type of B. If a person has both of these alleles, then they have a blood type of AB.

Name _____Period _____ Date_____

7:12 Reading Sheet 7.3

If we do a further investigation of the human blood type, one will find that there is a third possible trait. A person can also be type O, which is recessive. Due to this fact, human blood type can be used as an example of multiple alleles. **Multiple allele** is a situation in which there are more than two alleles that code for a particular trait. These alleles are all found on the same chromosome. Although any one person can have only one gene pair for blood type, there are actually three different alleles in the population. Figure two shows the example of human blood type for both co-dominance and multiple alleles.

Figure Two: Co-Dominance & Multiple alleles

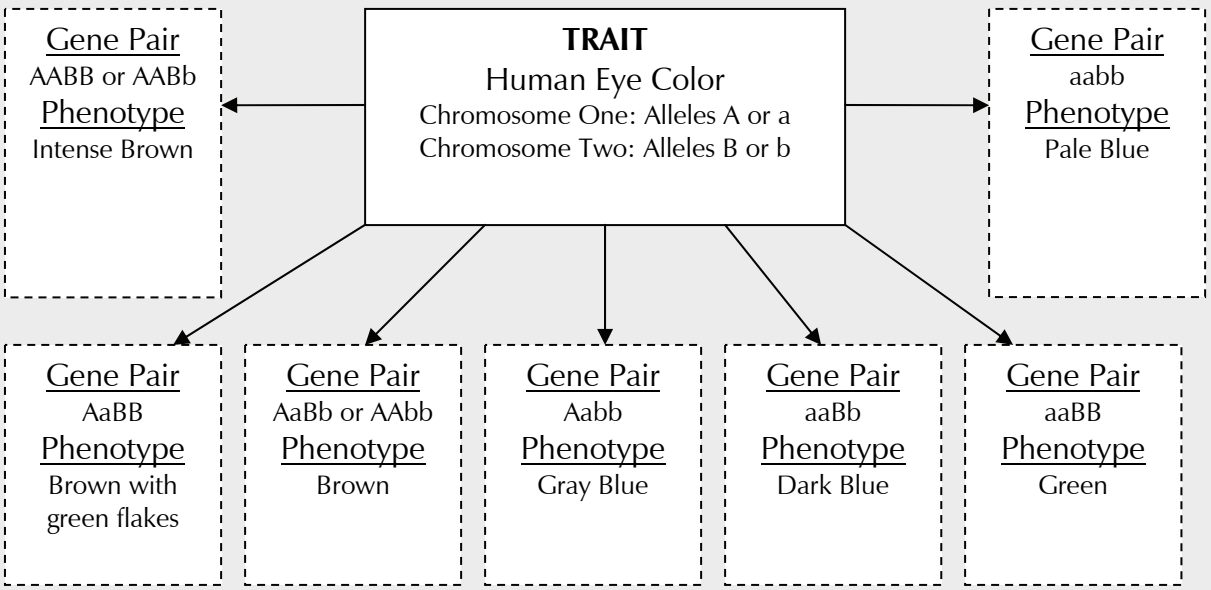


There are three alleles for blood type and no allele for type AB blood because this is an example of co-dominance.

Continuous Variation is able to explain a large number of human traits such as hair color, height, eye color and skin color. **Continuous variation** is when more than one allele for a trait is on different chromosomes. The trait has a range of possible phenotypes from one extreme to another. This can be explained because there are actually more than one chromosome involved in the expression of this trait and because all of these chromosomes independently

segregate during meiosis the possibilities of the traits that you will inherit increases. An example of continuous variation is human eye color. There are actually two different chromosomes and a total of four different alleles possible. As a result there are actually seven different phenotypes. This range is from all recessive, which is a pale blue to all dominant, which is intense brown. Figure three is the example of human eye color.

Figure Three: Continuous Variation



All of these traits are on an autosomal chromosome. These are chromosomes that are not related to the sex of an organism. Organisms have chromosomes that determine the sex of the organism. An organism that has two X-chromosomes is a female, while an organism that has one X-chromosome and one Y-chromosome is a male. There are traits that are transmitted on these chromosomes and they are considered to be **sex-linked**.

Name _____Period _____ Date_____

7:12 Reading Sheet 7.3

A sex-linked trait is found either on the X or Y chromosome. Due to the nature of sex chromosomes, a trait can only be linked to one sex chromosome. It can either be Y-linked trait or X-linked trait. If it is a Y-linked trait, it can only be based form father to son. If it is an X-linked trait it can be passed by either parent to either a boy or a girl depending on which parent carries the mutated gene. Often if the trait is on the X-chromosome, the mother is carrier for the mutated gene because she will have another normal X-chromosome. Many genetic disorders are hidden to the parents until they have children. If the mother carries the mutated gene, she will not realize it until she has children that are affected by it. This is especially true for boys that only can inherit one X-chromosome from their mother. An example of a sex-lined trait is in figure four.

Figure Four: Sex-Linked Trait