

Name: _____ Date: _____ Period: _____

Practice with Monohybrid Punnett Squares

Read the following passage and answer the questions.

Often times, people will refer to a trait or characteristic such as eye color or hair color as being genetic, but what does the word genetic really mean?

Genetics is termed as the study of heredity and how traits in offspring are based upon those of the parents.

Heredity is the process in which traits (characteristics that can be passed only from a living thing to its young) are passed from parents to offspring. A **Punnett square** is a grid system that can be set up and used to predict the possible outcomes that may result from the mating process between two individuals, when their genotypes are known. Each cell within the square is representative of one possible genotypic outcome for any offspring. The term **genotype** refers to the genetic make-up of an organism. Genotype is represented by using letters of the alphabet to stand for each allele that has been passed from the parents. A capital letter represents the dominant allele and a lower case letter represents the recessive allele. **Alleles** are all the forms of a gene for any given trait. There are usually two allele possibilities for every trait. For example: B and b are both alleles for the trait of hair color. Since genotype is the genetic make-up, **phenotype** is the physical result of a gene combination. **Dominance** is when one allele can mask the presence of another (B is the dominant gene for brown hair). **Recessive** refers to a characteristic that is masked by the presence of a dominant allele (b is a recessive gene for blonde hair). The only way to have a recessive trait expressed is to have both alleles be recessive (bb, resulting in the blond hair color). Homozygous is defined by the occurrence where the paired alleles for a specific trait, in this case hair color, are identical (BB or bb). If both parents are homozygous, they can each only pass on one allele type to their offspring. This means that all the offspring will have one B and one b allele and will be Bb genotype. This Bb genotype is termed as **heterozygous**. A heterozygous genotype is when the genes that an offspring receives are different, Bb. In this instance, dominance will also be expressed because the offspring will have the dominant trait of brown hair.

1. Genetics is the study of _____.
2. Traits are characteristic that can be passed only from a _____ thing to its _____.
3. The process in which traits are passed from parents to offspring is _____.
4. Each cell of a Punnett square represents one possible _____ outcome for any offspring of two specific parents.
5. Genotype refers to the _____ make-up of an organism.

6. _____ is the physical trait that is expressed in an individual.
7. _____ are the different forms of a gene for any given trait.
8. For each trait, there are _____ allele possibilities.
9. When the expression of one allele is masked by the presence of another, it is said to be _____.
10. When an allele masks the presence of another allele, it is said to be _____.
11. When both alleles of a parent or offspring are identical, one is said to be _____.
12. A heterozygous genotype is when the alleles present are _____, such as Bb.
13. It is proper to put the _____ allele before a recessive allele when determining the genotype of the offspring in a Punnett square.
14. For an offspring to _____ a recessive trait, both parents must have at least one _____ allele in their genotype.

For the following pairs of traits, conduct a monohybrid cross to determine the genotype and phenotype of the offspring.

1. Dominant trait: B (brown hair)
 Recessive trait: b (blonde hair)
 Possible Genotypes: _____
 Possible Phenotypes: _____

	B	b
B		
b		

2. Dominant trait: C (circular flower)
 Recessive trait: c (square flower)
 Possible Genotypes: _____
 Possible Phenotypes: _____

	C	c
c		
c		

3. Dominant trait: R (round seed)
 Recessive trait: r (wrinkled seed)
 Possible Genotypes: _____
 Possible Phenotypes: _____

	R	R
r		
r		

4. Dominant trait: W (white fur)
 Recessive trait: w (black fur)
 Possible Genotypes: _____
 Possible Phenotypes: _____

	W	w
W		
w		

5. Dominant trait: T (tall height)
 Recessive trait: t (short height)
 Possible Genotypes: _____
 Possible Phenotypes: _____

	t	t
t		
t		

1. Dominant trait: H (high metabolism)
 Recessive trait: h (normal metabolism)
 Possible Genotypes: _____
 Possible Phenotypes: _____

	D	d
D		
D		

