

NAME _____

BABY LAB

BACKGROUND INFORMATION:

Heredity is the passing of traits from parents to children. Hair color, eye color, eye shape, blood type and some diseases are all examples of traits that are passed on to children from their parents.

For every trait, a person has genes from both parents. Chromosomes come in pairs – each chromosome of a pair has genes for the same trait. One chromosome in the pair comes from the egg cell of the mother, and the other chromosome in the pair comes from the sperm cell of the father. The parents do not give each offspring the exact same set of chromosomes. Every human has 23 pairs of chromosomes. Chance determines which chromosomes are in any given egg or sperm cell. Chance determines which egg and which sperm join during fertilization. Therefore, chance determines the genes a person is born with. This explains why there are so many different traits among humans.

You can predict the chances of being born with some simple traits by using a Punnett Square. Traits that are usually expressed are said to be dominant. Traits that are seldom expressed are said to be recessive.

Example:

Some people have earlobes that are attached to the side of their head. Some people have earlobes that hang free. The unattached earlobe trait is dominant. The attached earlobe trait is recessive. For a person to have attached earlobes, he/she would have to have received a recessive gene from the mother and from the father. Recessive genes are expressed only when they are inherited from both parents. A person with unattached earlobes may have received the dominant gene from both parents; but may have received a recessive gene from either the mother or the father.

Let E = the dominant form of the gene / unattached earlobes

Let e = the recessive form of the gene / attached earlobes

		mother's genes	
		E	E
father's genes	e	eE	eE
	e	eE	eE

The mother inherited a dominant gene from her mother and her father. She has unattached earlobes. She can only pass on a dominant gene to her offspring.

The father inherited only recessive genes from his mother and his father. He has attached earlobes. He can only pass on recessive genes. All of their children will have one dominant gene and one recessive gene. They will all have unattached earlobes.

		mother's genes	
		E	e
father's genes	E	EE	Ee
	e	Ee	ee

Both mother and father can pass on either a dominant or recessive gene. The chances are that $\frac{1}{4}$ of the offspring will have 2 dominant genes and unattached earlobes, $\frac{1}{2}$ of the offspring will have one dominant and one recessive gene and unattached earlobes and $\frac{1}{4}$ of the offspring will have 2 recessive genes and attached earlobes.

The combination of genes (EE, ee, Ee) from the mother and father is called the genotype. How it is expressed (attached or unattached earlobes) is called the phenotype. Offspring that have the same gene from both parents (EE, ee) are said to be homozygous. Offspring that have different genes from each parent (Ee) are said to be heterozygous. Offspring that have a homozygous dominant genotype will show the dominant phenotype. Offspring that are heterozygous will also show the dominant phenotype. Offspring that have the homozygous recessive genotype will show the recessive phenotype. This explains why two parents (Ee, Ee) with unattached earlobes can have a child with attached earlobes (ee).

Sometimes heterozygous offspring show a combination of the two traits. This is called incomplete dominance.

Example:

A plant with red (R) flowers is crossed with a plant with white (r) flowers.

		Red flowers	
		R	R
White flowers	r	Rr	Rr
	r	Rr	Rr

All offspring are pink. They have a heterozygous genotype, Rr.

		Pink flowers	
		R	r
Pink flowers	R	RR	Rr
	r	Rr	rr

$\frac{1}{4}$ of the offspring are homozygous red. $\frac{1}{4}$ of the offspring are homozygous white. $\frac{1}{2}$ of the offspring are heterozygous pink. Genotypes are RR, Rr, rr. Phenotypes are red, pink and white.

DATA:

Trait	Mother's coin flip	Mother's gene	Father's coin flip	Father's gene	Baby's genotype	Baby's phenotype
Face shape						
Ear shape						
Eyebrow shape						
Lip shape						
Nose shape						
Eye color						
Eye shape						
Chin shape						
Hair type						
Hair color						



