

Name _____

Period _____

Date _____

Laboratory

Exploring Hereditary Traits

Objective

To determine your possible genotypes for some inherited traits

Process Skills

Observing, communicating, inferring

Materials

Pencil, paper

Inquiry

- 1 Make a table with three columns and nine rows. Head the columns Trait, Phenotype, and Possible Genotypes. In the first column list the nine traits shown below.
- 2 In the second column of the table, write yes or no depending on whether or not you possess each trait. Work with a partner. For traits that you cannot observe directly, ask your partner for help. Each of the traits listed is controlled by a dominant allele.



- Tongue-rolling (R): Stick out your tongue and try to roll up the sides so that the tongue forms a U-shape.
- Free earlobe (F): The lobe of the ear hangs freely below the point of attachment to the head.
- Widow's peak (W): The midpoint of the hairline along the front of the forehead points downward.
- Straight thumb (N): When extended from the palm of the hand, the top segment of the thumb forms a straight line with the bottom segment. (See figure.)
- Bent little finger (B): The last segment of the little finger bends in toward the ring finger.
- Left-over-right thumb crossing (L): When the hands are folded in a natural fashion, the left thumb crosses over the right.
- Chin cleft (C): The center of the chin has an indentation resembling a deep dimple.

- Mid-digital hair (H): Hair is present on the middle section of any of the fingers.
- Short big toe (T): The big toe is shorter than the second toe.

- 3 In the third column of the table, record your possible genotypes for each trait, using the appropriate symbols.
- 4 Compare your traits with those of your classmates. Which trait or traits are most common among your classmates?

Conclusions *Answers go on page 3*

- 1 Which observations are evidence that the most common trait may not be determined by the dominant allele? Which dominant alleles studied today were most common?
- 2 What factors should be considered before comparing the frequency of traits in the classroom with their frequency in the U.S. population?

Further Inquiry

Review all the traits studied and discuss in class possible adaptive advantage of each trait.

Data Chart:

Trait	Phenotype	Possible Genotypes	Class		o/o in class with trait
			yes	no	
Tongue-rolling (R)					
Free earlobe (F)					
Widow's Peak (W)					
Straight-thumb (N)					
Bent little finger (B)					
Left-over-right thumb crossing (L)					
Chin cleft (C)					
Mid-digital hair (H)					
Short big toe (T)					

Conclusions:

1.) Which observations are evidence that the most common trait may not be determined by the dominant allele?
(Traits that appeared with low percentages meaning that the recessive trait is more common.)

2.) Which dominant alleles studied were most common?

3.) What factors should be considered before comparing the frequency of traits in the classroom with their frequency in the U.S. population?

4.) If a man homozygous for tongue-rolling married a woman who couldn't roll her tongue, what % (percent) of their children would be tongue-rollers?

First - what are the genotypes of the parents?
man _____ woman _____

Complete the Punnett square to support your answer:

% of children who could roll their tongues = _____ %