

Exploring Hereditary Traits

Introduction:

Some human traits follow simple Mendelian genetic rules. The following 10 human traits are expressed through the action of dominant or recessive alleles. Each of the 10 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.
- Straight little finger (S): The last segment of the little finger forms a straight line with the rest of the finger rather than bending 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.
- Six-fingers (B): Six fingers are present on either hand (or were present at birth).
- PTC taster (T): Able to taste the chemical phenylthiocarbamide.

Purpose/Objective:

To determine your possible genotypes for 10 observable traits.

Materials:

pencil, paper, phenylthiocarbamide paper

Procedure:

1. Work with a partner. Determine whether or not you possess each of the ten traits and, in the appropriate place on your data table, write yes or no.
2. Knowing what the dominant allele is, record your possible genotype for each trait using the appropriate symbols.
3. Record your results on the board and when everyone has finished calculate the percent of students who possess each trait and the percent of students who don't possess each trait.
4. Answer all conclusions.

**Data/Observations:
Personal Data Table for 10 Traits**

Trait	Phenotype (yes or no)	Possible Genotype

Class Data Table for 10 Traits

Trait	% Students with Trait	% Students without Trait

Conclusions:

1. Which trait was the most common? _____
2. Is this trait dominant or recessive? _____
3. Which trait was least common? _____
4. Is this trait dominant or recessive? _____
5. Do any two people in the class have exactly the same combination of phenotypes for the traits studied? Explain your answer or tell who those people are.

6. Is it possible for a trait to be shared by most of the population and not be controlled by the dominant allele? Explain your answer.
