

## Fingerprints and Incomplete Dominance Activity

### Background Information:

**Fingerprints:** Every person has their own unique pattern of fingerprints. This fact has long been used by police in identifying suspects. However, all patterns fit into one of three main types: Whorl, Loop, or Arch. Within each of these types there is an unlimited amount of variation. But each person's prints will fall into one of these three major groups.

**Fingerprint genetics:** The three major fingerprint groups represent a classic example of incomplete dominance. Incomplete dominance occurs when neither the dominant nor recessive alleles for a trait act fully to create an intermediate phenotype. The dominant gene does not cover up the recessive gene, but instead their traits are blended together. This situation is seen in the diagrams below:



1. Recreate the diagram above in your lab notebook.
2. For each diagram, label it with the genotype using the letter "L". Hint: whorls are dominant.
3. Label it either homozygous dominant, homozygous recessive, or heterozygous.
4. Label the diagram that shows incomplete dominance.
5. Look in your book, look around the room, find three examples of incomplete dominance. Write each of these in your lab notebook. For each describe the homozygous dominant phenotype, the homozygous recessive phenotype, and the heterozygous phenotype.

### The Experiment:

When you have correctly answered the questions above, show it to Ms. Burton. You will then receive a piece of scotch tape, and you may begin the experiment.

- A. Problem:** Determine your phenotype and genotype for the fingerprint genes. How does this compare to your peers?
- B. Method: Part I**
1. Prepare a scotch tape fingerprint of your index finger.
  2. Rub a #2 pencil in about a one inch square on a sheet of paper (not this paper!). The idea is to make a dark mark on the paper.
  3. Rub the finger pad of your left index finger on the dark spot.
  4. Place the strip of scotch tape on the finger pad, sticky side facing the skin. When you remove the tape, your fingerprint outline will remain on the tape.
  5. Place your tape print in your lab notebook.
  6. Label your fingerprint with your genotype and genotype name, as well as your phenotype.
  7. Write down if your print is a result of incomplete dominance or not.
- C. Method: Part II**
1. There are three possible phenotypes: Whorl, Loop, and Arch. Find one of each type from yourself or others in the class and create a scotch tape finger print to place in your lab notebook.
  2. For each finger print give the person's name, their genotype, phenotype, and explain if it's a result of incomplete dominance.