



# Fingerprinting

**STEM Sims**

## Lesson 3: Comparing Fingerprints

One of the first things that detectives do at a crime scene is to look for fingerprints. Fingerprints indicate that a person has been at the crime scene. This could lead to finding suspects or reveal witnesses to help solve the crime. There can be multiple fingerprints as well as smudged or partial prints, so there might be many different fingerprints to test. Can you test for multiple suspects?

### Doing the Science

1. Start the Fingerprint Simulation by clicking on the “Sim” tab.
2. Record the ID number into Table 1 below.
3. Click on each of the fingerprints from the left and right hands to get a closer look at the fingerprint.
4. Identify which of the fingerprints are whorls and record the finger number (1-10) into the table under “Finger Numbers with Whorls”. Use the “Background” tab to refer to the finger numbers.
5. Using the “Finger Numbers with Whorls” column, find the value of the fingerprints with whorls and record the numbers under “Finger Number Whorl Values”. Refer to the background to find the values.
6. Sum the whorl values of the odd finger numbers and record into the table.
7. Sum the whorl values of the even finger numbers and record into the table.
8. Calculate the primary group ratio:  $\frac{1+(\text{sum of whorled,EVEN finger value})}{1+(\text{sum of whorled,ODD finger value})}$ . This is done by adding 1 to both the “Sum of Even Whorl Values” and to the “Sum of Odd Whorl Values”. Now divide the new sum of even whorl values by the new sum of odd whorl values. Record the ratio into the table.
9. In the “Fingerprint Database” section, click on the tab that corresponds to the primary group ratio found. (The numerator of the ratio should be used to determine which tab to click. For example, if the numerator was 10, click on the green tab because 10 is between 9 and 16.)
10. Further narrow down the database search by clicking on one of the blue boxes that has the numbers that the primary group ratio goes into. (Look at the numerator to determine which blue box to click.)
11. Using the numerator and denominator of the primary group ratio now, click on the blue box that has the primary group ratio that you found.
12. Compare the fingerprints of the left and right hands to determine if there is a match between the suspect and the fingerprints in the database. Click on “Select as Match” to check to see if the match was correct. Click on “Back” to return to the database.
13. If a match is found, record the Fingerprint Database ID# into the table.
14. Click on the right yellow button to find a new set of unknown fingerprints.
15. Repeat steps 2-14 for four more suspects.

**Table 1.**

	<b>Finger Numbers with Whorls</b>	<b>Finger Number Whorl Values</b>	<b>Sum of Odd Whorl Values</b>	<b>Sum of Even Whorl Values</b>	<b>Primary Group Ratio</b>	<b>Fingerprint Database ID#</b>
<b>Unknown Prints 1:</b> <b>ID # _____</b>						
<b>Unknown Prints 2:</b> <b>ID # _____</b>						
<b>Unknown Prints 3:</b> <b>ID # _____</b>						
<b>Unknown Prints 4:</b> <b>ID # _____</b>						
<b>Unknown Prints 5:</b> <b>ID # _____</b>						

**Do You Understand?**

1. Can you always identify a suspect with the Henry Classification System?
2. What happens if there are fingerprints for only one hand? How does this affect the primary group ratio?
3. Can there be multiple people with the same primary group ratio?