1. **Fingerprint Principles**
   According to criminal investigators, fingerprints follow 3 fundamental principles:
   
   1. A fingerprint is an ________________ characteristic; no two people have been found with the ____________ same fingerprint pattern.
   2. A fingerprint pattern will remain ____________ for the ____________ of an individual.
   3. Fingerprints have general characteristic ____________ patterns that allow them to be systematically identified.

2. **Fingerprint Classes**
   There are 3 specific classes for all fingerprints based upon their visual ________________ arches, loops, and whorls. Each group is divided into smaller groups as seen in the list below.

<table>
<thead>
<tr>
<th>Plain</th>
<th>Radial</th>
<th>Plain</th>
<th>Loops = ______</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plain Radial</td>
<td>Radial Ulnar</td>
<td>Central pocket</td>
<td>Whorls = ______</td>
</tr>
<tr>
<td>Plain Tented</td>
<td></td>
<td>Double loop</td>
<td>Arches = ______</td>
</tr>
<tr>
<td>Tented Ulnar</td>
<td></td>
<td>Accidental</td>
<td></td>
</tr>
</tbody>
</table>

3. **Examples**
   
   **Arches** are the simplest type of fingerprints that are formed by ridges that enter on one ______ of the print and exit on the ____________. No ______________ are present.

   **Loops** must have one ______ and one or more ______ that enter and leave on the same side. These patterns are named for their positions related to the ______ and ______ bones.
Whorls have at least one__________ that makes (or tends to make) a complete__________
They also have at least__________ deltas. If a print has more than two deltas, it is most likely an______________

Draw a line between the two deltas in the plain and central pocket whorls shown below. If some of the curved ridges touch the line, it is a plain whorl. If none of the center core touches the line, it is a central pocket whorl. Label each fingerprint below.

__________________ whorls are made up of any two loops combined into one print.

__________________ whorls contain two or more patterns (not including the plain arch), or does not clearly fall under any of the other categories.

4. Identify each fingerprint pattern shown on the class notes.
A. ________________ C. ________________ D. ________________
B. ________________

5. Follow your teacher’s directions to document your fingerprints on the My Prints worksheet. Use your notes and a magnifying glass to identify the pattern in each one.

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Fingerprint Ridge Patterns

Arches
- Plain Arch
- Tented Arch

Loops
- Radial Arch
- Ulnar Arch

Whorls
- Plain Whorl
- Central Pocket Whorl
- Double Loop
- Accidental

Fingerprint Ridge Characteristics

- Core
- Ending Ridge
- Short Ridge
- Fork or Bifurcation
- Delta
- Hook
- Eye
- Dot or Island
- Crossover
- Bridge
- Enclosures
- Specialty
Fingerprint Challenge

Match the prints inside the question mark to the prints found around the border of the page.
Make fingerprints for each hand and then classify them according to the types presented in class.
Step 1: Classify your fingerprints and record the number of each pattern below. Your total should equal 10!

Arches = _______  Loops = _______  Whorls = _______

Step 2: Complete the chart below by recording the total number of each pattern for the class. The expected averages are 60% for loops, 35% for whorls, and 5% for arches.

<table>
<thead>
<tr>
<th>Pattern</th>
<th>#</th>
<th>Total Prints</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arches</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loops</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Whorls</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

How do our prints compare to the expected averages?

Step 3: Complete the chart below by recording the total number of each pattern for the males and females in the class.

<table>
<thead>
<tr>
<th>Pattern</th>
<th># Males</th>
<th># Females</th>
<th>Total Prints</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arches</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loops</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Whorls</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Which pattern is most common pattern among the males in this class?

Which is most common pattern among the females?

How do the averages for each sex compare to the expected averages?
Site #1: NIST Matching Up Fingerprints

1. Click the link for “Solving Crimes, Improving Security” and work your way through the pages to complete this section. WAIT for the blue CONTINUE or NEXT SECTION buttons before you move ahead.

A. What does the acronym FBI mean? __________________________________________________________________________

B. How many fingerprints are in the FBI master database of criminal files? __________________________________________________________________________

C. What is another term for a partial print found at a crime scene? __________________________________________________________________________

D. What do fingerprints consist of? __________________________________________ and __________________________________________

F. What are the three main types of fingerprints? __________________________________________ __________________________________________ __________________________________________

G. What type of minutiae points are shown below?


H. How many minutiae points must be in common between the latent and suspect print to be considered a match? __________

I. How many minutiae points will match on a complete fingerprint? ______

J. What type of fingerprint equipment is replacing “inked” fingerprints? __________________________________________

K. Follow the directions to find a print that matches the latent print from the stolen car. Which suspect matched the latent print? __________

L. Which type of fingerprint is most common? ______________

M. Which type is least common? ______________

2. Return to the first page of this site and scroll down to find the link for “Now try our fingerprint matching game!” Click the link and keep track of the number of guesses you needed to find the correct one.

   - Which fingerprint was the correct one? __________

   - How many guesses did it take to find the correct one? __________
Site #2: TruTV Fingerprint Game
Choose the “Fingerprints Game” link and follow the directions to match the prints. Try the game at least 5 times and record your efforts in the chart.

<table>
<thead>
<tr>
<th>Print</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td># of Guesses</td>
<td>Correct Print</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

To identify the prints, use the corresponding letters below.

A B C D E

Site #3: PBS Whodunit?

Click the link for “Whodunit?” Read the information presented and follow the directions to complete this activity.

What was the crime?

What time did it happen? Where?

How many people were involved?

How many fingerprints did you collect from the bank?

How many other fingerprints did you find that could not be used?

Who are your main suspects?

Why would you fingerprint the bank employees?

Follow the directions to match prints from the evidence files to the ones in the fingerprint files.

Which person was responsible for the crime?

Done? Try the games listed below. The links are listed in the Mysteries & More section.

☐ The Mystery of the Hidden Mine – Who did it?

☐ Burgled Bonuses – Who did it?

Don’t forget to turn in your worksheet!

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Make toe prints for each foot and then classify them according to the types presented in class.

How do your toe prints compare to your fingerprints?

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