**Fingerprints**

**Description of Session**

This session provides participants with an understanding of fingerprints and how they’re analyzed and compared in the forensic laboratory.

**Category**

* Exploring: Law Enforcement
* Exploring: Science
* U. S. Department of Education: STEM
* U. S. Department of Education: Law, Public Safety, Corrections & Security

**Objectives**

* Describe what friction ridge skin is and where it’s found.
* Describe the two premises that fingerprint identification is based on.
* Explain the concept of an exemplar as it pertains to fingerprints.
* Create exemplars of all ten of your fingers.
* Describe each portion of a tenprint card and explain its purpose.
* Identify the basic pattern types that are employed in fingerprint classification.
* List the fingerprint pattern type frequencies.
* Classify the pattern types on each of your own ten fingers.
* Describe the information provided by fingerprints.
* Distinguish between the 3 primary ridge features that are used in identification.
* Identify and label ridge features using the correct nomenclature.
* Summarize the three conclusions that can be reached in a fingerprint comparison.
* Compare and identify a questioned fingerprint to a known fingerprint.

**Supplies**

* (1) computer with internet access
* (1) fingerprint ink pad (if a fingerprint ink pad is unavailable, a bank ink pad will do)
* (1) hand lens/magnifying glass
* (1) red pencil
* (1) ruler
* (1) roll of packing
* (1) pair of scissors
* (2) alcohol

**The following PDFs can be found by clicking the activity outline link at the bottom of this page:**

* PDF document titled *Tenprint Card*
* PDF document titled *Fingerprint Classification Overview*
* PDF document titled *Fingerprint Classification Exercise*
* PDF document titled *Fingerprint Individualization Overview*
* PDF document titled *Fingerprint Individualization Exercises Instructions*
* PDF document titled *Fingerprint Individualization Exercises*
* PDF document titled *Fingerprint Individualization Exercises Answer key*

**Websites**

* <http://www.forensicsciencesimplified.org/prints/how.html> - An overview of fingerprints.
* [http://onin. om/fp/](http://onin.com/fp/) - An in-depth resource for all things fingerprint related (1).
* <http://www.clpex.com/> - An in-depth resource for all things fingerprint related (2).

**Videos**

These videos were chosen because they illustrate important aspects of the forensic science discipline being studied in this module. Some of the content in the case studies is geared toward a mature audience. Advisors should review these videos before showing them to insure that these videos are age appropriate.

* <https://www.youtube.com/watch?v=d7N-4UNAzsw&index=3&list=PL89QP7ZwONKnmQxUgUiW9YR3EyRPxIgts> - How to roll fingerprints.
* <https://www.youtube.com/watch?v=fHQz2ZV2_9w> – Fingerprint classification.
* <https://www.youtube.com/watch?v=IrpTqKkgygA> – Fingerprint comparison.
* <https://www.youtube.com/watch?v=DIWiFudZo4Y> – CSI and fingerprint overview.
* <https://www.youtube.com/watch?v=tqFzVfPRd5s> – Developing fingerprints with black powder
* <https://www.youtube.com/watch?v=qxrjjql6FCE> – Developing fingerprints with magnetic powder.
* <https://www.youtube.com/watch?v=R0e8WXkFA64> – Developing fingerprints with Super Glue
* <https://www.youtube.com/watch?v=ZKi1CKTRCQM> – Automated Fingerprint Identification System (AFIS)
* <https://www.youtube.com/watch?v=JN6eet2i6Qc> – *Forensic Files: The Music Case* (Fingerprint Case Study #1).
* <https://www.youtube.com/watch?v=4EfPkm_t80c> – *Forensic Files: A Wrong Foot* (Fingerprint Case Study #2).
* <https://www.youtube.com/watch?v=LsspJcGcEp8> – Fingerprint examiner testifying in court in a criminal trial.

**Activities**

**Introduction**

Fingerprints have been used for more than a century to identify criminals. Fingerprint identification is based on two premises: 1) no two fingerprints are exactly alike and 2) barring injury, fingerprints don’t change throughout the course of a person’s life. Fingerprints possess basic pattern types that allow them to be classified. Within those pattern types are characteristics called ridge features that can be used to individualize a fingerprint to a particular person. The spatial arrangements of these ridge features are unique to each person and what are used for individualization.

**Activity 1**

* Review the PDF document titled *Fingerprint Classification Overview* with participants.
* Review the PDF document titled *Fingerprint Classification Exercise* with participants.
* Have participants complete the exercise as described in the instructions.
* Review the results with the participants upon completion.

**Activity 2**

* Review the PDF document titled *Fingerprint Individualization Overview* with participants.
* Review the PDF document titled Fingerprint *Individualization Exercises Instructions* with participants.
* Have participants complete the exercises one at a time in the order presented.
  1. Ridge Feature Recognition
  2. Ridge Counting
  3. Charted Enlargement (Loop)
  4. Charted Enlargement (Whorl)
  5. Charted Enlargement (Arch)
* **IMPORTANT!** Using the PDF document *titled Fingerprint Individualization Exercises Answer Key*, advisors should review each exercise with the participants prior to allowing them to proceed to the next exercise.

**Activity 3**

* Using a computer and the internet, look up 5 criminal cases that involve fingerprint evidence.
* Write a short summary of how fingerprints contributed to the resolution of each case.

**Activity 4**

* Using a computer and the internet, look up universities and colleges that have accredited forensic science programs that have fingerprints as part of their curriculum.
* Contact the colleges and universities and ask them for more information on their forensic science programs.

**Extension**

* Arrange for a visit to a local, county, or state crime laboratory with an emphasis on the latent print section.
* Reach out to a crime laboratory and ask them to send a latent print examiner to talk to participants.
* Attend a trial where latent fingerprint evidence is being presented.
* Contact a local CSI unit and request a guest speaker.
* Contact a local police station and ask if participants can visit the police station and get an in-person demonstration of how fingerprints are recorded.

**Reflection**

The following reflection points are intended to help the participants demonstrate what they’ve learned in this module of instruction. Feel free to use these points or to develop your own that are more in line with the direction that you would like to go with this topic

1. What fingerprint pattern type(s) do you have on your fingers? What percentage of the population has your pattern type(s)?
2. Name the three conclusions that can be reached in a fingerprint comparison. Rank them in the order of importance. Explain why you ranked them as you did.
3. Did you find comparing questioned fingerprints from crime scenes to the known fingerprints of a suspect to be more or less challenging than you expected?
4. In 2015 the FBI combined its criminal and civil fingerprint databases. This means that people who have been fingerprint for non-criminal purposes will have their fingerprints in the sane database with the fingerprints of criminals. Discuss the ethical implications of this.