Lesson 16
Human Fingerprints

CASE STUDY

I praise you, for I am fearfully and wonderfully made. Wonderful are your works; my soul knows it very well (Psalm 139:14).

Terms to Know

Bifurcation – a type of minutiae; the location where a single ridge splits into two separate ridges.

Core – the location of the center of the pattern area.

Crossover – a type of minutiae; the location where two ridges cross and form an "X."

Delta – the location where two ridges diverge and a point of reference or friction skin is visible at the center of the divergence. The term comes from the geographical term for a river delta.

Island – a type of minutiae; the location of a single spot of friction skin.

Ridge ending – a type of minutiae; the location where a ridge abruptly ends and does not continue.

Dermal layer – the connective tissue in skin that nourishes the epidermis. Fingerprint ridges and furrows are anchored deep within the dermal layer.

Epidermis – the thinner, outer layer of skin. This layer serves as a barrier against contagions and contains the sensory receptors.

Final – in the Henry classification system, the ridge count of the pinky finger in the right hand. If there is no loop in the right pinky, the left-hand pinky is used and placed in the denominator. If there is a loop in the right hand, the denominator is left blank. If there is no loop in either pinky finger, there is no final.

Key – in the Henry classification system, the ridge count of the first loop.

Major – in the Henry classification system, the ridge count or whorl tracing of the right thumb (numerator) and of the left thumb (denominator).

Primary – in the Henry classification system, the value of fingers 2, 4, 6, 8, 10 +1 (numerator) and of fingers 1, 3, 5, 7, 9 +1 (denominator). Calculating the primary is the most important step in the classification process.

Secondary – in the Henry classification system, the capital letter representation of the right index print pattern (A, T, U, R, W) (numerator) and of the left index print pattern (denominator).

Sub-secondary – in the Henry classification system, the ridge count codes (I, O) or whorl tracings (I, M, O) in fingers 2–4 of the right hand (numerator) and of the left hand (denominator). If a finger has a print in the small letter group, this will take precedence.

Case Study

Teacher: Review the case study and discuss it with your student. Be sure to address any notes the student took, as well as sensitive or difficult topics you want to talk through with your student. Topics covered in this case include firearms and murder.

Student: Review the case study. You can use this page to take notes on anything from the case that you have questions or concerns about. Discuss your thoughts with your teacher.

Notes

Multiple Choice

Circle the best answer from the choices below.

1. When do fingerprints develop in the mother's womb during fetal development?
   a. By 6 weeks
   b. Between 10 and 16 weeks
   c. Between 16 and 20 weeks
   d. Between 20 and 32 weeks
   e. By 36 weeks

2. God gave humans a special identity through their friction skin patterns in the form of how many unique details?
   a. Over 100
   b. Over 1,000
   c. Over 10,000
   d. Over 100,000
   e. One million

3. In what year did Dr. Johann Mayer publish the first information about the uniqueness of friction ridge skin?
   a. 1788
   b. The early 1700s
   c. 1823
   d. 1902
   e. None of the above

Fill-in-the-Blank

Fill in the blanks with the correct answer.

1. "For you formed my inward parts. . . . I am fearfully and wonderfully made"
   (_____ 139:13–14).

2. The surface of friction skin is extremely _____ and can relay information directly to your brain.

Short Answer

Respond to the following questions in complete sentences.

1. What three qualities does the value in fingerprint identification lie in?

   a. _____

   b. _____

   c. _____

2. What sorts of artifacts can evidence be found that demonstrates early civilizations recognized that fingerprints held value in someone's identity?

   _____

   _____

   _____

   _____

   _____

   _____

   _____

   _____

3. What was J.E. Purkinje the first person to do?

   _____

   _____

   _____

   _____

   _____

   _____

   _____

   _____

   _____

Multiple Choice

Circle the best answer from the choices below.

1. What types of fingerprint patterns are still used today? (There is more than one answer.)
   a. Arch
   b. Loop
   c. Whorl
   d. Swirl
   e. All of the above

2. It is a _____ certainty that no two people will have identical fingerprint patterns.
   a. 0%
   b. 25%
   c. 50%
   d. 75%
   e. 100%

3. The order of fingerprint patterns in humans from most common to rarest is:
   a. Whorls, loops, arches
   b. Loops, whorls, arches
   c. Arches, whorls, loops
   d. Loops, arches, whorls
   e. None of the above

Matching

Mark the letter in front of the correct person.

a. Sir Francis Galton | b. Sir William Herschel | c. Sir Edward Henry

d. Dr. Henry Faulds | e. Alphonse Bertillon

1. _____ Credited as the first European to implement the methodology of fingerprint identification
2. _____ Considered the father of the eugenics movement
3. _____ Devised the first system of classification based on a series of nine core body measurements
4. _____ Developed a systematic method to classify fingerprints by assigning numerical values to fingers with the presence of the whorl pattern
5. _____ Given credit for first publishing the practice of fingerprint identification

Short Answer

Respond to the following questions in complete sentences.

1. What is eugenics?

_____

_____

_____

2. What did Sir Francis Galton conclude after years of fingerprint research for eugenics?

_____

_____

_____

3. What happened in the West case that forever changed the use of fingerprints?

_____

_____

_____

4. What are the four common examples of fingerprint minutiae given in the lesson, as well as the two common locations in a print?

a. _____

_____

b. _____

_____

c. _____

_____

d. _____

_____

e. _____

_____

f. _____

_____

Multiple Choice

Circle the best answer from the choices below.

1. Arches are characterized by:
   a. Presence of a delta
   b. Presence of a core
   c. Sufficient recurve
   d. Presence of two deltas
   e. No delta or core
   f. Ridge count of at least one

2. What essential point must a loop meet? (There is more than one answer.)
   a. Presence of a delta
   b. Presence of a core
   c. Sufficient recurve
   d. Presence of two deltas
   e. No delta or core
   f. Ridge count of at least one

3. Whorls are characterized by: (There is more than one answer.)
   a. Presence of a delta
   b. Presence of a core
   c. Sufficient recurve
   d. Presence of two deltas
   e. No delta or core
   f. Ridge count of at least one

4. The ridge count is the number of ridges that cross an imaginary straight line from the _____ to the _____ of the fingerprint.
   a. Core, bifurcation
   b. Delta, core
   c. Delta, ridge ending
   d. Core, ridge ending
   e. Bifurcation, ridge ending

Short Answer

Respond to the following questions in complete sentences.

1. List the eight subdivisions of arches, loops, and whorls.

   a. _____

   b. _____

   c. _____

   d. _____

   e. _____

2. Explain the basics of how Sir Edward Henry's fingerprint classification system works.

   _____

   _____

   _____

   _____

   _____

3. What is the key?

   _____

   _____

   _____

   _____

   _____

4. Label the whorl tracings below.

a. _____ b. _____ c. _____

Multiple Choice

Circle the best answer from the choices below.

1. The most important step in the classification process is calculating the:
   a. Key
   b. Major
   c. Primary
   d. Secondary
   e. Sub-secondary
   f. Final
2. The secondary is simply the pattern type in the:
   a. Middle fingers
   b. Index fingers
   c. Thumbs
   d. Pinkies
   e. All of the above
   f. None of the above

3. The sub-secondary is the pattern type in the:
   a. Index fingers
   b. Middle fingers
   c. Ring fingers
   d. All of the above
   e. None of the above

4. The final is the ridge count of:
   a. The index finger in the right hand
   b. The pinky finger in the right hand
   c. The middle finger in the left hand
   d. The ring finger in the left hand
   e. The thumbs on both hands

Short Answer

Respond to the following questions in complete sentences.

1. What is the major?

_____

_____

_____

_____

_____

2. Fill out the missing information in the chart below used to calculate the primary in fingerprint classification.

Finger 1 _____ _____	Finger 2 _____ 16 points	_____ Right middle _____	_____ _____ 8 points	Finger 5 Right pinky _____
_____ Left thumb _____	_____ Left index 2 points	Finger 8 _____ 2 points	Finger 9 _____ _____	Finger 10 _____ 1 point

3. In ulnar loops, the number of ridges present from the delta to the core in each index, middle, and ring finger determines the code of I or O. Complete the chart below.

Code	Index	Middle	Ring
I			
O			

4. What do the values of I, M, and O mean in relation to whorls?

_____

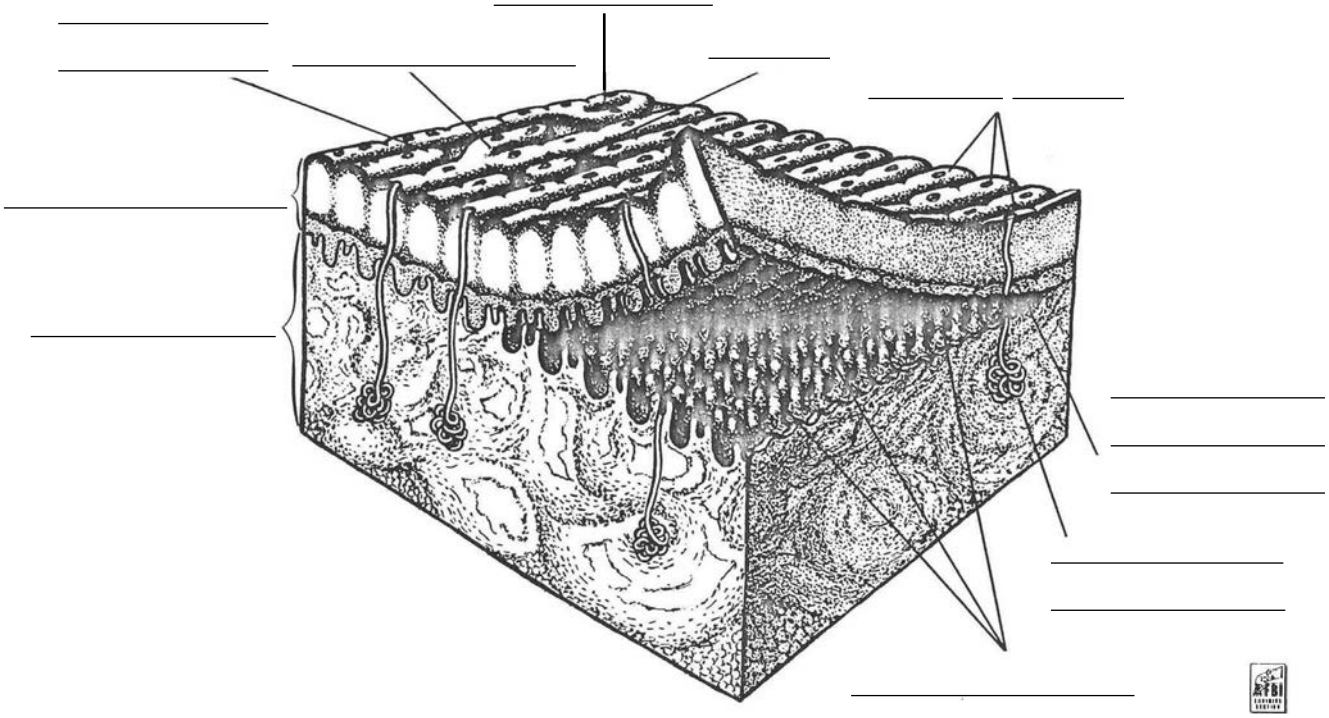
_____

_____

_____

_____

1. Label the parts of friction skin in the graphic below.



2. Label the types of minutiae in the graphic below. Also identify the core and delta (remember that these are not technically minutiae but common locations in a print).

Page intentionally left blank.

Recording & Identifying Fingerprints

Fingerprint patterns are the iconic tool used in criminal identification. Fingerprints are left behind by the secretions from sweat pores found on the surface of friction ridge skin. Friction ridge skin covers the surface of the hands and feet. Due to God's design of friction ridge skin, an uneven surface is created, which aids in a nonslip surface and firmer grip. Fingerprints develop in the mother's womb between 10 and 16 weeks and remain with an individual until the dermal and epidermal layers of skin fully decompose after death. The value in fingerprint identification lies in three qualities: individuality, identifiable characteristics, and unchanging structure. The beauty, design, and complexity behind the structure of friction ridge skin testifies to a Master Artist and Creator God who loved every single person so much He gave them 20 unique fingerprint patterns (ten on the fingers and ten on the toes) unlike anyone else who will ever live on the face of the earth . . . past, present, or future.

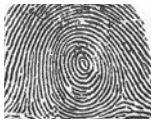
Fingerprints are classified into three broad categories: arch, loop, and whorl.

loops

whorls

arches

These three pattern types are further divided into eight total patterns.



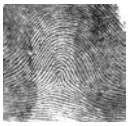
plain whorl

central pocket loop whorl

double loop whorl

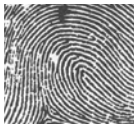
accidental whorl

plain arch



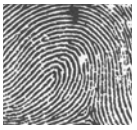
tented arch

radial loop (right hand)



ulnar loop (right hand)

radial loop (left hand)



ulnar loop (left hand)

Materials

☐ Pen or pencil ☐ Wipes ☐ Ink pad (or ground pencil)

Procedure

Part 1: Printing

1. Ink each of your fingers and print them on the fingerprint card below, one at a time. Use the nail-to-nail roll technique for both inking and printing. This means you start on one side of your finger and roll it across the ink pad (or paper) to the other side. Let the ink dry.
2. On the second blank below each fingerprint, identify the pattern as arch, loop, or whorl.
3. Bonus: On the first blank below each fingerprint, identify each of your fingerprints as one of the eight subtypes of patterns.

right thumb	right index	right middle	right ring	right little
Pattern: _____	Pattern: _____	Pattern: _____	Pattern: _____	Pattern: _____
left thumb	left index	left middle	left ring	left little
Pattern: _____	Pattern: _____	Pattern: _____	Pattern: _____	Pattern: _____

Part 2: Classification

1. The first step in classifying fingerprints is to identify the pattern of each finger with a letter under the finger. Use the information and fingerprint card example on page 197 in the student book to help you with this.

2. You will now classify the primary of your fingerprints. Use the information on page 198 in the student book to help you. _____

3. Now classify the secondary of your fingerprints. Use the information on page 199 in the student book to help you. _____