Fingerprints Vocabulary

Complete the worksheet BEFORE we do we do notes in class

1. Classification of fingerprints in three categories based on shape of the ridges.

   Scrambled: pienrerdttga **Answer:** _____

2. A fingerprint pattern in which the ridge pattern originates one side to the other side of the finger.

   Scrambled: cahr **Answer:** _____

3. A form used to record and preserve a person's fingerprints

   Scrambled: dtacenr **Answer:** _____

4. A fingerprint that resembles a bulls eye.

   Scrambled: lrwoh **Answer:** _____

5. An impression left on any surface that consists of patterns made by the ridges on a finger.

   Scrambled: ntrifipnerg **Answer:** _____

6. Hidden fingerprints made visible with powders or other techniques.

   Scrambled: etatln **Answer:** _____

7. A fingerprint pattern in which a ridge pattern originates from one side and turns around leaving the same side.

   Scrambled: olpo **Answer:** _____

8. Tiny details on fingerprints including ridge placement and shapes that make each persons fingerprints unique.

   Scrambled: tiamnuei **Answer:** _____

9. Visible fingerprint left by blood, ink or some other substance.

   Scrambled: tptaen **Answer:**

_____

10. Three dimensional fingerprint formed in soft material such as clay, soap, or putty.

    Scrambled: ctlispa **Answer:**

_____

Fingerprints

Learning Objectives:

- ❑ I can describe history and reliability of fingerprinting
- ❑ I can identify fingerprint characteristics and matches
- ❑ I can collect fingerprint evidence
- ❑ I can identify other print types

Draw arrows and give the year of each of the following events in the development of the science of fingerprinting.

1500

1600

Dr. Nehemiah's described patterns he saw on human hands under a microscope

1700

Sir William Herschel began the collection of fingerprints and noted they were not altered by age.

Johann Mayer was the first scientist to recognize that each person's fingerprints are unique

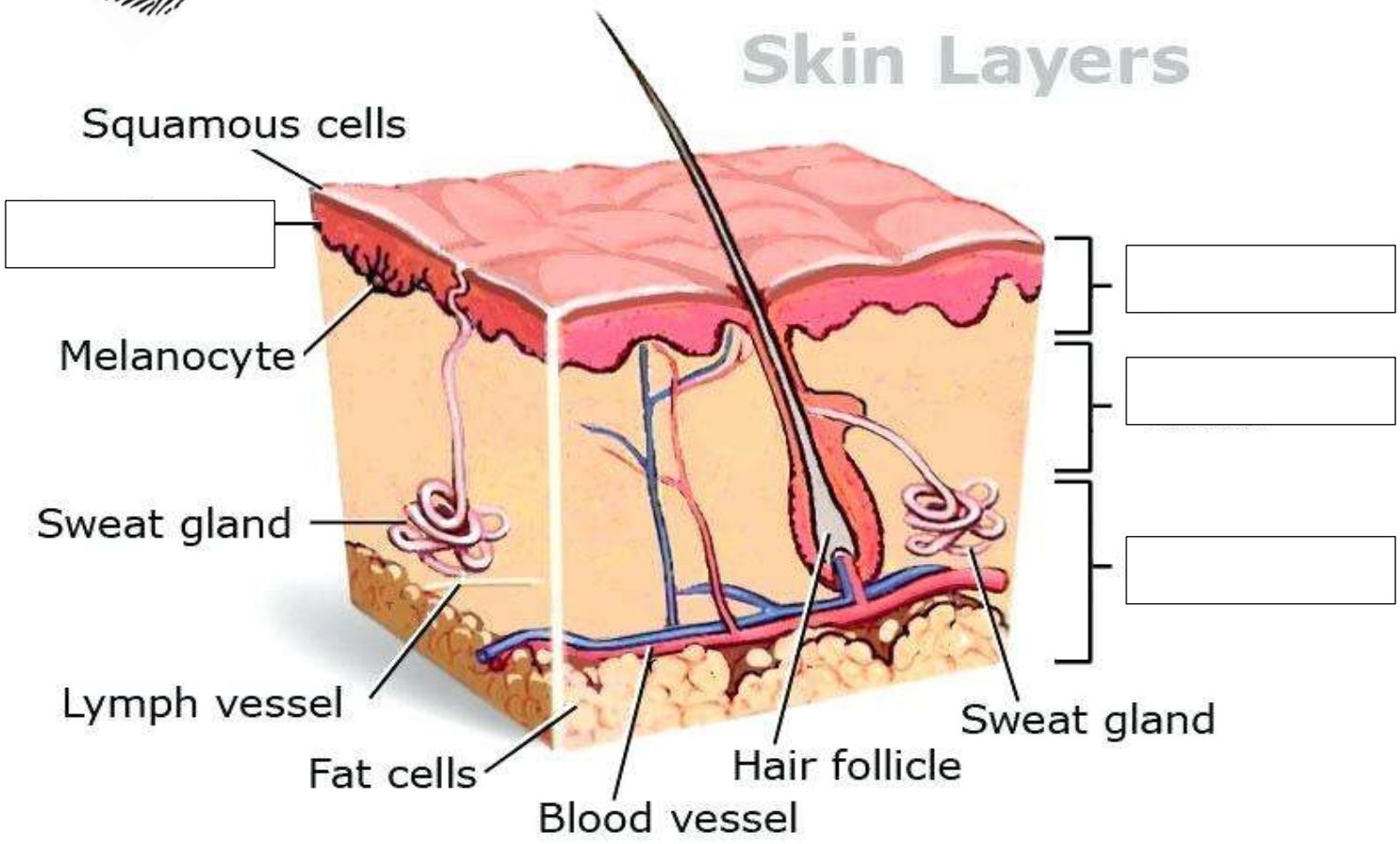
1800

Alphonse Bertillon was able to identify a repeat offender using the first fingerprint database.

1900

Sir Edward Henry created the ten card which hat divided all ten fingerprints into groups with notations about characteristics.

2000



Structure of Skin

Epidermis

- Outer layer of _____, _____ (flattened) cells provides a protective waterproof layer
- Inner layer of epithelial cells are still living

Dermis

- Separated from Epidermis by the _____ _____

- Includes blood vessels, oil and sweat glands, hair follicles, fat tissue, and nerves

Subcutaneous

- Fat and connective tissue that supports the outer layers of skin

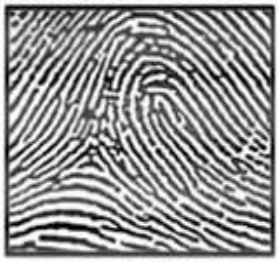
What are Fingerprints?

- All fingers, toes, feet, and palms are covered in ridges which help us grip objects
- Ridges are arranged in connected units called *dermal*, or *friction*, *ridges*
- Fingers accumulate natural secretions and dirt which get left behind on objects we touch as fingerprints

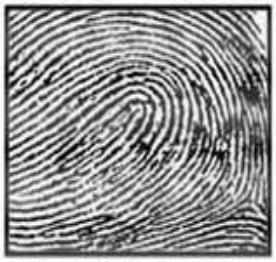
How Fingerprints are Classified

Loops

- Ridges enter on one side and exit on the same side
- About 65% of Population



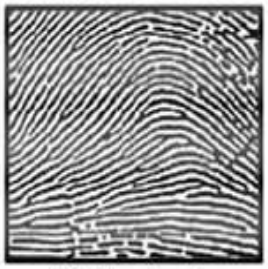
L - Radial Loop
R - Ulnar Loop



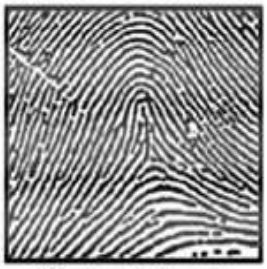
L - Ulnar Loop
R - Radial Loop

Arches

- Ridges enter on one side and exit on the other side
- About 5% of Population



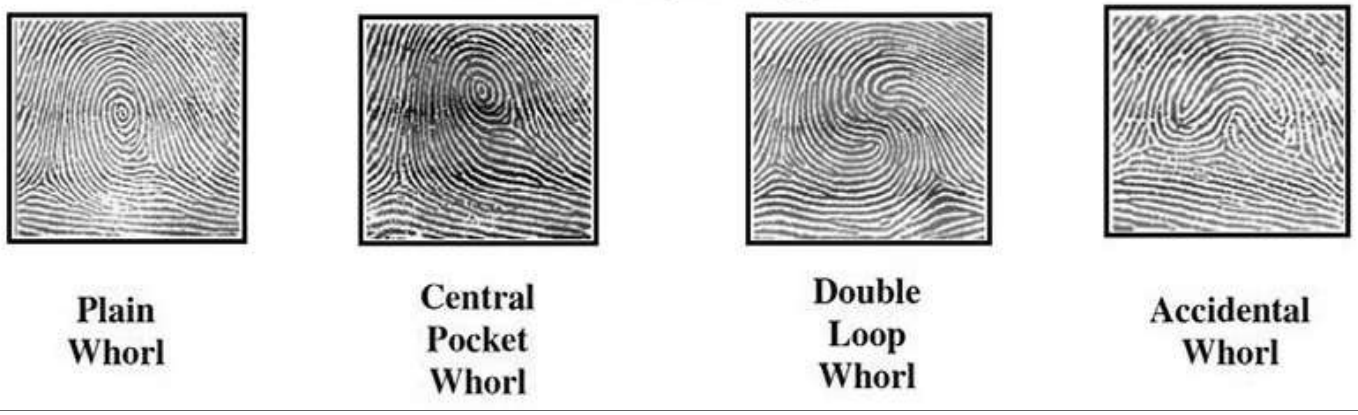
Plain Arch



Tented Arch

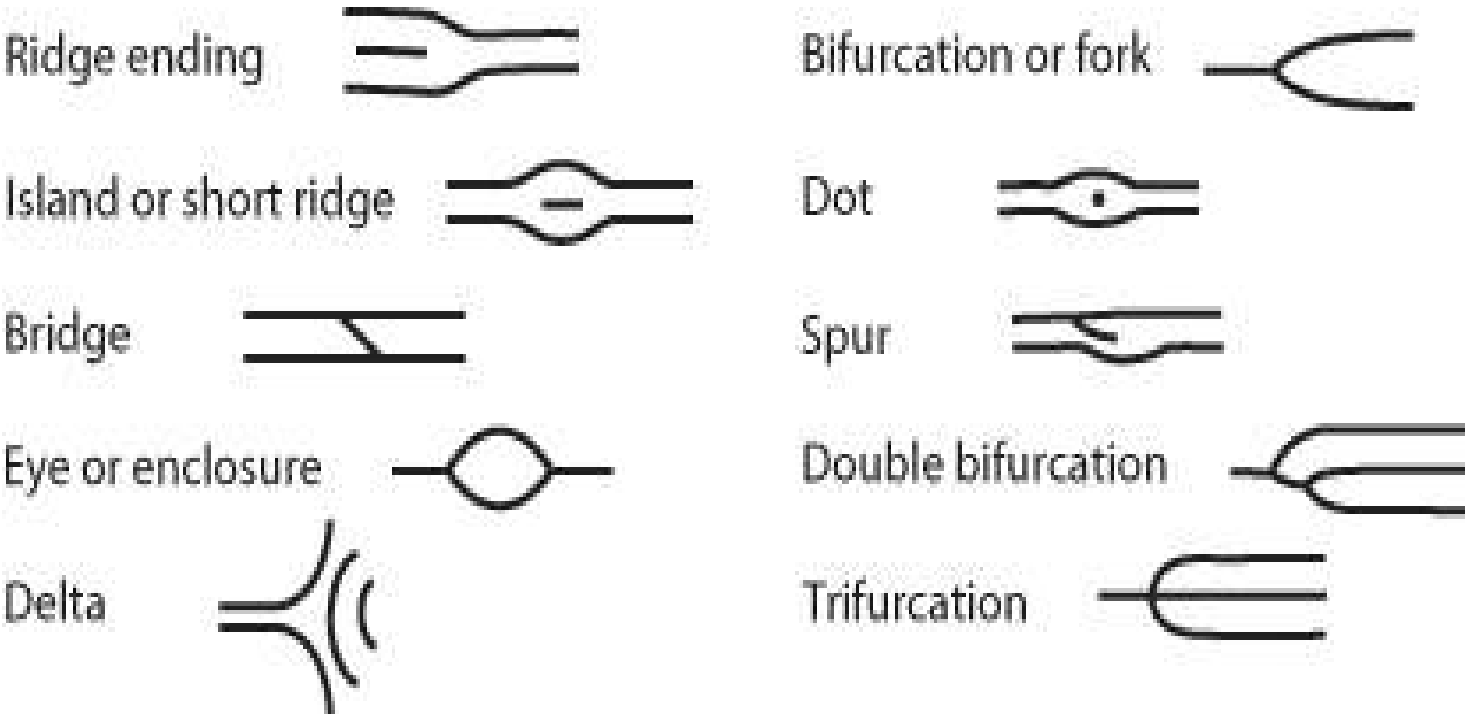
Whorls

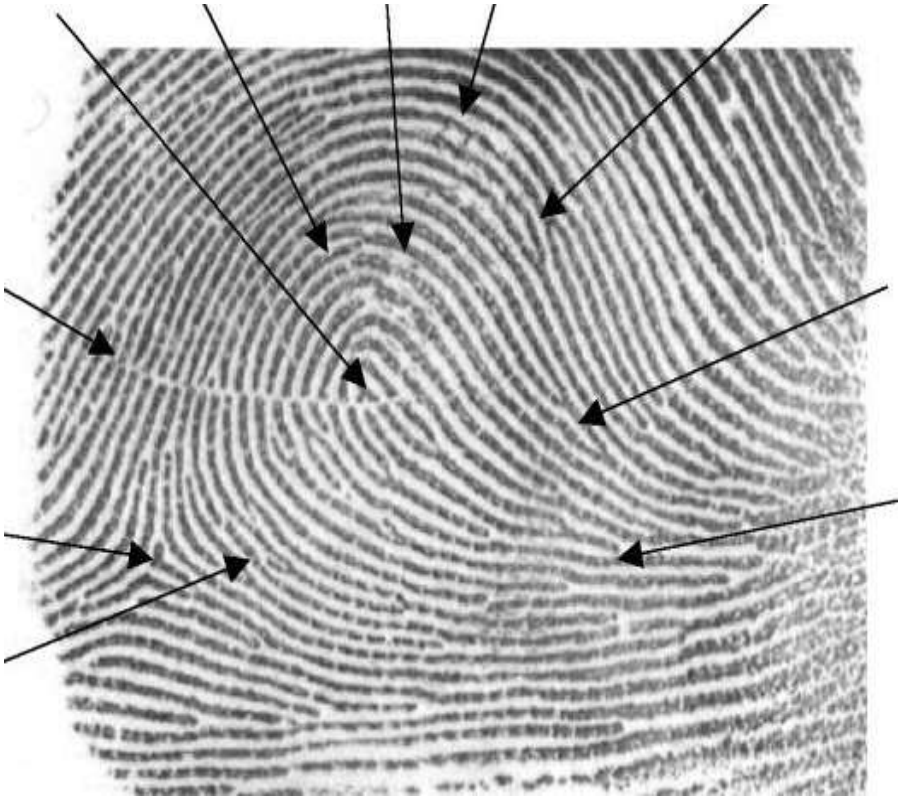
- Consists of circles, more than one loop, or a mixture of pattern types
- About 30% of Population



Characteristics of Fingerprints

Minutiae are Small ridge patterns used for more accurate suspect identification.





CSI:
CRIME SCENE INVESTIGATION

Television vs Reality

Can fingerprints be erased?
No, if, for example, they are removed with chemicals, they will grow back.

Is fingerprint identification reliable?
Yes, but analysts can make mistakes.

Is fingerprint matching carried out by computers in a matter of seconds?
No, but the FBI's Integrated Automated Fingerprint Identification System (IAFIS or AFIS) can provide a match in 2 hours for the prints in its Master File

Looking for Fingerprints

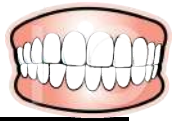
1. _____ **fingerprints** are visible prints transferred onto smooth surfaces by blood or other liquids.
2. _____ **fingerprints** are indentations left in soft materials such as clay or wax.
3. _____ **fingerprints** are not visible but made so by dusting with powders or the use of chemicals.

Preserving Fingerprints

Photograph fingerprint and surrounding area before anything else
If object is small, take it to the lab for analysis
If object is large, lift print using tape and place on card

Chemical	Uses	Directions	Appearance
	Paper	*Dip or spray, wait 24 hrs*	*purple-blue print*
	Plastic, Metal, Glass, Skin	*Heat sample in a vapor tent*	*White print*
	Paper, cardboard, unpainted surfaces	*Heat iodine crystals in a vapor tent*	*Brownish print (fades quickly) Must be photographed or sprayed with starch solution*

Other Prints



Questioned Documents Vocabulary

Complete the worksheet BEFORE we do we do notes in class

Help! The vocabulary has been shredded. You must piece the words together with the terms to learn the vocabulary for this chapter.

Questioned Documents

Learning Objectives:

- ❑ I can analyze handwriting to determine a match
- ❑ I can describe crimes relating to forgery and fraudulence
- ❑ I can detect counterfeit bills
- ❑ I can examine samples of ink to match a sample to a source

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Document Experts

Matches handwriting samples between a _____ _____ and _____ _____, determine forgeries and fraudulence, and detect counterfeiting.

Graphologist

Studies the _____ of a writer based on handwriting samples

_____ _____ _____ part of forensic science.

Biometric Signature Pad

"Learns" to recognize how a person signs

Evaluates _____, _____, and _____ of the signature

Recognizes forgeries by the detection of even slight differences.

Computerized Analysis

Compares handwriting samples _____.

Compared with samples stored in _____.

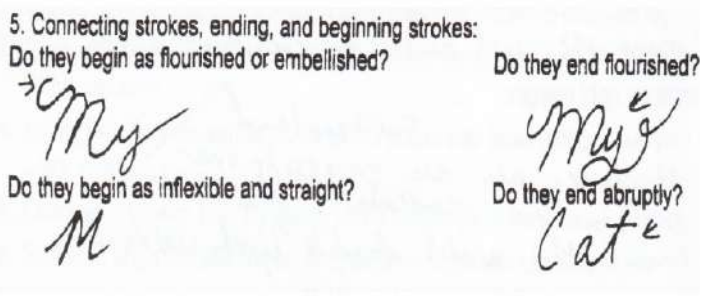
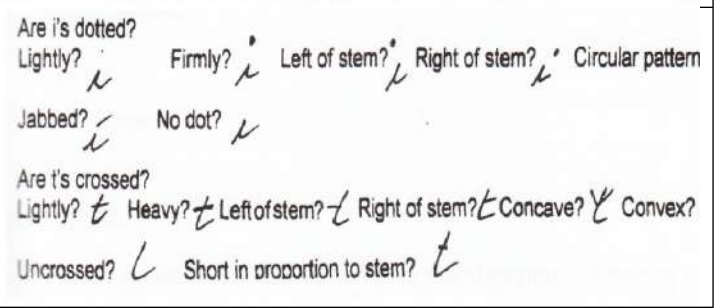
12 Characteristics of Handwriting

Circle the places where each characteristic is most evident

1. Line Quality Do the letters flow or are they erratic and shaky?	forensic science forensic science
2. Spacing Are the letters equally spaced or crowded?	The right of the people to be The right of the people to be secure in their The right of the people to be secure in their
3. Size Consistency Is the ratio of height to width is consistent or inconsistent?	The Right of the People The Right of the People The Right of the People
4. Continuous Is the writing continuous or does the writer lift their pen?	forensic science forensic science
5. Connecting Letters Are capital and lower case letters connected or not?	The Right of the The Right of the
6. Lettering Complete Does the letter begin and end on the page or are there any missing parts?	the right of the people the right of the people
7. Cursive and Printed Letters Are letters in cursive, printed or both?	Forensic Science Forensic Science Forensic Science

12 Characteristics of Handwriting

Circle the places where each characteristic is most evident

8. Pen Pressure Is equal pressure applied to upward and downward strokes?	forensic science forensic science forensic science
9. Slant If there is a slant does it slant left or right? Is it consistent?	forensic science forensic science forensic science
10. Line Habits Is text on, below, or above the line?	Straight on line: Jack and Jill went up the hill. Words leave baseline below it: Jack and Jill went up the hill. Words slant up from baseline: Jack and Jill went up the hill.
11. Fancy Curls or Loops Are there fancy curls?	
12. Crossing "t"s and dotting "i"s Are they correct or misplaced	

Forgery

_____ _____ include:

Checks, employment records, legal agreements, licenses, wills

_____ — forgery for material gain

Preventing Check Forgery

Print checks on _____ _____ _____

Large font size requires more ink and makes alterations more difficult

Use high resolution borders that are difficult to copy

Multiple color patterns

Embed _____ that _____ under different light

Use chemical wash detection systems that change color when a check is altered.

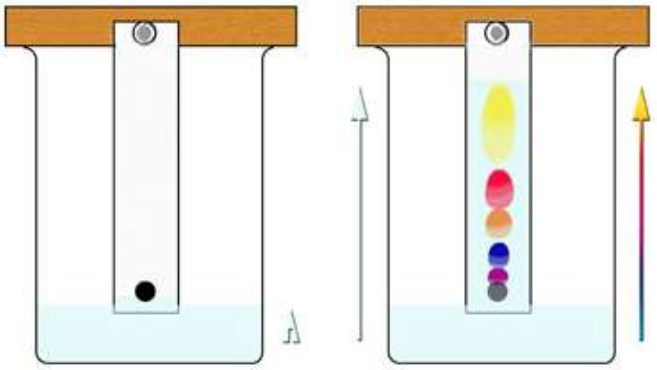
Literary and Art Forgery

The best literature and art forgers try to _____ the _____ document or piece of art including the _____ and _____ used in the original.

This may mean obtaining old paper, chemically treating it to make it appear older, mixing inks and dyes and copying tools or styles used at the time

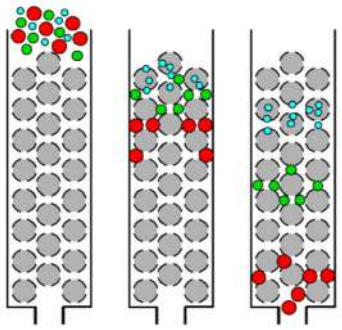
Counterfeiting Currency

Analyzing Dyes



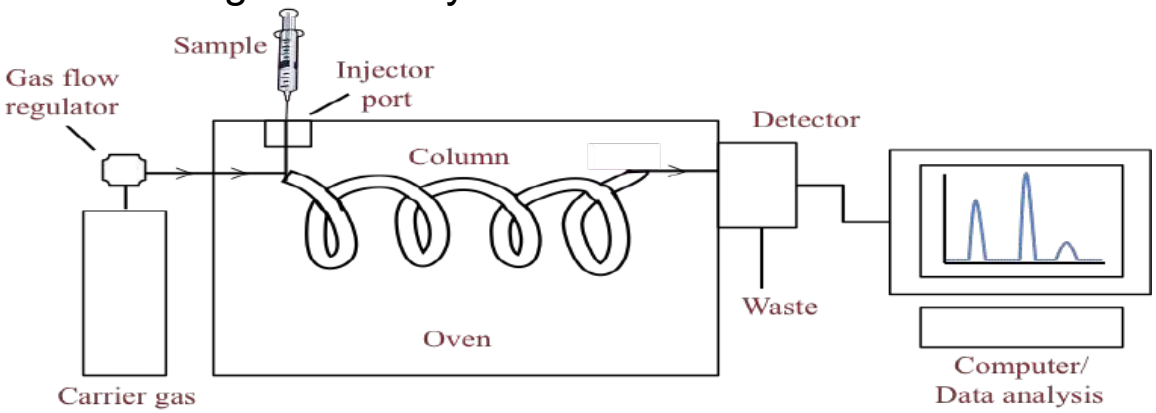
_____ Chromatography places a mixture on a solid phase, paper, which is then carried by a solvent as a mobile phase, usually water or alcohol. This separates components based on _____.

_____ _____ Chromatography allows a mixture to travel through beads with tiny holes in them. _____ molecules travel _____ through the beads. _____ molecules get _____ and don't travel as quickly.



_____ Chromatography stationary liquid phase is injected into a heated chamber where it turns into a mobile gas phase when it reaches its _____ _____ separating compounds based on _____.

_____ _____ blasts molecules with electrons breaking them into positive ions called cations. _____ are then _____ _____ _____ _____ and data is collected determining the identity of chemicals.



Counterfeiting – the production of an imitation of currency, works of art, documents, and name brand look alikes for the purpose of deception

Document analysis – the examination of questioned documents with known material for a variety of analysis, such as authenticity, alterations, erasures, and obliterations

Document Expert – a person who scientifically analyzes hand writing

Exemplar – a standard document of known origin and authorship used in handwriting analysis

Forgery – the making, adapting, or falsifying of documents or other objects with the intention of deceiving someone.

Fraudulence – When a financial gain accompanies a forgery

Questioned Document – any signature, handwriting, type writing, or other written mark whose source or authenticity is in dispute or uncertain