The Constitution:  
The Fourth Amendment  
“The right of the people to be secure in their persons, houses, papers, and effects against unreasonable searches and seizures, shall not be violated, and no warrants shall issue, but upon probable cause, supported by oath or affirmation, and particularly describing the place to be searched, and their person or things to be seized.”

Chapter 10  
Handwriting Analysis, Forgery, and Counterfeiting  
By the end of this chapter you will be able to:

- describe 12 types of handwriting characteristics that can be analyzed in a document  
- demonstrate an example of each of the 3 types of handwriting traits  
- identify the major goal of a forensic handwriting analysis  
- distinguish between the terms "forgery" and "fraudulence"  
- identify several ways that businesses prevent check forgery  
- describe 4 features of paper currency that are used to detect counterfeit bills

Introduction  
- Document analysis - examination of questioned documents with known material for authenticity, changes, erasures, and obliterations.  
- Questioned document – a signature, handwriting, typewriting, or other written mark whose source or authenticity is in dispute or uncertain.  
- Examples: check certificates, wills, passports, lottery tickets, licenses, money, letters, contracts, receipts.  
- Also investigate the type of paper and ink.  
- Study threatening, ransom, or suicide notes.  
- Their work can help identify a document’s author.

History of Forensic Handwriting Analysis  
- In the 1930s, handwriting analysis played a role in the famous Lindbergh case.  
- In 1999, the United States Court of Appeals determined that handwriting analysis qualified as a form of expert testimony.  
- To be admissible in court, however, scientifically accepted guidelines must be followed.  
- Handwriting analysis has been used by Scotland Yard, the FBI, and the Secret Service.

Introduction  
- Document expert – person who scientifically analyzes handwriting and other features.  
- Compare traits such as appearance of letters, detect changes from the original, or identify the author.  
- Exemplar – standard document of known origin and authorship used in handwriting analysis.  
- Graphologist – studies the personality of the writer based on handwriting samples  
- Not always accepted by forensic scientists

Introduction to Handwriting  
- Natural variations include type of writing instrument, mood, age, how hurried we are.  
- Handwriting is unique to each person despite the variations  
- As children we learn to write through basically the same method.  
- Once we write subconsciously, unique handwriting is formed.
3 Main Characteristics of Handwriting

- **Letter form** – shape, curve, angle, and proportional size of letters, connecting lines between letters, and correct form (dotted \(i\))
- **Line form** – smoothness of letters, darkness of lines in upstroke and downstroke. Influence by speed of writing, pressure, and writing instrument.
- **Formatting** – spacing between letters, words, lines, placement of words on a line, margins.
- These are further divided into 12 categories.

Introduction to Handwriting

Everyone’s handwriting shows natural variations. Here are 6 of the 12 major, specific traits.

<table>
<thead>
<tr>
<th>Specific Trait</th>
<th>Line quality</th>
<th>Spacing</th>
<th>Rise consistency</th>
<th>Continuous letters</th>
<th>Connecting letters</th>
<th>Lettering complete</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The letters line or are erratic and slanted.</td>
<td>The letters are equally spaced or crowded.</td>
<td>The rise of heights is consistent or inconsistent.</td>
<td>The writing is continuous or the writer lifts the pen.</td>
<td>Captials and lowercase letters are connected and continuous or are not connected and continued.</td>
<td>The letter begins and ends on this page or part of the letter is missing.</td>
</tr>
</tbody>
</table>

Introduction to Handwriting

The traits are functions of formatting or of letter or line form. Here are the other 6 of the 12 major, specific traits.

<table>
<thead>
<tr>
<th>Specific Trait</th>
<th>Cursive and printed letters</th>
<th>Non pressure</th>
<th>Blunt</th>
<th>Line habits</th>
<th>Fancy curls or loops</th>
<th>Placement of crosses on P’s and dots on I’s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Letters are narrow, printed, or both.</td>
<td>Pressure is equal or not when applied to upward and downward strokes.</td>
<td>If there is a slant, it is left, right, or vertical.</td>
<td>Text is above or below the line.</td>
<td>There are or are not fancy curls.</td>
<td>These are correct or misplaced.</td>
</tr>
</tbody>
</table>

Handwriting Examination

Two writings are the product of one person if their similarities are unique and no unexplainable differences are found.

1. Examine the questionable document for detectable traits and record them.
2. Obtain some writing of the suspect’s (an exemplar) and compare the traits found in the questionable document with it.
3. Draw conclusions about the authorship of the questionable document based on the comparison.

Analyzing a handwriting sample

- If possible, exemplar should be obtained without informing the person of the intention of comparison.
- Suspect should not be shown the questioned document.
- Suspect should not be given instructions about punctuation or spelling.
- Pen and paper should be similar to that of the questioned document.

Technology in Analysis

- Initial examination made with eye, hand lens, or microscope.
- Specialized equipment can reveal minor details about how a document was changed.
  - Infrared can determine if two different inks were used on same document.
Technology Used in Handwriting Analysis

Biometric Signature Pads
- This computerized pad “learns” to recognize how a person signs his or her name based on the speed, pressure, and rhythm of the signing.
- Forgeries then are recognized by the detection of even slight differences.

Computerized Analysis of Handwriting
- Computers can make objective comparisons between handwritings.
- Suspect signatures can be compared with ones stored in databases.

F.I.S.H.
- Forensic Information System for Handwriting
- Used and maintained by Secret Service
- Documents scanned into computer and kept in database
- This system has verified that no two writers pen their words exactly the same nor do they have the same combination of handwriting characteristics.

Handwriting Evidence in the Courtroom
- The expert shows how comparisons were made.
- The defense attorney likely will cross-examine the handwriting expert.

Shortcomings in Analysis
- Quality of the exemplar determines the quality of comparison.
- Good exemplars may be difficult to obtain.
- Factors can affect handwriting, i.e. fatigue.

Technology Assignment
- Find information about four handwriting analysis technologies, other than those we have already mentioned.
- The technologies can help identify handwriting characteristics, analyze ink or paper, identify changes, etc.
- Write a few sentences for each technology.

Forgery
- Forged documents can include such things as checks, employment records, legal agreements, licenses, and wills.
- Fraudulence is forgery done for material gain.
- Check forgery can include:
  - ordering another’s checks from a deposit slip.
  - altering a check.
  - intercepting another’s check, altering, and cashing it.
  - creating a check from scratch.

Preventing Check Forgery
These are some methods used to prevent check forgery:
- Print checks on chemically sensitive paper.
- Use a large font size that requires more ink and makes alterations more difficult.
- Use high resolution borders on the checks that are difficult to copy.
- Print checks in multiple color patterns.
- Embed fibers in checks that glow under different types of lights.
- Use chemical wash detection systems that change color when a check is altered.
Literary Forgery

- Letters or other documents written by famous people can be very valuable.
- The literary forgers aim to duplicate the original document by using:
  - old paper
  - chemically treated materials to fake an older look will not pass microscopic examination
  - inks mixed from substances that would have been used at the time
  - watermarks to add the appearance of age
  - tools and styles that would have been popular at the time

William Henry Ireland - Research

- Identify documents that Ireland forged.
- Cite some evidence discovered by experts that showed the documents were imitations.
- Discuss how Ireland obtained the antique paper and ink.
- Find out how Ireland evaluated the credibility of the paper and writings he produced.

Counterfeiting

- Counterfeiting – production of an imitation of currency, works of art, documents, and name-brand look-alikes, for the purpose of deception.
- Counterfeiting money is a crime stretching back into ancient times. Items most often forged today include:
  - currency
  - traveler's checks
  - food stamps
  - certain bonds
  - postage stamps

Counterfeit Currency

- Federal felony punishable by up to 15 years in prison
- U.S. Secret Service is in charge of investigating counterfeiting
- They have worked with electronics and software makers to add security features to paper currency that makes forgery extremely difficult.
- Scanning cannot reproduce these security features.
- The first security feature is the feel of the paper. Regular printer paper contains starch. Paper bills contain rag fiber instead of starch.

Verifying Authentic Currency

- Portrait stands out and appears raised off the paper.
- Contains clear red and blue fibers woven throughout the bill.
- Has clear, distinct border edge.
- Treasury seal is shown with clear, sharp saw-tooth points.
- Watermark appears on the right side of the bill in the light.
- The security thread is evident—a thin embedded vertical strip with the denomination of the bill printed in it.
- There is minute printing on the security threads, as well as around the portrait.
- When the bill is tilted, the number in the lower right-hand corner makes a color shift from copper to green.

Detecting Counterfeit Currency

- Counterfeit detecting pens contain iodine, mark will turn bluish-black on counterfeit bills because of a reaction with starch
- Makers claim pen is 98% effective, however the government uses additional criteria
  - Counterfeiters could bleach a $1 bill and turn it into a $100 bill which would pass the pen test.
- Global movement to change to polymer money (plastic) which would be cheaper to make and more difficult to counterfeit.