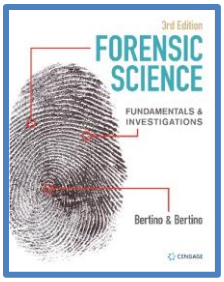
Forensic Science Fundamentals and Investigations 3rd edition Bertino Solutions Manual

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Chapter 1: Observational Skills

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Student Learning Objectives

At the conclusion of this chapter, the student should be able to:

INTRODUCTION: WHAT IS FORENSIC SCIENCE?

_____ 1. Describe the purpose of forensic science.

_____ 2. Explain the role and responsibilities of a forensic scientist. What decisions are involved in processing a crime scene in regards to:
   a. identification of evidence.
   b. collection of evidence.
   c. documentation of evidence.

WHAT DO FORENSIC SCIENTISTS DO?

_____ 3. Explain the importance of a crime-scene investigator possessing the abilities to observe, interpret, and report observations clearly.

_____ 4. Distinguish between qualitative and quantitative data. Provide examples of each type of data.

_____ 5. Explain how the *Claim Evidence Reasoning Model* provides a series of logical steps that can be applied when analyzing scientific evidence.

_____ 6. Discuss the type of analytical or critical thinking skills that are used by a forensic scientist when analyzing a crime scene.

OBSERVATION AND PERCEPTION

_____ 7. Define the term *observation*.

_____ 8. Discuss factors that influence your ability to observe and to report accurately what you have seen.

_____ 9. Distinguish between observation and perception.

_____ 10. Discuss the changes that occur within our brain as we make observations. Include in your answer:
   a. information from your senses.
   b. what information your brain perceives.
   c. short-term memory.
   d. long-term memory.

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EYEWITNESS OBSERVATION

_____ 11. Compare the ability of someone to accurately recall events when their emotions are heightened through fear, anxiety or joy as compared to when they are feeling less emotional.

_____ 12. Discuss the many factors that may account for different eyewitness accounts of the same events from other eyewitnesses and from other victims. Include in your answer:

a. whether you were alone or with several people.
b. who was in the vicinity of the crime scene?
c. the type and level of activity in the area.
d. visual and hearing capabilities of the eyewitness.
e. state of health.
f. level of fatigue.
g. emotional involvement.
h. individual perception differences.
i. amount of time something was observed.
j. personal bias.
k. amount of distraction.
l. level of interest.

_____ 13. Distinguish between fact and opinion as they relate to eyewitness testimony.

_____ 14. Explain the importance of each eyewitnesses separately providing a description of the events at a crime scene as soon as possible. Relate this to how the brain tends to "fill in gaps in our memory" as memory fades with time.

_____ 15. Explain the purpose of *The Innocence Project* created by Barry C. Scheck and Peter J. Neufeld.

_____ 16. Discuss the main reason given by The Innocence Project for wrongful convictions.

IMPROVING OBSERVATION SKILLS

_____ 17. Discuss four different ways to improve your observational skills.

_____ 18. In your opinion, do you think crime-scene investigators should be trained in how to make accurate and complete observations of a crime scene?

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INTERVIEW TECHNIQUES

_____ 19. Elaborate on why law-enforcement officers conduct an interview employing these methods:
   a. separation of witnesses.
   b. interview one person at a time.
   c. record eye witness observations as soon as possible.
   d. ask questions of the eye witness throughout the interview session.

_____ 20. Describe methods used by a good interviewer to determine if a person is lying or telling the truth.

ACTIVITIES

_____ 21. Develop your observational skills and your ability to assess the validity of eyewitness accounts of a crime.

_____ 22. Design an experiment that demonstrates how different factors influence our observational abilities.

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Chapter 1: Forensic Science and Observation

Preparation:

These lesson plans are designed to help guide you in preparing your lessons for your forensic science course, including classroom and lab time. A correlating PowerPoint presentation is also available to help engage students in the classroom. In addition to these Lesson Plans, we encourage you to refer to the Wraparound Teacher's Edition which contains additional information intended to assist you in teaching the topics introduced in this chapter. It includes background information, ways to engage students and enrich the learning experience, and explains how to differentiate learning for a heterogenous class. Review this additional information, found in the margins of the Wraparound Teacher Edition, when preparing to present your lesson.

Learning Objectives:

Covered in Lecture

1.1 Describe the purpose of forensic science.
1.2 Explain the role and responsibilities of a forensic scientist.
1.3 Distinguish between observation and perception.
1.4 Distinguish between fact and opinion as they relate to eyewitness testimony.
1.5 Describe ways to improve observation skills.
1.6 Describe effective techniques that result in an accurate eyewitness interview.

Covered in Activities

1.7 Develop your observational skills and ability to assess the validity of eyewitness accounts of a crime. (Activities 1-1, 1-2, and 1-3)
1.8 Design an experiment that demonstrates how different factors influence our observational abilities. (Activity 1-3)

Key Terms Introduced:

- **analytical skill** the ability to identify a concept or problem, isolate its component parts, organize information for decision making, establish criteria for evaluation, and draw appropriate conclusions
- **deductive reasoning** deriving a conclusion from the facts using a series of logical steps
- **eyewitness** a person who has seen someone or something related to a crime and can communicate their observations
- **fact** a statement or information that can be verified
- **forensic science** using science to help resolve legal matters
- **hypothesis** a possible explanation of a question or problem based on prior knowledge or observation

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- **logical** based on clear reasoning of the facts
- **observation** what a person perceives using their senses
- **opinion** personal belief founded on judgment rather than on direct experience or knowledge
- **perception** the brain's interpretation of a situation based on opinions, judgment, and personal experiences

References: Refer to chapter bibliography and Internet resources

Suggested Readings for Students:

Forensic Science: Fundamentals and Investigations. 3rd ed., Bertino & Bertino
Ekman, Paul. *Emotions Revealed*, 2nd ed. NY
Henry Holt and Company; Huston, Philip; Floyd, Michael; and Carnicero, Susan
Spy the Lie: Three Former CIA Officers Reveal Their Secrets to Uncloaking Deception. New York: St. Martin's Press, 2012

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I. Introduction

A. "Forensic" derives from the Latin word *forensis*, which means "of the forum."
B. The ancient Roman forum was an open area where scholars would gather to debate issues; crimes were solved by forum debates.
C. However, debating is not forensic science.
D. It is about the skill of observation to uncover evidence and discover the facts of a crime.

Reference: *Forensic Science*, p. 3
Slide: 1-2

II. What Is Forensic Science?

Learning Objective 1-1: Describe the purpose of forensic science.

A. Forensic science
   1. Using science to help resolve legal matters, such as crimes
B. Forensic investigator
   1. Collects and examines physical evidence
   2. Reports to law enforcement
   3. Possibly testifies in court
C. Tools of the forensic investigator
   1. Ability to observe, interpret, and report findings clearly
   2. Ability to identify the evidence, document it, and determine its significance

Reference: *Forensic Science*, p. 4
Slides: 1-3 and 1-4

III. What Do Forensic Scientists Do?

Learning Objective 1-2: Explain the role and responsibilities of a forensic scientist.

A. Observation and application of scientific knowledge
   1. Find evidence
      a. Decide what needs to be collected, documented, packaged, examined, and tested
   2. Collect data
      a. *Qualitative* data is subjective, descriptive data
         i. Color
         ii. Shape
      b. *Quantitative* data is objective

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i. Weight
ii. Height
iii. Mass

3. Analyze data
   a. Identify a concept or problem
   b. Isolate its component parts
   c. Organize information for decision making
   d. Establish criteria for evaluation
   e. Draw appropriate conclusions

B. Communication
   1. Convince a jury that the evidence analysis is scientific, reliable, valid, and sufficient

C. Deductive reasoning
   1. Scientific method
      a. State the problem or question
      b. Propose a hypothesis based on prior knowledge or observation
      c. Conduct an experiment
      d. Collect data
      e. Analyze data
      f. Draw a conclusion based on the data
   2. Claim Evidence Reasoning Model
      a. Make observations
      b. Determine what question you want to answer
      c. Make a claim and an assertion based on evidence or observations
      d. Provide evidence, scientific data that supports the claim
      e. Provide reasoning or justification that links the claim with the evidence

Reference: *Forensic Science*, pp. 4-5
Activities: Activity 1-1 and Capstone Project 7
Slides: 1-5 through 1-8

IV. Observation and Perception

Learning Objective 1-3: Distinguish between observation and perception.

A. Observation
   1. Gathering information through senses
      a. Sight
      b. Taste
      c. Hearing
      d. Smell
      e. Touch
   2. Done largely without thinking

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a. Our brains select what information to take in
b. We unconsciously apply a filter to pay attention to things most likely to be important

3. Paying attention to details
   a. Requires a conscious effort

B. Perception
1. Interpreting sensory observations
   a. Not always accurate
   b. Does not always reflect reality
      i. Our brains apply knowledge we already have
      ii. A creamy pink dessert is perceived to be strawberry flavored even though it is vanilla flavored
2. Understanding limitations
   a. Helps improve observation skills

Reference: *Forensic Science,* pp. 6-7
Slides: 1-9 and 1-10

V. Eyewitness Observation

Learning Objective 1-4: Distinguish between fact and opinion as they relate to eyewitness testimony.

A. Observations made by witnesses
1. Perceptions of witnesses can be faulty
2. Emotional states influence the ability to see and hear what is happening
   a. Anxiety plays a big part in what we see and remember
   b. Fear interferes with accurate memory
3. Eyewitness accounts of crimes can be valuable evidence
   a. Bystanders unaware that a crime is unfolding are not subject to the anxiety *experienced* by victims
   b. Some victims are less subject to the disruptive effects of anxiety and memory
4. Factors affecting accuracy include:
   a. Whether you are alone or with a group of people
   b. The number and types of people and/or animals in the area
   c. The type and level of activity occurring around you
   d. Visual capabilities
   e. State of health
   f. Fatigue and stress level
   g. Emotional involvement
   h. Distractions from use of electronic devices
   i. Disguises that may be in use

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j. Ability to make quick decisions
k. Individual perception differences
l. Amount of time something was observed
m. Motivational or cognitive bias

B. Eyewitness accounts
   1. Accounts of crime-scene events vary considerably from person to person depending on various factors
      a. Level of interest
      b. Stress
      c. Concentration
      d. Amount and kind of distraction present
   2. Evaluating eyewitness testimony requires discrimination between fact and opinion
      a. Fact is a statement of information that can be verified
      b. Opinion is a personal belief founded on judgement
   3. After witness examination, the examiner sequences the events
      a. Determine the pattern of events
      b. Verify the evidence reinforced by the witness testimony

C. The Innocence Project
   1. Created with the purpose of reexamining postconviction cases
      a. Uses DNA evidence
      b. Provides conclusive proof of guilt or innocence
   2. Found that faulty eyewitness identification contributed to up to 70 percent of wrongful convictions

Reference: *Forensic Science*, pp. 7-9
Activities: Activity 1-2 and Activity 1-3
Slides: 1-11 and 1-12

VI. Improving Observation Skills

Learning Objective 1-5: Describe ways to improve observation skills.

A. Tips to improve observation skills
   1. We are not naturally inclined to pay attention to all details of our surroundings
      a. Make a conscious effort to examine our environment systematically
      b. Look systematically at every part of the evidence on a microscope slide
   2. We are naturally included to filter out information we assume is unimportant
      a. Consciously observe everything, no matter how small or familiar or our emotions or previous experiences

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   b. Train ourselves to turn off our filters and instead act more like data-gathering robots
3. We are naturally inclined to interpret what we see
   a. Looking for patterns and making connections can lead to jumping to conclusions
   b. Need to concentrate first on gathering all available information
   c. Leave interpretation until we have as much information as possible
4. We know our memories are faulty
   a. Write down and photograph as much information as possible

Reference: *Forensic Science*, pp. 9-10
Slide: 1-13

VII. Interview Techniques

Learning Objective 1-6: Describe effective techniques that result in an accurate eyewitness interview.

A. Conducting interviews
   1. Law-enforcement officers conduct interviews of:
      a. Eyewitnesses
      b. Suspects
      c. Victims
      d. The accused
   2. Effective interviewers
      a. Provide minimal guidance
      b. Ask questions that may help the person reconstruct what occurred
      c. Avoid interjecting biases or gender specific terms
   3. Effective techniques
      a. Separate eyewitnesses as soon as possible to avoid witnesses influencing each other's' stories or sharing untruths
      b. Interview one person at a time so that no one else influences their memory of what occurred
      c. Write down their observations during the interview or as soon as possible afterward
      d. Ask questions to draw out details during the interview
B. Identifying a truth or a lie
   1. Interviewers determine if eyewitnesses are telling the truth or lying
      a. If a witness is telling the truth, the account of what happened is consistent each time it's told

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   b. If a witness is lying, it is more difficult to repeat the events exactly the same
2. Methods to identify if something is a truth or a lie include:
   a. Ask the interviewee to repeat their story several times
   b. Ask the interviewee to recount the story in reverse order of events
   c. Ask the interviewee questions on or off the topic to distract the individual
3. The goal is to record someone's memory of an event before their memory may be affected

Reference: *Forensic Science*, pp. 10-11
Slides: 1-14 and 1-15

VIII. Summary

- Forensic science is the application of science to help resolve legal matters.
- Forensic scientists find, examine, photograph, document, and evaluate evidence and provide expert testimony to courts.
- Observations at crime scenes are based on sensory input and are affected by factors that affect our ability to focus.
- Perceptions are our brain's interpretation of our observations.
- Facts are based on evidence, but opinions are based on what you perceive might have happened.
- Observational skills can be improved by limiting distractions and increasing your awareness of your surroundings.
- Effective interview techniques help the observer recall events in an unbiased way to provide the best eyewitness account.

Reference: *Forensic Science*, p. 11
Slides: 1-16 and 1-17

IX. Assignment – Review Chapter 2 and reference accompanying teacher notes in the Wraparound Teacher's Edition of *Forensic Science, 3e*.

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