



AMERICAN BOARD OF CRIMINALISTICS

"Professional Competency Certification in Criminalistics"

FOUNDATIONAL KNOWLEDGE EXAMINATION

Candidate Study Guide

American Board of Criminalistics

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Introduction

Congratulations on your decision to pursue certification!

This examination was created through the Developing a Curriculum (DACUM) process. Using a panel of Subject Matter Experts (SME), comprised of practitioners from a variety of types of laboratories (e.g., city/county, state, federal, etc.) across the country, a job analysis was completed to define the profession of Forensic Scientist. As a result of this job analysis, the Forensic Scientist Job Description (08-1003S) was created and lists the duties and associated tasks for that position. The tasks and duties in the Job Description may include ones that are not performed specifically by your Forensic Science Service Provider but are part of the larger role of a Forensic Scientist.

The tasks listed in the job description were aligned to Knowledge-Skill (K-S) categories, and these categories were grouped into larger Domains (e.g., Science and Math, Quality Assurance/Quality Control, etc.) to create an Examination Blueprint. This blueprint was subsequently used to determine the number of questions in each of the larger domains.

The examination is structured around the knowledge and skills needed to perform tasks and duties of the job. The study guide was developed using the Job Description and the Examination Blueprint. All K-S categories are represented in the examination. Refer to the Examination Blueprint for a detailed breakdown of the Knowledge/Skills and Tasks used to create this examination.

References listed in this Study Guide were used to write examination questions; however, not all questions were written using these references.

For more information on the development of this examination, please refer to additional examination development documents on the ABC website.

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Examination Outline

Domain	Knowledge-Skill	% of Exam
Process		21%
	Organizational	
	Critical thinking (e.g., analytical, problem solving, troubleshooting, investigative, attention to detail)	
	Scientific method	
Laboratory		18%
	Basic laboratory safety	
	Basic laboratory skills	
	Lab/scene equipment (e.g., instrumentation, photography)	
Science and Math		17%
	Statistics	
	Math	
	Science education/training	
Quality Assurance/Quality Control		15%
	Accreditation standards	
	Codes of ethics	
Communication (e.g., oral, written, presentation, listening, interpersonal)		13%
Computer		9%
	Computer and software programs	
	Forensic databases	
All Forensic Disciplines (e.g., contemporary, historical)		4%
Legal System (e.g., courtroom etiquette, law)		3%

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Process

The Process domain makes up 21% of the examination. The knowledge and skills needed to succeed in this domain are:

- Organization and Critical Thinking
 - At the crime scene
 - Proper procedures for processing a crime scene
 - Documentation methods
 - Types of evidence and methods of transfer
 - Evidence identification, collection, and packaging
 - In the laboratory
 - Class versus individual characteristics
 - Handling and storage of evidence
 - Analysis of evidence, including order of analysis for evidence with multiple disciplines requested
 - Adequate note taking
 - Interpretation of results
 - Report writing

Laboratory

The Laboratory domain makes up 18% of the examination. The knowledge and skills needed to succeed in this domain are:

- Basic concepts in laboratory safety
 - Communication of laboratory safety procedures
 - Proper Personal Protective Equipment (PPE) in the laboratory
- Basic laboratory skills
 - Proper use of laboratory glassware, pipettes, and other measuring devices
- Common laboratory equipment
 - Purpose and basic application of the equipment commonly used to process forensic evidence

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Science and Math

The Science and Math domain makes up 17% of the examination. The knowledge and skills needed to succeed in this domain are:

- Basic statistical definitions and concepts
- Basic scientific concepts in the field of chemistry
 - Scientific units
 - Scientific naming
 - Basic definitions of scientific concepts (e.g., SI units, electromagnetic spectrum)
- Basic scientific concepts in the field of biology
 - Genetics
 - Forensic serology
 - DNA
- Basic mathematical concepts and their application to the fields of biology and chemistry
 - Serial dilutions
 - Basic calculations and SI unit conversions

Quality Assurance/Quality Control

The Quality Assurance/Quality Control domain makes up 15% of the examination. The knowledge and skills needed to succeed in this domain are:

- Basic concepts regarding quality assurance and quality control in the Crime Laboratory
 - Validation and verification
 - Different types of controls, performance checks
 - Training programs
 - Note taking
 - Writing and reviewing reports
 - Proficiency testing
 - Expert testimony
- ISO Accreditation
 - ISO/IEC 17025 standards and other accreditation requirements
 - Accreditation process
- Ethics
 - Ethical behavior to scenarios in the field of forensic science
 - ABC Rules of Professional Conduct

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Communication

The Communication domain makes up 13% of the examination. The knowledge and skills needed to succeed in this domain are:

- Ways to effectively communicate in forensic science
 - Different types of crime scene documentation
 - Adequate note taking
 - Writing and reviewing reports
 - Courtroom testimony
 - Communication between the laboratory and the customer

Computer

The Computer domain makes up 9% of the examination. The knowledge and skills needed to succeed in this domain are:

- Familiarity with Laboratory Information Management Systems (LIMS) as they pertain to the following areas:
 - Maintaining chain of custody
 - Inventory and documentation of evidence
 - Security
- Use of computer programs in forensic science
 - Crime scene processing
 - Analysis of evidence
 - Court testimony
- Basic concepts relating to the forensic analysis of computers
- Forensic Databases
 - Different forensic databases available and the information obtained from these databases

All Forensic Disciplines (e.g., contemporary, historical)

The All Forensic Disciplines domain makes up 4% of the examination. The knowledge and skills needed to succeed in this domain are:

- Basic knowledge of different types of forensic evidence
- Basic knowledge of common forensic analyses performed on different types of evidence

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Legal System (e.g., courtroom etiquette, law)

The Legal domain makes up 3% of the examination. The knowledge and skills needed to succeed in this domain are:

- Court cases important to the field of forensic evidence
- Basic understanding of the Federal Rules of Evidence
- Understanding the difference between *Daubert* and *Frye*
- Knowledge of proper expert testimony
- Basic understanding of different types of warrants and subpoenas

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References

General College Textbooks (or similar)	Edition	Author
<ul style="list-style-type: none">• Introduction to probability for engineers and scientists	4 th	Ross, S
<ul style="list-style-type: none">• Molecular nature of matter and change	2 nd	Silberberg, M., Duran, R., et al
Forensic Science Books	Edition	Author
<ul style="list-style-type: none">• Forensic chemistry	1 st or higher	Bell, S.
<ul style="list-style-type: none">• Techniques of crime scene investigation	4 th or higher	Fisher, B.
<ul style="list-style-type: none">• Fundamentals of forensic science	2 nd or higher	Houck, M. and Siegel, J.
<ul style="list-style-type: none">• Kirk's fire investigation	4 th or higher	Iscoe, D., Haynes, G., DeHaan, J
<ul style="list-style-type: none">• Criminalistics: An introduction to forensic science	4 th or higher	Saferstein, R.
<ul style="list-style-type: none">• Forensic Science Handbook, Volume I	2 nd	Saferstein, R.; Hall, A.
<ul style="list-style-type: none">• Forensic Science Handbook, Volume II	2 nd	Saferstein, R.
<ul style="list-style-type: none">• Forensic Science Handbook, Volume III	2 nd	Saferstein, R.
Guidance/Standards Documents	Edition	Author
<ul style="list-style-type: none">• Rules of Professional Conduct		ABC
<ul style="list-style-type: none">• ISO/IEC 17020: Conformity assessment: Requirements for the operation of various types of bodies performing inspection	2012	ISO/IEC
<ul style="list-style-type: none">• ISO/IEC 17025: General requirements for the competence of testing and calibration laboratories	2017	ISO/IEC
<ul style="list-style-type: none">• Biosafety in the laboratory: Prudent practices for the handling and disposal of hazardous material	1989	National Research Council Committee on Hazardous Biological Substances in the Laboratory
<ul style="list-style-type: none">• Relevant Accreditation Requirements NOTE: either of the below listed documents is sufficient; candidates do not need to review both		
<ul style="list-style-type: none"><ul style="list-style-type: none">○ AR 3125 ISO/IEC 17025:2017 Forensic Science Testing & Calibration Laboratories Accreditation Requirements	2019	ANAB
<ul style="list-style-type: none"><ul style="list-style-type: none">○ R221 – Specific Requirements – Forensic Examination Accreditation Program - Testing	2020	A2LA

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Example Questions

Below are 10 questions that represent the structure of questions on the examination. The primary Knowledge-Skill (K-S) Category and Associated Job Task(s) are also included. Refer to the Introduction for additional information regarding K-S and Job Tasks.

Knowledge-Skill: 5.1 – Organizational

Job Task: A5 – Conduct analysis

1. A scientist tests a sample of red fluid and determines it is blood. Which test will be performed next?
 - A. DNA profiling
 - B. species determination
 - C. A-B-O blood typing
 - D. Rh blood typing

Knowledge-Skill: 2.1 – Accreditation Standards

Job Task: A6 – Generate case file documentation

2. Per ISO/IEC 17025:2017, technical records shall be created or maintained in a(n) _____ manner.
 - A. temporary
 - B. permanent
 - C. organized
 - D. scientific

Knowledge-Skill: 6.3 – Lab/scene equipment (e.g., instrumentation, photography)

Job Task: A5 – Conduct analysis

3. During laboratory analysis, which of the following actions is most useful to protect the evidence from analyst contamination?
 - A. Separate evidence packages on different pieces of exam paper
 - B. Place evidence items on a clean exam paper
 - C. Wearing gloves during laboratory analysis
 - D. Change gloves every time the evidence is touched

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Knowledge-Skill: 6.3 – Lab/scene equipment (e.g., instrumentation, photography)

Job Task: A7 – Interpret analytical data

4. In the interpretation of indistinguishable automotive paint samples, which scenario has the greatest degree of evidential significance?

- A. A physical match of two white, single layered, broken paint chips.
- B. Correspondence of physical properties and chemical composition of eight layered paint chips.
- C. A cross transfer of corresponding paint chips between green and orange vehicles.
- D. Correspondence of physical properties and chemical composition of paint chips containing both original factory paint as well as refinish paint layers.

Knowledge-Skill: 3.1 – Computer and Software Programs

Job Task: A5 – Conduct analysis

5. When dealing with computer forensics what is considered part of the software of a computer?

- A. Hard disk drive
- B. Central processing unit
- C. Random-access memory
- D. Operating system

Knowledge-Skill: 2.4 – Codes of Ethics

Job Task: A6 – Generate case file documentation

6. Ethical and professionally responsible forensic personnel:

- A. will accept cases on a contingency fee basis.
- B. make conclusions based on extraneous information.
- C. are independent and impartial.
- D. only keep record of examinations that support their conclusion.

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Knowledge-Skill: 5.2 – Critical Thinking

Job Task: A7 – Interpret analytical data

7. If equipment does not pass quality control checks, the first thing to do is:
- A. repair the equipment.
 - B. recalibrate the equipment.
 - C. change the acceptable quality control parameters until the equipment passes.
 - D. take the equipment out of service.

Knowledge-Skill: 1.7 – Science education/training

Job Task: A5 – Conduct analysis

8. Liquid-liquid extractions utilize what physical property of a compound?
- A. melting point
 - B. concentration
 - C. oxidation state
 - D. solubility

Knowledge-Skill: 4.1 – Communication

Job Task: B12 – Employ laboratory safety

9. To comply with federal OSHA standards, an employer must have a written _____.
- A. Chemical Hygiene Plan
 - B. Chemical Hazard Plan
 - C. Controlled Hazard Plan
 - D. Controlled Hygiene Plan

Knowledge-Skill: 5.2 – Critical thinking

Job Task: A7 – Interpret analytical evidence

10. A backspatter pattern is created when:
- A. blood drops are released from an object in motion.
 - B. a projectile creates an entrance wound.
 - C. blood is forced out of the nose by air.
 - D. an object strikes liquid blood.

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Example Questions Key

1. B
2. B
3. C
4. A
5. D
6. C
7. D
8. D
9. A
10. B