

## **APPENDIX B**

### **AFTE Job Analysis Questionnaire**

**ASSOCIATION OF FIREARM AND TOOLMARK EXAMINERS**

**JOB ANALYSIS QUESTIONNAIRE**

**1998**

**Cooperative Personnel Services  
191 Lathrop Way, Suite A  
Sacramento, CA 95815  
(916) 263-3600**

## **FIREARM AND TOOLMARK EXAMINER JOB ANALYSIS QUESTIONNAIRE**

As a Subject Matter Expert, you have been requested by the *Association of Firearm and Toolmark Examiners* to provide job analysis information on the tasks, knowledges, skills, and abilities associated with the Firearms and Toolmark Examiner job classification. The information you provide in this Job Analysis Questionnaire will greatly assist the *Association of Firearm and Toolmark Examiners* to develop an accurate characterization of the Firearm and Toolmark Examiner position. This information will be used in developing certification examinations in the firearms, toolmark, and gunshot residue content areas.

The knowledge, skills, abilities, and task statements contained in this questionnaire were compiled from other job analyses of this position as well as job analyses of the more general Criminalist position. These job statements were then reviewed by AFTE subject matter experts. The job statements were edited, some were combined, others were deleted, and many more were added to complete this AFTE Firearm and Toolmark Examiner Job Analysis Questionnaire. The results of this questionnaire will be analyzed to determine the most important and frequently performed job tasks, as well as the most important and critical knowledges, skills, and abilities (KSAs). These KSAs will form the basis of the AFTE Firearm and Toolmark Examiner certification examinations.

This questionnaire contains 61 Task Statements, 153 Knowledge Statements, 53 Skills Statements, and 106 Ability Statements. Task Statements are summaries of the individual duties performed by Firearm and Toolmark Examiners. Knowledge Statements are summaries of the individual knowledge areas used by Firearm and Toolmark Examiners. The Skills Statements describe the physical competence (i.e., psychomotor functioning) necessary to perform the individual duties performed by Firearm and Toolmark Examiners. The Ability Statements describe the competencies needed to perform those job duties that require mental functioning (such as performing analysis, or decision-making).

You will be asked to rate each Task Statement on two scales: (1) frequency (i.e., how often you perform the task), and (2) on its importance to successful completion of the job. You will also be asked to rate each of the Knowledge, Skills, and Ability Statements on two scales: (1) on its importance to successful completion of the job, and (2) what level of competency you believe is needed at the time of certification.

A response sheet has been provided to you on which to record your responses to the questionnaire. When you complete this questionnaire, the response sheet should be mailed back to Cooperative Personnel Services (CPS) in the envelope provided (no postage is necessary). It is essential that this information be mailed back to CPS no later than February 28, 1998.

It is important that all AFTE members take the time to complete this questionnaire. Firearm and Toolmark Examiner positions may differ by jurisdiction and/or by geographic area. Therefore, it is imperative that we obtain a representative sample of AFTE members.

**Your participation and input into this project are greatly appreciated.**

## INSTRUCTIONS FOR COMPLETING THE QUESTIONNAIRE RESPONSE SHEET

Please mark all of your responses on the response sheet provided. When completing the questionnaire, take extreme care not to bend the edges of the response sheet or mutilate it in any way. When filling out the response sheet you should:

- Use only a soft-lead pencil (No. 2) to mark your response sheet. Do not use a ball-point pen or other ink pen.
- Completely darken in the appropriate response bubble (do not use an “X” or checkmark to mark the response bubble).
- Make no stray marks on the response sheet, and make sure that all erasures are complete and clean.
- Verify that you have recorded your responses on the correct location of the response sheet for each question.

**Demographic Information:** The first step in completing the AFTE Job Analysis Questionnaire is to fill in the demographic information located throughout the response sheet. The information you provide in this section will be used to ensure that a representative sample of response sheets is received from the AFTE membership. At no time will this information be used to examine the responses of any particular AFTE member. Please locate and fill in the appropriate response bubbles for the following questions:

**Race/Ethnicity:** Please indicate your ethnicity from among the options given. If your ethnicity is not listed as one of the choices, then choose “OTHER.” Choose only one option. If you are multi-ethnic, choose the ethnic group with which you identify with the most.

**Gender:** Please indicate whether you are male or female.

**Years of Experience:** Indicate the number of years of experience you have in the Firearms and Toolmark Examiner job classification (or related classifications). If you have less than ten years of experience, be sure to darken in the zero in the tens column (e.g., a member with eight years of experience should darken in 08).

**AFTE Member Number:** Please indicate your AFTE Member Number. The space to record this information is located on page two (the back) of the response sheet.

**Job Component Areas:** This job analysis questionnaire is comprised of four separate job component areas: (1) Task Statements; (2) Knowledge Statements; (3) Skills Statements; and (4) Ability Statements. Each job component area has a corresponding section on the response sheet in which to record your responses. Please complete all of the ratings for each job component area before beginning the next job component area. Each job component area has its own rating scales. Please read these rating scales thoroughly before you begin your ratings. The rating scales are printed at the top of each page for your reference.

Rate each of the statements as it pertains to your job with your agency. Your ratings should reflect how you actually perform your job, (and not how it theoretically should be performed). Different jurisdictions will

perform the Firearm and Toolmark Examiner duties differently. The purpose of this questionnaire is not to judge any member or jurisdiction on how they perform their job, but to better understand, and take into account, variations in performing the Firearm and Toolmark Examiner job duties.

### TASK STATEMENT RATINGS

The next step in completing this questionnaire is to rate the Firearm and Toolmark Examiner Task Statements for frequency and importance. Task Statements are summaries of the individual duties performed by Firearm and Toolmark Examiners. The scales used to rate the Task Statements are described below:

**FREQUENCY:** Rate each Task Statement on the average frequency the task was performed during the last 12 months.

- A This task was **NOT PERFORMED** during the last 12 months.
- B This task was performed **LESS THAN ONCE EACH MONTH** during the last 12 months.
- C This task was performed **AT LEAST ONCE EACH MONTH** during the last 12 months.
- D This task was performed **AT LEAST ONCE EACH WEEK** during the last 12 months.
- E This task was performed **AT LEAST ONCE EACH DAY** during the last 12 months.

**IMPORTANCE:** Rate each task for how important or critical it is to the overall performance of the job. Do not consider how often you perform this task. Rate the importance of each task even if you have not performed the task during the past 12 months.

- 1 This task has **NO IMPACT** on overall job performance.
- 2 This task has a **MODERATE IMPACT** on overall job performance.
- 3 This task has a **HIGH IMPACT** on and is **ESSENTIAL** to overall job performance.
- 4 This task has an **EXTREME IMPACT** on and is **CRITICAL** to overall job performance.

**RECORDING YOUR RESPONSES:** All of your ratings of the Task Statements must be recorded on the response sheet provided. Each Task Statement has a unique number assigned to it. Find the corresponding number on the response sheet. For your convenience, the first Task Statement is marked T1. Notice that next to the number are two sets of response bubbles, the first set has five response bubbles (marked A - E), the second set has four response bubbles (marked 1 - 4). Record your Task Statement Frequency rating in the first set of bubbles by completely darkening the response bubble which corresponds to your rating. Use the same method to record your Task Statement Importance rating in the second set of bubbles. Continue working until you have completed rating all of the Task Statements.

## TASK STATEMENTS: Summaries of Individual Duties Performed

FREQUENCY	IMPORTANCE
<b>A</b> NOT PERFORMED <b>B</b> LESS THAN ONCE EACH MONTH <b>C</b> AT LEAST ONCE EACH MONTH <b>D</b> AT LEAST ONCE EACH WEEK <b>E</b> AT LEAST ONCE EACH DAY	<b>1</b> NO IMPACT <b>2</b> MODERATE IMPACT <b>3</b> HIGH IMPACT <b>4</b> EXTREME IMPACT

### COLLECTION OF EVIDENCE

- T1. Marks physical evidence at crime scenes.
2. Makes notes, and sketches, to document the crime scene.
3. Takes measurements to document crime scene using various measuring devices.
4. Uses photographic equipment (still cameras and video equipment) to document crime scene.
5. Conducts search of crime scenes to detect firearm and toolmark evidence.
6. Conducts search of crime scenes to detect non-firearm/toolmark evidence.
7. Collects evidence at the crime scene using proper evidence handling techniques.
8. Performs shooting scene reconstruction activities.
9. Operates metal detectors to discover items of evidence.

### PRESERVATION OF EVIDENCE

10. Preserves firearm and toolmark evidence using proper evidence handling techniques.
11. Preserves non-firearm/toolmark evidence using proper evidence handling techniques.
12. Receives and releases evidence following proper chain of custody procedures.

### EXAMINATION OF EVIDENCE

13. Performs those examinations appropriate for the identification and/or individualization of the evidence items.
14. Performs initial screening examinations on physical evidence for the presence/absence of trace or serological evidence, preserving the integrity of this evidence (or any other category of evidence which may be present) for subsequent examiners.
15. Examines firearm and toolmark evidence to determine which tests would be most pertinent, relative to the elements of a case or investigation.

## TASK STATEMENTS: Summaries of Individual Duties Performed

FREQUENCY	IMPORTANCE
<b>A</b> NOT PERFORMED <b>B</b> LESS THAN ONCE EACH MONTH <b>C</b> AT LEAST ONCE EACH MONTH <b>D</b> AT LEAST ONCE EACH WEEK <b>E</b> AT LEAST ONCE EACH DAY	<b>1</b> NO IMPACT <b>2</b> MODERATE IMPACT <b>3</b> HIGH IMPACT <b>4</b> EXTREME IMPACT

### **FIREARMS**

16. Examines firearms for general condition, functioning, and safety.
17. Test fires various types of firearms for functioning and comparison purposes.
18. Restores obliterated serial numbers on firearms, tools, etc., using various restoration techniques.
19. Uses sound meters to evaluate silencers as to their structure, design and effectiveness.
20. Functionally examines firearms for alterations by testfiring and disassembling when necessary.
21. Prepares known testfired targets and determines the muzzle to target distance of evidence items.
22. Determines ejection patterns for firearms for purpose of positioning shooters.
23. Maintains and retrieves firearm information from electronic databases.

### **AMMUNITION**

24. Microscopically examines ammunition and components for signs of reloading.
25. Microscopically examines bullets and cartridge cases for marks produced by firearms as well as marks produced by the manufacturer or manufacturing process.
26. Uses measurement and microscopy equipment to examine bullets and cartridge cases to determine the caliber and manufacturer.
27. Visually and microscopically examines bullets and cartridge cases to determine the type and manufacturer of the firearm from which they were fired.
28. Prepares test marks for comparison using appropriate test materials in the production of testfired cartridge components and toolmarks.
29. Uses microscopy equipment to compare questioned bullets and cartridge cases to test fired bullets and cartridge cases to determine if they were fired from the same firearm.
30. Uses microscopy equipment to intercompare bullets and other cartridge components to determine if they originated from the same firearm or are of the same manufacturing source.
31. Examines holes or wounds by physical and chemical means to determine if they were caused by bullets.

## TASK STATEMENTS: Summaries of Individual Duties Performed

FREQUENCY	IMPORTANCE
<p>A NOT PERFORMED B LESS THAN ONCE EACH MONTH C AT LEAST ONCE EACH MONTH D AT LEAST ONCE EACH WEEK E AT LEAST ONCE EACH DAY</p>	<p>1 NO IMPACT 2 MODERATE IMPACT 3 HIGH IMPACT 4 EXTREME IMPACT</p>

### TOOLMARKS

31. Visually and microscopically examines toolmarks to determine their characteristics and the type, size, and configuration of the tool used.
33. Makes casts of toolmarks using various casting mediums.
34. Visually and microscopically compares questioned toolmarks with test toolmarks to determine if they were produced by the same tool.
35. Visually and microscopically examines tools to determine what area of the tool produced the toolmark and whether this area is capable of producing individual (unique) toolmarks due to the lack of influence from sub-class characteristics.
36. Visually and microscopically examines toolmarks to determine what actions of the tool produced the toolmarks.
37. Visually and microscopically intercompares toolmarks to determine if they were made by the same tool.

### GUNSHOT RESIDUE

38. Visually and microscopically examines evidence items for various types of gunshot residue and shot patterns (from shotgun and shot cartridge discharges) when performing distance determinations.
39. Examines samples for the presence of firearms discharge residues by scanning electron microscopy/energy dispersive x-ray.
40. Examines samples by FTIR analysis for the identification of gunpowder.
41. Examines samples by IR luminescence and reflectance for the presence of gunshot residues.

### LABORATORY TECHNIQUES

42. Calibrates laboratory equipment to ensure accurate results.
43. Uses common laboratory equipment (pumps, mixers, ultrasonic baths) to prepare evidence for examination.
44. Processes film and film negatives for the purpose of documenting evidence.



## TASK STATEMENTS: Summaries of Individual Duties Performed

FREQUENCY	IMPORTANCE
A NOT PERFORMED B LESS THAN ONCE EACH MONTH C AT LEAST ONCE EACH MONTH D AT LEAST ONCE EACH WEEK E AT LEAST ONCE EACH DAY	1 NO IMPACT 2 MODERATE IMPACT 3 HIGH IMPACT 4 EXTREME IMPACT

### EVALUATION AND INTERPRETATION OF ANALYTICAL RESULTS

- 45. Evaluates firearm and toolmark evidence to develop an opinion regarding class, sub-class, and individual characteristics.
- 46. Evaluates test results to develop an opinion regarding whether or not a questioned item originated from the suspected source.
- 47. Evaluates examination requests for appropriateness.

### DOCUMENTATION OF PHYSICAL EVIDENCE AND ANALYTICAL RESULTS

- 48. Writes technical reports concerning examination findings and the significance of such findings.
- 49. Documents observations and examination results using proper English and scientific notations.
- 50. Documents firearm and toolmark evidence as appropriate through proper notes, sketches and photographs.

### ORAL DESCRIPTION OF EVIDENCE, THE ANALYTICAL PROCESS, AND ANALYTICAL RESULTS

- 51. Orally communicates with others (such as attorneys, peers, investigators, etc.) regarding case-related information.

### SAFE WORK PRACTICES

- 52. Uses safe work practices to eliminate or minimize the potential of injury to him- or herself, coworkers, or others.

### MAINTAINING KNOWLEDGE OF SCIENTIFIC DEVELOPMENTS AND RELATED LITERATURE

- 53. Participates in research and training in areas of firearms and toolmarks.
- 54. Participates in quality control programs to ensure high standards of test results.
- 55. Reads pertinent professional publications to sustain currency of job-related knowledge, skills, and abilities.
- 56. Attends professional meetings to sustain currency of job-related knowledge, skills, and abilities.

### TESTIFYING IN LEGAL PROCEEDINGS

- 57. Testifies in legal proceedings regarding examination results and opinions.

### TASK STATEMENTS: Summaries of Individual Duties Performed

FREQUENCY	IMPORTANCE
A NOT PERFORMED B LESS THAN ONCE EACH MONTH C AT LEAST ONCE EACH MONTH D AT LEAST ONCE EACH WEEK E AT LEAST ONCE EACH DAY	1 NO IMPACT 2 MODERATE IMPACT 3 HIGH IMPACT 4 EXTREME IMPACT

58. Participates in pre-trial conferences regarding pending testimony.

#### TRAINING

59. Trains less experienced individuals in: firearm determinations from class characteristics, the examination and comparison of firearms and toolmarks, distance determinations, the examination of firearm discharge residues, etc.

#### MAINTAINING PROFESSIONAL ETHICAL STANDARDS OF CONDUCT

60. Follows proper professional ethics standards.

61. Encourages others to follow proper professional ethics standards.

**This concludes the Task Statement Ratings.**

## JOB KNOWLEDGE RATINGS

The third step in completing this questionnaire is to rate the Firearm and Toolmark Examiner Knowledge Statements for: (1) importance to job performance, and (2) the level of competency in this knowledge that you believe is essential at the time of certification. Job Knowledge Statements are summaries of the individual knowledge areas used by Firearm and Toolmark Examiners. The scales used to rate the Knowledge Statements are described below:

**IMPORTANCE:** Rate each Knowledge Statement in relation to its importance for successfully performing the job duties of a Firearm and Toolmark Examiner.

- A** This knowledge is **NOT NEEDED** to successfully perform the job.
- B** This knowledge is **SLIGHTLY IMPORTANT** for successfully performing the job.
- C** This knowledge is **IMPORTANT** for successfully performing the job.
- D** This knowledge is **VERY IMPORTANT** for successfully performing the job.
- E** This knowledge is **CRITICALLY IMPORTANT** for successfully performing the job.

(Note: This Importance scale is slightly different than the one used to rate the Task Statements).

**EXPECTED AT CERTIFICATION:** Rate each Knowledge Statement as to what level of competency you believe is needed at the time of initial certification to perform the Firearm and Toolmark Examiner job duties.

- 1** Competency in this knowledge is **NOT ESSENTIAL** at the time of certification.
- 2** **SOME COMPETENCY** in this knowledge is **ESSENTIAL** at the time of certification.
- 3** **A HIGH DEGREE OF COMPETENCY** in this knowledge is **ESSENTIAL** at the time of certification.
- 4** **FULL COMPETENCE** in this knowledge is **ESSENTIAL** at the time of certification.

**RECORDING YOUR RESPONSES:** All of your ratings of the knowledge statements must be recorded on the response sheet provided. Each knowledge statement has a unique number assigned to it. Find the corresponding number on the response sheet. For your convenience, the first Knowledge Statement is marked K1. Notice that next to the number are two sets of response bubbles, the first set has five response bubbles (marked A - E), the second set has four response bubbles (marked 1 - 4). Record your Knowledge Statement Importance rating in the first set of bubbles by completely darkening the response bubble which corresponds to your rating. Use the same method to record your Knowledge Statement "Expected at Certification" rating in the second set of bubbles. Continue working until you have completed rating all of the Knowledge Statements.

## JOB KNOWLEDGE STATEMENTS: Summaries of Individual Job Knowledge Areas

IMPORTANCE	EXPECTED AT CERTIFICATION
<p><b>A</b> This knowledge is <b>NOT NEEDED</b> to perform the job.</p> <p><b>B</b> This knowledge is <b>SLIGHTLY IMPORTANT</b> for performing the job.</p> <p><b>C</b> This knowledge is <b>IMPORTANT</b> for performing the job.</p> <p><b>D</b> This knowledge is <b>VERY IMPORTANT</b> for performing the job.</p> <p><b>E</b> This knowledge is <b>CRITICALLY IMPORTANT</b> for performing the job.</p>	<p><b>1</b> Competency in this knowledge is <b>NOT ESSENTIAL</b>.</p> <p><b>2</b> <b>SOME COMPETENCY</b> in this knowledge is <b>ESSENTIAL</b>.</p> <p><b>3</b> <b>A HIGH DEGREE OF COMPETENCY</b> in this knowledge is <b>ESSENTIAL</b>.</p> <p><b>4</b> <b>FULL COMPETENCE</b> in this knowledge is <b>ESSENTIAL</b>.</p>

### COLLECTION OF EVIDENCE

- K1. Knowledge of legal search requirements and restrictions governing access to the crime scene and materials that can be legally seized.
2. Knowledge of various search patterns techniques (grid, spiral, line, quadrant, random) and how to select the technique most appropriate for a particular situation.
3. Knowledge of which tools or instruments are most appropriate for the recovery of evidence.
4. Knowledge of shooting-scene reconstruction techniques.
5. Knowledge of non-firearms/toolmark types of forensic evidence: such as trace evidence (hairs, fibers, paint, etc.), serological evidence, etc.

### PRESERVATION OF EVIDENCE

6. Knowledge of legal requirements for the preservation of evidence.
7. Knowledge of scientific methodologies for the preservation of evidence.
8. Knowledge of activities to perform to ensure the preservation of a crime scene.
9. Knowledge of which tools, instruments, and containers are most appropriate for the preservation of evidence.
10. Knowledge of the proper storage conditions for evidence collected.
11. Knowledge of the effects of biological agents (bacteria, molds, insects, animals, etc.) on various types of evidence and ways to prevent its effects.
12. Knowledge of basic Chain of Custody rules.
13. Knowledge of the effects that interfering factors (such as substrate, time, activity, temperature, weather, etc.) have upon various types of evidence, and ways to prevent their effects.

### DOCUMENTATION OF PHYSICAL EVIDENCE AND ANALYTICAL RESULTS

14. Knowledge of how to properly document evidence and analytical results (through notes, sketches, photography, reports, etc.).
15. Knowledge of the techniques and procedures used to properly mark evidence (when appropriate).
16. Knowledge of the proper mechanics of the English language (grammar, punctuation, spelling, and composition).

## JOB KNOWLEDGE STATEMENTS: Summaries of Individual Job Knowledge Areas

IMPORTANCE	EXPECTED AT CERTIFICATION
<p><b>A</b> This knowledge is <b>NOT NEEDED</b> to perform the job.</p> <p><b>B</b> This knowledge is <b>SLIGHTLY IMPORTANT</b> for performing the job.</p> <p><b>C</b> This knowledge is <b>IMPORTANT</b> for performing the job.</p> <p><b>D</b> This knowledge is <b>VERY IMPORTANT</b> for performing the job.</p> <p><b>E</b> This knowledge is <b>CRITICALLY IMPORTANT</b> for performing the job.</p>	<p><b>1</b> Competency in this knowledge is <b>NOT ESSENTIAL</b>.</p> <p><b>2</b> <b>SOME COMPETENCY</b> in this knowledge is <b>ESSENTIAL</b>.</p> <p><b>3</b> <b>A HIGH DEGREE OF COMPETENCY</b> in this knowledge is <b>ESSENTIAL</b>.</p> <p><b>4</b> <b>FULL COMPETENCE</b> in this knowledge is <b>ESSENTIAL</b>.</p>

- 17. Knowledge of the proper methodologies for the written documentation of scientific results.
- 18. Knowledge of how to prepare reports for peer review.
- 19. Knowledge of how to prepare articles for peer review/publication.
- 20. Knowledge of various photographic techniques and their application for documenting evidence and analytical results, and for preparing courtroom exhibits.

### EXAMINATION OF EVIDENCE

- 21. Knowledge of testing procedures commonly used to examine evidence, the expected results from each, and when to apply each.
- 22. Knowledge of experimental design methodologies for conducting scientific experiments and investigations.
- 23. Knowledge of how each scientific test affects the evidence being examined.
- 24. Knowledge of quality assurances and quality control procedures and how they are maintained by Firearm and Toolmark Examiners.
- 25. Knowledge of sequential priorities for conducting scientific tests so as not to destroy evidence or contaminate test results.
- 26. Knowledge of definitions of class, sub-class, and individual characteristics and the differences between them.
- 27. Knowledge of the sources of class, sub-class, and individual characteristics.

### EQUIPMENT/TOOLS

- 28. Knowledge of how and when to use photographic equipment (such as camera types, lenses, film types, filters, proper camera settings, depth of field, proper illumination, and determination of film exposure times).
- 29. Knowledge of how and when to use various microscopy equipment; such as stereo binocular, comparison, compound (including polarizing), scanning electron microscope, video microscope.
- 30. Knowledge of how and when to use microscopy enhancement techniques (such as magnesium smoke).
- 31. Knowledge of how to prepare casts and use of casting materials.
- 32. Knowledge of how and when to use photomicrography equipment and its components (such as digital photography, video cameras, camera-to-microscope adapters), determination of effective magnification on printed photographs, determination of proper exposure times.

## JOB KNOWLEDGE STATEMENTS: Summaries of Individual Job Knowledge Areas

IMPORTANCE	EXPECTED AT CERTIFICATION
<p><b>A</b> This knowledge is <b>NOT NEEDED</b> to perform the job.</p> <p><b>B</b> This knowledge is <b>SLIGHTLY IMPORTANT</b> for performing the job.</p> <p><b>C</b> This knowledge is <b>IMPORTANT</b> for performing the job.</p> <p><b>D</b> This knowledge is <b>VERY IMPORTANT</b> for performing the job.</p> <p><b>E</b> This knowledge is <b>CRITICALLY IMPORTANT</b> for performing the job.</p>	<p><b>1</b> Competency in this knowledge is <b>NOT ESSENTIAL</b>.</p> <p><b>2</b> <b>SOME COMPETENCY</b> in this knowledge is <b>ESSENTIAL</b>.</p> <p><b>3</b> <b>A HIGH DEGREE OF COMPETENCY</b> in this knowledge is <b>ESSENTIAL</b>.</p> <p><b>4</b> <b>FULL COMPETENCE</b> in this knowledge is <b>ESSENTIAL</b>.</p>

33. Knowledge of when and how to properly use measuring equipment (such as filar micrometer eyepieces, stage micrometers, dial micrometers and calipers, vernier micrometers and calipers, gauges and balances, rulers, tape measures, levels, angle finders, protractors, etc.).
34. Knowledge of how and when to use metal detectors.
35. Knowledge of how and when to use surgical equipment (such as scalpels, needles, scissors, etc.).
36. Knowledge of how and when to use video microscopes.
37. Knowledge of how and when to use chemical laboratory equipment (such as glassware, burners, pipettes, etc.).
38. Knowledge of how and when to use various vises, clamps, and restraining devices.
39. Knowledge of how and when to use gunsmithing tools.
40. Knowledge of how and when to use ultrasonic baths and cleaners.
41. Knowledge of how and when to use various cleaning solutions.
42. Knowledge of how and when to use pulled-bullet/cartridge exemplar files.
43. Knowledge of how and when to use borescopes.
44. Knowledge of how and when to use bore lights.
45. Knowledge of how and when to use IR light and UV light equipment.
46. Knowledge of how and when to use different probes (such as wood, fiberglass, metal, etc.) for bullet holes.
47. Knowledge of how and when to use lasers.
48. Knowledge of how and when to use sieves for screening materials to locate evidence.
49. Knowledge of how and when to use sound meters.
50. Knowledge of how and when to use microfinish exemplar templates.
51. Knowledge of how and when to use magnifying glasses of various powers.
52. Knowledge of how and when to use chemical reagents.
53. Knowledge of how and when to use exposure meters.
54. Knowledge of how and when to use stirring equipment (such as magnetic stirring machines) to mix chemicals.

## JOB KNOWLEDGE STATEMENTS: Summaries of Individual Job Knowledge Areas

IMPORTANCE	EXPECTED AT CERTIFICATION
<p><b>A</b> This knowledge is <b>NOT NEEDED</b> to perform the job.</p> <p><b>B</b> This knowledge is <b>SLIGHTLY IMPORTANT</b> for performing the job.</p> <p><b>C</b> This knowledge is <b>IMPORTANT</b> for performing the job.</p> <p><b>D</b> This knowledge is <b>VERY IMPORTANT</b> for performing the job.</p> <p><b>E</b> This knowledge is <b>CRITICALLY IMPORTANT</b> for performing the job.</p>	<p><b>1</b> Competency in this knowledge is <b>NOT ESSENTIAL</b>.</p> <p><b>2</b> <b>SOME COMPETENCY</b> in this knowledge is <b>ESSENTIAL</b>.</p> <p><b>3</b> <b>A HIGH DEGREE OF COMPETENCY</b> in this knowledge is <b>ESSENTIAL</b>.</p> <p><b>4</b> <b>FULL COMPETENCE</b> in this knowledge is <b>ESSENTIAL</b>.</p>

- 55. Knowledge of how and when to use x-ray equipment.
- 56. Knowledge of how and when to use vacuum pumps.
- 57. Knowledge of how and when to use various small handtools (such as screwdrivers, hammers, pliers, etc.).
- 58. Knowledge of how and when to use metal and woodworking machinery (such as drill presses, grinders, dremels, lathes, mills, etc.).
- 59. Knowledge of how and when to use fume hoods.
- 60. Knowledge of how and when to use audio/video equipment (such as tape recorders, TVs, VCRs, monitors, slide projectors, overhead projectors, ELMO demo units in court, etc.).
- 61. Knowledge of how and when to use household equipment (such as refrigerators, dishwashers, vacuum cleaners, and irons).
- 62. Knowledge of how and when to use hot and cold air blowers.
- 63. Knowledge of how and when to use survey equipment.
- 64. Knowledge of how and when to use drafting equipment.
- 65. Knowledge of how and when to use chronograph equipment.
- 66. Knowledge of how and when to use computer systems and work-related computer programs.
- 67. Knowledge of how and when to use examination tables.
- 68. Knowledge of how and when to use bullet and cartridge recovery systems (water, snail, cotton waste, etc.).
- 69. Knowledge of how and when to use bullet pullers.
- 70. Knowledge of how and when to use spring trigger pull scales.
- 71. Knowledge of how and when to use trigger pull weights.
- 72. Knowledge of how and when to use FTIR.

### **FIREARMS**

- 73. Knowledge of the historical development of firearms design.

## JOB KNOWLEDGE STATEMENTS: Summaries of Individual Job Knowledge Areas

IMPORTANCE	EXPECTED AT CERTIFICATION
<p><b>A</b> This knowledge is <b>NOT NEEDED</b> to perform the job.</p> <p><b>B</b> This knowledge is <b>SLIGHTLY IMPORTANT</b> for performing the job.</p> <p><b>C</b> This knowledge is <b>IMPORTANT</b> for performing the job.</p> <p><b>D</b> This knowledge is <b>VERY IMPORTANT</b> for performing the job.</p> <p><b>E</b> This knowledge is <b>CRITICALLY IMPORTANT</b> for performing the job.</p>	<p><b>1</b> Competency in this knowledge is <b>NOT ESSENTIAL</b>.</p> <p><b>2</b> <b>SOME COMPETENCY</b> in this knowledge is <b>ESSENTIAL</b>.</p> <p><b>3</b> <b>A HIGH DEGREE OF COMPETENCY</b> in this knowledge is <b>ESSENTIAL</b>.</p> <p><b>4</b> <b>FULL COMPETENCE</b> in this knowledge is <b>ESSENTIAL</b>.</p>

74. Knowledge of machining and finishing processes of tools, guns, barrels, breechfaces, extractors, ejectors, firing pins, and silencers (with emphasis on working surfaces and edges) and their effect on individuality.
75. Knowledge of muzzleloading firearms designs, including ignition systems and loading techniques.
76. Knowledge of breechloading firearms designs, including falling breechlocks, bolt actions, lever actions, pump actions, break open, semiautomatics (blowback, gas-operated, recoil operated, etc.), revolvers--double and single action.
77. Knowledge of firearms ignition systems: flintlock, percussion, rimfire, centerfire, caseless ammunition.
78. Knowledge of methods of imprinting serial numbers on firearms.
79. Knowledge of theory of restorative techniques of serial numbers in firearms.
80. Knowledge of sources of information regarding identification markings and serial numbering systems in firearms (including locations of serial numbers, part/assembly numbers, proof marks on firearms and the locations of hidden numbers).
81. Knowledge of the proper operation of the different types of firearms encountered in casework.
82. Knowledge of the different materials that may be present in the bore of a firearm.
83. Knowledge of the types of trace materials that may be present on firearms.
84. Knowledge of methods for determining if and how often a firearm has been fired since it was last cleaned.

### AMMUNITION

85. Knowledge of propellants: physical forms and associated purposes of small arms propellants; black gun powder and Pyrodex; nitrocellulose propellants, both single and double base.
86. Knowledge of projectiles: design (ogive shape, base shape, cannelure types, forming processes); construction and composition (lead alloy compositions, jacketing materials and styles, etc.).
87. Knowledge of cartridge cases: design (i.e., rimfire, centerfire, Boxer/Berdan priming systems); compositions (copper, brass, steel, aluminum).
88. Knowledge of manufacturer information: headstamps, color coding.
89. Knowledge of the history/development of ammunition components: cartridge naming system; alternate names; interchangeability.



## JOB KNOWLEDGE STATEMENTS: Summaries of Individual Job Knowledge Areas

IMPORTANCE	EXPECTED AT CERTIFICATION
<p><b>A</b> This knowledge is <b>NOT NEEDED</b> to perform the job.</p> <p><b>B</b> This knowledge is <b>SLIGHTLY IMPORTANT</b> for performing the job.</p> <p><b>C</b> This knowledge is <b>IMPORTANT</b> for performing the job.</p> <p><b>D</b> This knowledge is <b>VERY IMPORTANT</b> for performing the job.</p> <p><b>E</b> This knowledge is <b>CRITICALLY IMPORTANT</b> for performing the job.</p>	<p><b>1</b> Competency in this knowledge is <b>NOT ESSENTIAL</b>.</p> <p><b>2</b> <b>SOME COMPETENCY</b> in this knowledge is <b>ESSENTIAL</b>.</p> <p><b>3</b> <b>A HIGH DEGREE OF COMPETENCY</b> in this knowledge is <b>ESSENTIAL</b>.</p> <p><b>4</b> <b>FULL COMPETENCE</b> in this knowledge is <b>ESSENTIAL</b>.</p>

- 90. Knowledge of shotshell: design, construction and nomenclature; shot sizes and composition (hardened lead, plated steel, etc.); wad design and types of filler (buffering) materials.
- 91. Knowledge of primers: design, color, staking.
- 92. Knowledge of ammunition components.
- 93. Knowledge of ammunition manufacturing methods.
- 94. Knowledge of the types of legal vs. illegal ammunition.
- 95. Knowledge of the principles of ammunition reloading.
- 96. Knowledge of the tools, sources, and types of components used in ammunition reloading, and when to use them.
- 97. Knowledge of proper ammunition selection.

### BALLISTICS

- 98. Knowledge of internal ballistics: ignition, pressure, function of chamber design, chamber and cartridge dimensions, headspace considerations.
- 99. Knowledge of exterior ballistics: line of sight vs. bullet path; departure path and angle; trajectories (long and short); angle of fall; ballistic tables (flight time, drop, velocity loss with distance, wind drift, etc.); ballistic programs; bullet stability, rotational velocity, yaw, twist rates necessary to stabilize various bullet types.
- 100. Knowledge of terminal ballistics: penetration, bullet deformation and expansion and its relation to impact velocity and orientation.
- 101. Knowledge of ballistic wounds: penetration, bullet deformation and expansion; penetration mechanics in tissue and tissue simulants; temporary and permanent cavitation.
- 102. Knowledge of bullet holes/bullet impact sites and ricochet marks.
- 103. Knowledge of cartridge case ejection patterns: (physics and mechanics affecting; surface effects on pattern; and the effect of intermediate objects).
- 104. Knowledge of ballistic tables, how to use them and their limitations.
- 105. Knowledge of bullet recovery methods, and the advantages and disadvantages of each.
- 106. Knowledge of chemical tests used in the examination of bullet holes, bullet impact site, and ricochet marks.

## JOB KNOWLEDGE STATEMENTS: Summaries of Individual Job Knowledge Areas

IMPORTANCE	EXPECTED AT CERTIFICATION
<p>A This knowledge is <b>NOT NEEDED</b> to perform the job.</p> <p>B This knowledge is <b>SLIGHTLY IMPORTANT</b> for performing the job.</p> <p>C This knowledge is <b>IMPORTANT</b> for performing the job.</p> <p>D This knowledge is <b>VERY IMPORTANT</b> for performing the job.</p> <p>E This knowledge is <b>CRITICALLY IMPORTANT</b> for performing the job.</p>	<p>1 Competency in this knowledge is <b>NOT ESSENTIAL</b>.</p> <p>2 <b>SOME COMPETENCY</b> in this knowledge is <b>ESSENTIAL</b>.</p> <p>3 <b>A HIGH DEGREE OF COMPETENCY</b> in this knowledge is <b>ESSENTIAL</b>.</p> <p>4 <b>FULL COMPETENCE</b> in this knowledge is <b>ESSENTIAL</b>.</p>

### DISTANCE DETERMINATION

- 106. Knowledge of how and when to perform microscopic examinations for the purpose of distance determination.
- 108. Knowledge of how and when to perform IR reflectance and/or luminescence tests for the purpose of distance determination.
- 109. Knowledge of how and when to perform chemical tests (such as: sodium rhodizonate and Griess) for the purpose of distance determination.
- 110. Knowledge of stippling patterns/powder patterns on a surface and how they are used in distance determination.
- 111. Knowledge of pellet patterns and how they are used in distance determination.
- 112. Knowledge of which firearms, ammunition, and test pattern surfaces to use for the purpose of distance determination.
- 113. Knowledge of bullet hole characterization for caliber size determination (within limitations) when performing distance determination.

### TOOLMARK IDENTIFICATION

- 114. Knowledge of proper use of tools and materials for testmarks.
- 115. Knowledge of the toolmarks created during the reloading of ammunition.
- 116. Knowledge of the interactive nature of the tool/toolmark process and the transference of class, sub-class, and individual characteristics.
- 117. Knowledge of impressed (static) vs. striated (dynamic) toolmarks.
- 118. Knowledge of the best agreement possible in situations of known non-matches when comparing toolmarks.
- 119. Knowledge of the principles of preparing test marks and the effects of test materials in the production of testfired cartridge components and toolmarks for comparison.

### GUNSHOT RESIDUE (Non Distance Determination Examinations)

- 120. Knowledge of firearms-generated discharge products: how deposited; primer constituents, propellant residues, bullet metal and bullet lubricants.
- 121. Knowledge of methods for the collection and analysis of gunshot residue samples, including: atomic absorption; scanning electron microscopy/energy dispersive x-ray.

## JOB KNOWLEDGE STATEMENTS: Summaries of Individual Job Knowledge Areas

IMPORTANCE	EXPECTED AT CERTIFICATION
<p>A This knowledge is <b>NOT NEEDED</b> to perform the job.</p> <p>B This knowledge is <b>SLIGHTLY IMPORTANT</b> for performing the job.</p> <p>C This knowledge is <b>IMPORTANT</b> for performing the job.</p> <p>D This knowledge is <b>VERY IMPORTANT</b> for performing the job.</p> <p>E This knowledge is <b>CRITICALLY IMPORTANT</b> for performing the job.</p>	<p>1 Competency in this knowledge is <b>NOT ESSENTIAL</b>.</p> <p>2 <b>SOME COMPETENCY</b> in this knowledge is <b>ESSENTIAL</b>.</p> <p>3 <b>A HIGH DEGREE OF COMPETENCY</b> in this knowledge is <b>ESSENTIAL</b>.</p> <p>4 <b>FULL COMPETENCE</b> in this knowledge is <b>ESSENTIAL</b>.</p>

122. Knowledge of different interpretations for any given gunshot residue analytical results.

### PHYSICAL SCIENCES

- 123. Knowledge of mathematical operations, and interrelationships (including arithmetic, geometry, calculus, statistics, and their applications).
- 124. Knowledge of physics: the prediction of physical principles, laws, and applications (including material dynamics, light, heat, and electric theory).
- 125. Knowledge of chemistry: the composition, structure, and properties of substances and of the chemical processes and transformations they undergo.
- 126. Knowledge of biology: i.e., plant and living tissue, cells, organisms, etc. (including their functions, interdependencies, and interactions with each other and the environment).
- 127. Knowledge of anatomy and dentistry; i.e., the various organs and components of the body (including their appearances and functions).
- 128. Knowledge of metallurgy: i.e., the science of metalworking, and properties of metals and alloys.

### ORAL DESCRIPTION OF EVIDENCE, THE ANALYTICAL PROCESS, AND ANALYTICAL RESULTS

129. Knowledge of correct word usage and pronunciation.

### SAFE WORK PRACTICES

- 130. Knowledge of the potential hazardous properties of biological hazards (such as hepatitis, AIDS, etc.).
- 131. Knowledge of the potential hazardous properties of parasites.
- 132. Knowledge of the potential hazardous properties of toxic and reactive chemicals.
- 133. Knowledge of the potential hazardous properties of gunshot residues.
- 134. Knowledge of the proper methods for the handling and disposing of hazardous materials.
- 135. Knowledge of how to safely handle potentially dangerous items, such as defective firearms, ammunition, and explosives for laboratory examination.
- 136. Knowledge of radiation hazards and how to safely use radiation equipment (such as x-ray equipment, lasers, etc.).

## JOB KNOWLEDGE STATEMENTS: Summaries of Individual Job Knowledge Areas

IMPORTANCE	EXPECTED AT CERTIFICATION
<p>A This knowledge is <b>NOT NEEDED</b> to perform the job.</p> <p>B This knowledge is <b>SLIGHTLY IMPORTANT</b> for performing the job.</p> <p>C This knowledge is <b>IMPORTANT</b> for performing the job.</p> <p>D This knowledge is <b>VERY IMPORTANT</b> for performing the job.</p> <p>E This knowledge is <b>CRITICALLY IMPORTANT</b> for performing the job.</p>	<p>1 Competency in this knowledge is <b>NOT ESSENTIAL</b>.</p> <p>2 <b>SOME COMPETENCY</b> in this knowledge is <b>ESSENTIAL</b>.</p> <p>3 <b>A HIGH DEGREE OF COMPETENCY</b> in this knowledge is <b>ESSENTIAL</b>.</p> <p>4 <b>FULL COMPETENCE</b> in this knowledge is <b>ESSENTIAL</b>.</p>

- 137. Knowledge of thermal hazards (cryogenics and excessive heat) and safety methods associated with each.
- 138. Knowledge of the proper use of safety equipment and materials (such as protective clothing, eye and ear protective devices, and disinfectants).
- 139. Knowledge of safety procedures and the potential hazardous properties regarding test firing various firearms.
- 140. Knowledge of safety procedures associated with the use of laboratory equipment.
- 141. Knowledge of safety procedures associated with the use of handtools, woodworking machinery, and metalworking machinery.

### MAINTAINING KNOWLEDGE OF SCIENTIFIC DEVELOPMENTS AND RELATED LITERATURE

- 142. Knowledge of which journals, newsletters and professional publications report information applicable to Firearm and Toolmark Examiners.
- 143. Knowledge of which professional organizations address Firearm and Toolmark Examiners concerns.
- 144. Knowledge of where to find and how to use various reference collections, tables, and databases (including ballistic tables, Drugfire and IBIS, Firearm Reference Collections, Ammunition Reference Collections, General Rifling Characteristics File for make and model determinations, etc.), and the limitations of such databases and tables.

### TESTIFYING IN LEGAL PROCEEDINGS

- 145. Knowledge of legal requirements (e.g., *Daubert* and *Frye* cases) and the protocols for the presentation of scientific evidence.
- 146. Knowledge of appropriate legislation and statutory definitions as applied to the expert witness.
- 147. Knowledge of courtroom procedures regarding the testimony of expert witnesses.
- 148. Knowledge of the proper demeanor for testifying in legal proceedings.
- 149. Knowledge of the preparation and use of demonstrative evidence (such as displays, etc.).

### TRAINING

- 150. Knowledge of training methods used to teach scientific disciplines.

**JOB KNOWLEDGE STATEMENTS: Summaries of Individual Job Knowledge Areas**

IMPORTANCE	EXPECTED AT CERTIFICATION
<p>A This knowledge is <b>NOT NEEDED</b> to perform the job.</p> <p>B This knowledge is <b>SLIGHTLY IMPORTANT</b> for performing the job.</p> <p>C This knowledge is <b>IMPORTANT</b> for performing the job.</p> <p>D This knowledge is <b>VERY IMPORTANT</b> for performing the job.</p> <p>E This knowledge is <b>CRITICALLY IMPORTANT</b> for performing the job.</p>	<p>1 Competency in this knowledge is <b>NOT ESSENTIAL</b>.</p> <p>2 <b>SOME COMPETENCY</b> in this knowledge is <b>ESSENTIAL</b>.</p> <p>3 <b>A HIGH DEGREE OF COMPETENCY</b> in this knowledge is <b>ESSENTIAL</b>.</p> <p>4 <b>FULL COMPETENCE</b> in this knowledge is <b>ESSENTIAL</b>.</p>

**MAINTAINING PROFESSIONAL ETHICAL STANDARDS OF CONDUCT**

- 151. Knowledge of the ethical standards maintained by the legal and law enforcement professions.
- 152. Knowledge of the ethical standards maintained by the scientific community (in general).
- 153. Knowledge of the ethical standards maintained by forensic science organizations (including the American Society of Crime Laboratory Directors and the Association of Firearms and Toolmark Examiners).

**This concludes the Knowledge Statement Ratings.**

## JOB SKILLS RATINGS

The fourth step in completing this questionnaire is to rate the Firearm and Toolmark Examiner job skills for: (1) importance to job performance, and (2) the level of competency in this skill that you believe is essential at the time of certification. Job skills pertain to the physical competence (i.e., psychomotor functioning) to perform the individual duties performed by Firearm and Toolmark Examiners. The scales used to rate the Skills Statements are described below:

**IMPORTANCE:** Rate each Skills Statement in relation to its importance for successfully performing the job duties of a Firearm and Toolmark Examiner.

- A This skill is **NOT NEEDED** to successfully perform the job.
- B This skill is **SLIGHTLY IMPORTANT** for successfully performing the job.
- C This skill is **IMPORTANT** for successfully performing the job.
- D This skill is **VERY IMPORTANT** for successfully performing the job.
- E This skill is **CRITICALLY IMPORTANT** for successfully performing the job.

**EXPECTED AT CERTIFICATION:** Rate each Skills Statement as to what level of competency you believe is needed at the time of initial certification to perform the Firearm and Toolmark Examiner job duties.

- 1 Competency in this skill is **NOT ESSENTIAL** at the time of certification.
- 2 **SOME COMPETENCY** in this skill is **ESSENTIAL** at the time of certification.
- 3 **A HIGH DEGREE OF COMPETENCY** in this skill is **ESSENTIAL** at the time of certification.
- 4 **FULL COMPETENCE** in this skill is **ESSENTIAL** at the time of certification.

**RECORDING YOUR RESPONSES:** All of your ratings of the Skills Statements must be recorded on the response sheet provided. Each Skills Statement has a unique number assigned to it. Find the corresponding number on the response sheet. For your convenience, the first Skills Statement is marked S1. Notice that next to the number are two sets of response bubbles, the first set has five response bubbles (marked A - E), the second set has four response bubbles (marked 1 - 4). Record your Skills Statement Importance rating in the first set of bubbles by completely darkening the response bubble which corresponds to your rating. Use the same method to record your Skills Statement "Expected at Certification" rating in the second set of bubbles. Continue working until you have completed rating all of the Skills Statements.

## JOB SKILLS STATEMENTS: Physical Competence to Perform Individual Job Duties

IMPORTANCE	EXPECTED AT CERTIFICATION
<p><b>A</b> This skill is <b>NOT NEEDED</b> to perform the job.</p> <p><b>B</b> This skill is <b>SLIGHTLY IMPORTANT</b> for performing the job.</p> <p><b>C</b> This skill is <b>IMPORTANT</b> for performing the job.</p> <p><b>D</b> This skill is <b>VERY IMPORTANT</b> for performing the job.</p> <p><b>E</b> This skill is <b>CRITICALLY IMPORTANT</b> for performing the job.</p>	<p><b>1</b> Competency in this skill is <b>NOT ESSENTIAL</b>.</p> <p><b>2</b> <b>SOME COMPETENCY</b> in this skill is <b>ESSENTIAL</b>.</p> <p><b>3</b> <b>A HIGH DEGREE OF COMPETENCY</b> in this skill is <b>ESSENTIAL</b>.</p> <p><b>4</b> <b>FULL COMPETENCE</b> in this skill is <b>ESSENTIAL</b>.</p>

### COLLECTION OF EVIDENCE

- S1. Skill in recovering and removing evidence from the crime scene and related objects.
2. Skill in carefully and properly handling physical evidence without loss, contamination, or changes to the evidence that could result in loss of information.
3. Skill in scene diagraming.
4. Skill in taking notes to document a crime scene.
5. Skill in using photographic and video equipment to document a crime scene.
6. Skill in using measurement equipment for the analysis and documentation of the crime scene.
7. Skill in the measurement of cartridge case locations relative to a logical reference point, documentation of the substrate and immediate environment considerations to establish ejection characteristics.
8. Skill in the collection and safeguarding of non-firearms/toolmark evidence (such as trace materials).
9. Skill in making representative casts of marks of forensic interest.
10. Skill in properly preparing (mix or melt) the casting medium.

### PRESERVATION OF EVIDENCE

11. Skill in properly packaging and storing evidence.

### EXAMINATION OF EVIDENCE

12. Skill in preparing and calibrating ordnance gelatin for use as a tissue simulant.
13. Skill in correctly measuring test and evidence patterns.
14. Skill in disassembling locks, safes, etc. to examine internal components.

### LABORATORY TECHNIQUES

15. Skill in taking suitable photographs of subjects (specimens) through the optics of the microscope (involves the selection of appropriate film, filters, light source, illumination technique, and exposure times).
16. Skill in properly mounting and illuminating specimens.

## JOB SKILLS STATEMENTS: Physical Competence to Perform Individual Job Duties

IMPORTANCE	EXPECTED AT CERTIFICATION
<p><b>A</b> This skill is <b>NOT NEEDED</b> to perform the job.</p> <p><b>B</b> This skill is <b>SLIGHTLY IMPORTANT</b> for performing the job.</p> <p><b>C</b> This skill is <b>IMPORTANT</b> for performing the job.</p> <p><b>D</b> This skill is <b>VERY IMPORTANT</b> for performing the job.</p> <p><b>E</b> This skill is <b>CRITICALLY IMPORTANT</b> for performing the job.</p>	<p><b>1</b> Competency in this skill is <b>NOT ESSENTIAL</b>.</p> <p><b>2</b> <b>SOME COMPETENCY</b> in this skill is <b>ESSENTIAL</b>.</p> <p><b>3</b> <b>A HIGH DEGREE OF COMPETENCY</b> in this skill is <b>ESSENTIAL</b>.</p> <p><b>4</b> <b>FULL COMPETENCE</b> in this skill is <b>ESSENTIAL</b>.</p>

17. Skill in operating the controls/setting of various types of photographic and video equipment.
18. Skill in processing film/negatives as required (includes Polaroid positive/negative film).
19. Skill in properly setting up light sources for suitable illumination when operating photographic or video equipment.
20. Skill in setting up and using various types of microscopes (includes setting the appropriate illumination).
21. Skill in magnesium smoking techniques to reduce surface reflectance when using microscopes.
22. Skill in using chronograph and other measuring devices (e.g., micrometers, depth gauges, headspace gauges, balances, rulers, calipers, etc.).
23. Skill in the proper and safe use of bullet pullers.
24. Skill in disinfecting evidence and surface areas using appropriate materials.
25. Skill in using various handheld tools used for the recovery of evidence (including handtools, surgical tools, vises and clamps, probes, etc.).
26. Skill in measuring and/or mixing various liquids and chemical compounds.
27. Skill in reading meters (including sound meters, exposure meters, etc.).
28. Skill in operating common laboratory equipment, instruments, and machines (such as pumps, mixers, ultrasonic baths, IR and UV light equipment, etc.).
29. Skill in preparing suitable test marks.

### SAFE WORK PRACTICES

30. Skill in safely handling, loading and firing firearms.
31. Skill in safely operating recovery equipment for testfired bullets and cartridge cases.

### FIREARMS

32. Skill in preparing a proper cast to recover the necessary dimensions in the case of chamber or bore castings or to replicate the class and individual characteristics of various firearm surfaces (e.g., bore, breechface, etc.) necessary to complete a comparison.
33. Skill in locating the site of an obliterated firearm serial number.



## JOB SKILLS STATEMENTS: Physical Competence to Perform Individual Job Duties

IMPORTANCE	EXPECTED AT CERTIFICATION
<p><b>A</b> This skill is <b>NOT NEEDED</b> to perform the job.</p> <p><b>B</b> This skill is <b>SLIGHTLY IMPORTANT</b> for performing the job.</p> <p><b>C</b> This skill is <b>IMPORTANT</b> for performing the job.</p> <p><b>D</b> This skill is <b>VERY IMPORTANT</b> for performing the job.</p> <p><b>E</b> This skill is <b>CRITICALLY IMPORTANT</b> for performing the job.</p>	<p><b>1</b> Competency in this skill is <b>NOT ESSENTIAL</b>.</p> <p><b>2</b> <b>SOME COMPETENCY</b> in this skill is <b>ESSENTIAL</b>.</p> <p><b>3</b> <b>A HIGH DEGREE OF COMPETENCY</b> in this skill is <b>ESSENTIAL</b>.</p> <p><b>4</b> <b>FULL COMPETENCE</b> in this skill is <b>ESSENTIAL</b>.</p>

34. Skill in preparing firearms for serial number restorative technique(s).
35. Skill in raising and recording obliterated serial numbers.
36. Skill in preparing test fired specimens suitable for comparison and identification purposes.
37. Skill in measuring firearm trigger pulls.
38. Skill in measuring gun barrel lengths and overall lengths of firearms.
39. Skill in field testing firearms for full automatic firing.
40. Skill in chambering cartridges in firearms for discharge.
41. Skill in safely using appropriate chemicals to restore obliterated serial numbers.
42. Skill in locating any hidden numbers, areas of obliterated serial numbers, assessing the most probable removal method used for the obliteration, and the suitability for restoration.
43. Skill in repairing broken or rusted firearms.
44. Skill in disassembling and reassembling firearm mechanisms.
45. Skill in adequately downloading rifle cartridges as necessary to avoid damage to the recovery device, yet yielding satisfactory test fired bullets.
46. Skill in using remote firing devices (such as Zero-One and Ransom Rest).

### AMMUNITION

47. Skill in locating marks on various ammunition components that can be associated with the specific reloading tool that came in contact with the component (cartridge case, primer, bullet).
48. Skill in preparing the appropriate bullet recovery medium, for the type of ammunition represented by the evidence bullet (e.g., wet rolled cotton, water).
49. Skill in modifying expanding bullets in such a way that they will not disintegrate when fired into the recovery device.
50. Skill in the preparation and use of ballistic gelatin.
51. Skill in identifying various marks on ammunition components as having been produced by a particular part of a firearm.

## JOB SKILLS STATEMENTS: Physical Competence to Perform Individual Job Duties

IMPORTANCE	EXPECTED AT CERTIFICATION
<p><b>A</b> This skill is <b>NOT NEEDED</b> to perform the job.</p> <p><b>B</b> This skill is <b>SLIGHTLY IMPORTANT</b> for performing the job.</p> <p><b>C</b> This skill is <b>IMPORTANT</b> for performing the job.</p> <p><b>D</b> This skill is <b>VERY IMPORTANT</b> for performing the job.</p> <p><b>E</b> This skill is <b>CRITICALLY IMPORTANT</b> for performing the job.</p>	<p><b>1</b> Competency in this skill is <b>NOT ESSENTIAL</b>.</p> <p><b>2</b> <b>SOME COMPETENCY</b> in this skill is <b>ESSENTIAL</b>.</p> <p><b>3</b> <b>A HIGH DEGREE OF COMPETENCY</b> in this skill is <b>ESSENTIAL</b>.</p> <p><b>4</b> <b>FULL COMPETENCE</b> in this skill is <b>ESSENTIAL</b>.</p>

### GUNSHOT RESIDUE

- 52. Skill in recovering gunshot residues from clothing, fired cartridge cases, gun barrels, etc., and preparing them for examination and comparison.
  
- 53. Skill in using various visualization methods for gunshot residue deposits on clothing and other surfaces.

**This concludes the Skills Statement Ratings.**

## JOB ABILITY RATINGS

The final step in completing this questionnaire is to rate the Firearm and Toolmark Examiner Ability Statements for: (1) importance to job performance, and (2) the level of competency in this ability that you believe is essential at the time of certification. Job abilities pertain to the competence to perform those job duties that require mental functioning (such as performing analysis, or decision-making). The scales used to rate the Ability Statements are described below:

**IMPORTANCE:** Rate each Ability Statement in relation to its importance for successfully performing the job duties of a Firearm and Toolmark Examiner.

- A This ability is **NOT NEEDED** to successfully perform the job.
- B This ability is **SLIGHTLY IMPORTANT** for successfully performing the job.
- C This ability is **IMPORTANT** for successfully performing the job.
- D This ability is **VERY IMPORTANT** for successfully performing the job.
- E This ability is **CRITICALLY IMPORTANT** for successfully performing the job.

**EXPECTED AT CERTIFICATION:** Rate each Ability Statement as to what level of competency you believe is needed at the time of initial certification to perform the Firearm and Toolmark Examiner job duties.

- 1 Competency in this ability is **NOT ESSENTIAL** at the time of certification.
- 2 **SOME COMPETENCY** in this ability is **ESSENTIAL** at the time of certification.
- 3 **A HIGH DEGREE OF COMPETENCY** in this ability is **ESSENTIAL** at the time of certification.
- 4 **FULL COMPETENCE** in this ability is **ESSENTIAL** at the time of certification.

**RECORDING YOUR RESPONSES:** All of your ratings of the Ability Statements must be recorded on the response sheet provided. Each Ability Statement has a unique number assigned to it. Find the corresponding number on the response sheet. For your convenience, the first Ability Statement is marked A1. Notice that next to the number are two sets of response bubbles, the first set has five response bubbles (marked A - E), the second set has four response bubbles (marked 1 - 4). Record your Ability Statement Importance rating in the first set of bubbles by completely darkening the response bubble which corresponds to your rating. Use the same method to record your Ability Statement "Expected at Certification" rating in the second set of bubbles. Continue working until you have completed rating all of the Ability Statements.

## JOB ABILITY STATEMENTS: Competence to Perform Duties Requiring Mental Functioning

IMPORTANCE	EXPECTED AT CERTIFICATION
<p><b>A</b> This ability is <b>NOT NEEDED</b> to perform the job.</p> <p><b>B</b> This ability is <b>SLIGHTLY IMPORTANT</b> for performing the job.</p> <p><b>C</b> This ability is <b>IMPORTANT</b> for performing the job.</p> <p><b>D</b> This ability is <b>VERY IMPORTANT</b> for performing the job.</p> <p><b>E</b> This ability is <b>CRITICALLY IMPORTANT</b> for performing the job.</p>	<p><b>1</b> Competency in this ability is <b>NOT ESSENTIAL</b>.</p> <p><b>2</b> <b>SOME COMPETENCY</b> in this ability is <b>ESSENTIAL</b>.</p> <p><b>3</b> <b>A HIGH DEGREE OF COMPETENCY</b> in this ability is <b>ESSENTIAL</b>.</p> <p><b>4</b> <b>FULL COMPETENCE</b> in this ability is <b>ESSENTIAL</b>.</p>

### COLLECTION OF EVIDENCE

- A1. Ability to recognize the evidence potential of an item.
2. Ability to recognize and safeguard non-firearms evidence, such as trace materials.
3. Ability to recognize bullet impact sites at crime scenes.
4. Ability to select the appropriate casting materials.
5. Ability to properly record conditions at a shooting scene or crime scene in general.
6. Ability to interpret the value, meaning, and relationship of various items of evidence at crime scenes for the purpose of reconstructing what events occurred.

### PRESERVATION OF EVIDENCE

7. Ability to establish and maintain a proper chain of custody.
8. Ability to maintain a complete inventory of evidence from a particular case.

### EXAMINATION OF EVIDENCE

9. Ability to design a testing protocol (based on size of sample and type of evidence) that will provide the most useful information, while avoiding procedures that are redundant or will interfere with subsequent tests.
10. Ability to evaluate examination requests, while considering the totality of the case.
11. Ability to adhere to an examination protocol for both firearms and toolmark cases.
12. Ability to use logic to analyze and identify strengths and weaknesses of different approaches.
13. Ability to use scientific methodology, statistics, and logic in solving forensic problems.

### LABORATORY TECHNIQUES

14. Ability to perform routine maintenance on laboratory equipment and machines (includes calibrating instruments).
15. Ability to determine when enhancement techniques are needed when examining evidence.
16. Ability to operate job-related computer systems and programs.

## JOB ABILITY STATEMENTS: Competence to Perform Duties Requiring Mental Functioning

IMPORTANCE	EXPECTED AT CERTIFICATION
<p>A This ability is <b>NOT NEEDED</b> to perform the job.</p> <p>B This ability is <b>SLIGHTLY IMPORTANT</b> for performing the job.</p> <p>C This ability is <b>IMPORTANT</b> for performing the job.</p> <p>D This ability is <b>VERY IMPORTANT</b> for performing the job.</p> <p>E This ability is <b>CRITICALLY IMPORTANT</b> for performing the job.</p>	<p>1 Competency in this ability is <b>NOT ESSENTIAL</b>.</p> <p>2 <b>SOME COMPETENCY</b> in this ability is <b>ESSENTIAL</b>.</p> <p>3 <b>A HIGH DEGREE OF COMPETENCY</b> in this ability is <b>ESSENTIAL</b>.</p> <p>4 <b>FULL COMPETENCE</b> in this ability is <b>ESSENTIAL</b>.</p>

17. Ability to select proper casting material and technique.

18. Ability to operate basic laboratory equipment.

### EVALUATION AND INTERPRETATION OF ANALYTICAL RESULTS

19. Ability to understand and interpret technical data output from laboratory instruments.

20. Ability to make detailed calculations accurately.

21. Ability to recognize discrepancies or inconsistencies in analytical findings and determine their cause and significance.

22. Ability to recognize utility and limitations of reference collection/database programs.

23. Ability to recognize the limitations of tests and interpretations.

### FIREARMS

24. Ability to determine the design of the lockwork (firing system) in firearms.

25. Ability to locate and identify the type (or types) of safety system(s) incorporated in a particular firearm.

26. Ability to determine the design type, method of operation and ignition of a submitted firearm.

27. Ability to recognize when a firearm has been altered from its original design.

28. Ability to determine the metal type in which the identification numbers were located.

29. Ability to select the best restorative method(s)/solutions for raising obliterated serial numbers based on the substrate.

30. Ability to recognize the effect that firearms and ammunition manufacturing processes, the design of firearms, and design of firearms accessories have on markings imparted to bullets and casings and to interpret them accordingly.

31. Ability to recognize different manufacturing methods and, based upon this, to properly interpret potential for class, sub-class, and individual characteristics.

32. Ability to examine, either directly or through the use of casts, the interior surface of a gun barrel to determine the method of rifling.

33. Ability to recognize and discriminate common rifling profiles.

34. Ability to distinguish "action" markings from those caused during firing.

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- 35. Ability to evaluate the operability of each safety system, chambering method, and lockwork, recognize and explain any defects or failures in each of these systems and the consequences of any such defect or failure.
- 36. Ability to compare firearm mechanisms with standards.
- 37. Ability to recognize which parts of a firearm leave tool marks of forensic interest.

### AMMUNITION

- 38. Ability to recognize when fired bullets and casings have been fired in a firearm not designed for them.
- 39. Ability to recognize, compare and identify various ammunition types and components.
- 40. Ability to recognize manufacturer-induced/placed toolmarks (sub-class characteristics) on ammunition as well as their usefulness and limitations.
- 41. Ability to identify reloaded ammunition as having been assembled by the same equipment by determining that specific reloading tool(s) came in contact with cartridge components.
- 42. Ability to recognize and interpret the effects of ammunition/firearms combination on various aspects involved in reconstructing what happened at a shooting scene.
- 43. Ability to recognize reloaded or handloaded ammunition.
- 44. Ability to compare ammunition components on the basis of design characteristics or features.
- 45. Ability to compare unfired propellant samples from disassembled cartridges.
- 46. Ability to recognize: (1) those attributes or characteristics of a particular firearm design which are reflected in the fired projectiles and fired cartridge cases; and (2) non-firearm caused toolmarks on ammunition components.
- 47. Ability to determine the source and uniqueness of various striated and/or static marks on bullets and cartridges.
- 48. Ability to recognize and properly align reproducible striae arrays sufficient for identification purposes.
- 49. Ability to recognize, determine the source of, and differentiate between class, sub-class, and individual characteristics on bullets, cartridges, cartridge cases, and in non-firearm related toolmarks.
- 50. Ability to make comparisons between evidence and reference cartridges and recovered cartridge components.
- 51. Ability to identify a specific reloading tool as having resized a cartridge case or as having seated a bullet and/or primer.
- 52. Ability to identify a cast bullet as having come from a particular bullet mold.

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- 53. Ability to distinguish between the quality and quantity of matching striae in a true identity and that observed in known non-matches.
- 54. Ability to recognize commercially reloaded or handload ammunition components from their markings and characteristics.
- 55. Ability to identify reloaded ammunition as having been assembled by the same manufacturer and/or containing the same brand of components.
- 56. Ability to recognize the evidentiary value of reloaded ammunition.
- 57. Ability to recognize any manufacturer-induced characteristics.

### BALLISTICS

- 58. Ability to identify potential ballistic issues or considerations on specific cases (e.g., questionable ammunition performance, the shooter's sight picture at the moment of the shot, bullet flight time vs. changes in the position of the victim).
- 59. Ability to carry out basic external ballistic calculations.
- 60. Ability to design relevant experiments to evaluate ballistic questions.
- 61. Ability to make velocity measurements with ballistic chronography.
- 62. Ability to identify holes and/or defects in various objects as bullet-caused, through physical and/or chemical means (e.g., lead containing "bullet wipe," "bullet splash," copper/lead transfers in bullet graze or ricochet marks).
- 63. Ability to determine directionality of a bullet's course, as affected/unaffected by intervening objects, and estimate the bullet's trajectory (flight path) where possible.
- 64. Ability to recognize situations where gunshots might be sequenced.
- 65. Ability to integrate shooting scene data with the test firing data and establish the probable position(s) of the shooter and exclude other sites.
- 66. Ability to properly limit the scope of reconstruction to the hypotheses being tested.
- 67. Ability to recognize bullet impact sites at shooting scenes.
- 68. Ability to recognize the limitations of a particular shooting scene reconstruction.
- 69. Ability to compare and interpret test and evidence gunshot discharge patterns.

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70. Ability to accurately record the appearance of bullet holes.

### TOOLMARKS

- 71. Ability to make determinations in toolmark comparisons (both firearm and non-firearm toolmarks) regarding: identifications, exclusions, and inconclusives.
- 72. Ability to recognize patterns (profiles, etc.) produced by various tool working surfaces.
- 73. Ability to recognize sources of class, sub-class, and individual characteristics on any given tool.
- 74. Ability to recognize toolmarks as being class, sub-class, or individual in nature.

### GUNSHOT RESIDUES

- 75. Ability to visualize, document and measure gunshot residue deposits on clothing and other surfaces, and to prepare representative gunshot residue test patterns with the evidence firearm and appropriate ammunition, and to estimate the muzzle to target distance from the comparison of evidence and test patterns.
- 76. Ability to perform relevant chemical tests for the purpose of distance determination.
- 77. Ability to identify the physical form and type of small arms propellant recovered from a gun, victim's clothing, etc. (e.g., flattened ball powder, perforated disc, flake powder, etc.).
- 78. Ability to evaluate the appropriateness of testing for primer derived gunshot residue on various substrates.
- 79. Ability to evaluate the possibility/likelihood of contamination by various means (environmental, transference, dispersion due to firearms discharges in confined spaces, etc.).
- 80. Ability to recognize various primer mixtures available in modern rimfire and centerfire ammunition of both domestic and foreign manufacture.
- 81. Ability to test for gunshot residues on various substrates (such as glass, cloth, painted metal, etc.).
- 82. Ability to recognize the various physical and chemical forms of propellants, their purpose in various cartridges and their value as physical evidence.
- 83. Ability to interpret results of comparative examinations of gunshot residues.



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### DOCUMENTATION OF PHYSICAL EVIDENCE AND ANALYTICAL RESULTS

- 84. Ability to record scientific observations and the results of scientific tests.
- 85. Ability to write coherently and concisely for the intended audience.
- 86. Ability to maintain clear and comprehensive case notes.
- 87. Ability to write comprehensive reports that put test results in proper perspective.
- 88. Ability to read and understand information and ideas presented in writing.
- 89. Ability to properly document evidence items, examinations, and comparisons.

### ORAL DISSEMINATION OF EVIDENCE AND ANALYTICAL RESULTS

- 90. Ability to explain theory, operations, and applications of various laboratory instruments.
- 91. Ability to speak clearly and succinctly in front of groups.
- 92. Ability to listen to and understand information and ideas presented through spoken words and sentences.
- 93. Ability to answer questions clearly and to the point.

### SAFE WORK PRACTICES

- 94. Ability to recognize unsafe conditions.
- 95. Ability to employ safe work practices.
- 96. Ability to render conditions safe.

### MAINTAINING KNOWLEDGE OF SCIENTIFIC DEVELOPMENTS AND RELATED LITERATURE

- 97. Ability to recognize the need for additional expertise in certain situations and what can be expected to be gained by their participation.
- 98. Ability to remain current about, and take advantage of, new technologies.

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**TESTIFYING IN LEGAL PROCEEDINGS**

- 99. Ability to interpret and present technical results and their significance in lay terms.
- 100. Ability to look professional and maintain a professional demeanor while testifying in legal proceedings.
- 101. Ability to listen to and comprehend statements and questions made during legal proceedings.
- 102. Ability to present effective testimony that is thorough and objective using good communication skills.
- 103. Ability to prepare and use visual displays in legal proceedings.

**TRAINING**

- 104. Ability to teach others in specific knowledge areas how to perform a specific function (vocational training).

**MAINTAINING PROFESSIONAL ETHICAL STANDARDS OF CONDUCT**

- 105. Ability to advocate only the propriety of the casework that was performed, and not the position of either the prosecution or the defense.
- 106. Ability to maintain and practice high ethical standards in the performance of one’s job duties.

**This concludes the AFTE Firearm and Toolmark Examiner Job Analysis Questionnaire.**

**Please mail your completed response sheet to CPS no later than February 28,  
in the envelope provided.**

**Thank you for your assistance in this project.**