



Firearms Unit Training Manual

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TRAINING: INTRODUCTION TO THE FIREARMS UNIT

INTRODUCTION

This training is designed to familiarize all newly hired trainees with the department, crime laboratory, and firearms unit.

OBJECTIVES

The trainee should develop knowledge and skills in the following areas:

- The laboratory's mission, organization, and capabilities
- The laboratory's general policies and procedures
- The laboratory's Quality Assurance program
- The unit's security, capabilities, general equipment, and references materials
- The laboratory/unit hazards and available PPE

TRAINING

The following topics will be covered in this training module:

- The overall scope of the training program
- The competency/proficiency testing program
- The firearms unit subdisciplines and the generation of laboratory requests
- General procedures for evidence retrieval, examination, documentation, and reporting
- General procedures for discovery requests and releasing analytical results
- Proper handling and disposal of hazardous materials
- Proper use of unit equipment and the calibration/verification schedule related to each

LITERATURE REVIEW

The trainee will be provided a list of suggested literature; however, the trainee may utilize all appropriate resources to achieve the objectives and complete the assignments in this module.

WRITTEN/DISCUSSION QUESTIONS

PRACTICAL EXERCISES

FINAL WRITTEN EXAM

- Trainee must receive 80% or better with evaluation.

COMPETENCY

- Trainee must receive 100% with evaluation.

TRAINING: EXAMINATION OF FIREARMS PART 1

INTRODUCTION

This training is designed to familiarize all trainees with basic firearm examinations in order to answer investigative questions pertaining to operability, functionality, and legal classifications.

OBJECTIVES

The trainee should develop knowledge and skills in the following areas:

- Firearm safety
- Firearm classification
- Firearm operating systems
- Firearm pre-fire examination and documentation
- Firearm test fire protocol
- Firearm Operability vs. Functionality

TRAINING

The following topics will be covered in this training module:

- The universal safety rules associated with handling firearms
- How to receive, unload, transfer, transport, and store reference/evidence firearms
- The types of firearms and how to recognize, classify, and document each
- The types of operating systems and how to recognize, document, and check each
- The types of mechanical safeties and how to recognize, document, and check each
- The cycle of fire and determining manual versus automatic function
- How to conduct and document a pre-fire firearm examination
- How to load and test fire firearms using the various collection devices available
- The limitations associated with inoperable and/or malfunctioning firearms
- Reporting results of a general firearm examination

LITERATURE REVIEW

The trainee will be provided a list of suggested literature; however, the trainee may utilize all appropriate resources to achieve the objectives and complete the assignments in this module.

WRITTEN/DISCUSSION QUESTIONS

PRACTICAL EXERCISES

FINAL WRITTEN EXAM

- Trainee must receive 80% or better with evaluation.

COMPETENCY

- Trainee must receive 100% with evaluation.

TRAINING: EXAMINATION OF FIREARMS PART 2

INTRODUCTION

This training is designed to familiarize Criminalist trainees with advanced firearm examinations in order to answer investigative questions pertaining to operability, functionality, and legal classifications. Furthermore, successful completion of this training will prepare a Criminalist to testify as a subject matter expert.

OBJECTIVES

The trainee should develop knowledge and skills in the following areas:

- History and development of firearms
- Firearm manufacturing techniques
- Malfunctioning firearm diagnostics
- Homemade firearm examination and documentation
- Homemade sound suppressor examination and documentation

TRAINING

The following topics will be covered in this training module:

- Early firearms and the factors which drove the evolution to modern designs
- Past and current manufacturing techniques and how they contribute to toolmarks
- How to diagnose common sources of firearm malfunctions
- Proper disassembly for a variety of firearms in order to examine internal components
- Correcting malfunctions for the purpose of safely acquiring known samples
- How to conduct and document a pre-fire homemade firearm examination
- How to conduct and document a pre-fire homemade sound suppressor examination
- How to perform and document a qualitative examination relating to a sound suppressor's functionality
- Alternatives to traditional test firing
- Recreating case specific scenarios
- Reporting results of an advanced firearm examination

LITERATURE REVIEW

The trainee will be provided a list of suggested literature; however, the trainee may utilize all appropriate resources to achieve the objectives and complete the assignments in this module.

WRITTEN/DISCUSSION QUESTIONS

PRACTICAL EXERCISES

FINAL WRITTEN EXAM

- Trainee must receive 80% or better with evaluation.

COMPETENCY

- Trainee must receive 100% with evaluation.

TRAINING: EXAMINATION OF AMMUNITION PART 1

INTRODUCTION

This training is designed to familiarize all trainees with basic ammunition examinations in order to answer investigative questions pertaining to design and functionality.

OBJECTIVES

The trainee should develop knowledge and skills in the following areas:

- Basic ammunition components
- Basic ammunition style/design
- Basic ammunition nomenclature
- Ammunition pre-fire examination and documentation

TRAINING

The following topics will be covered in this training module:

- The types of projectiles and how to recognize, classify, and document each
- The types of cartridge cases and how to recognize, classify, and document each
- The types of primers and how to recognize, classify, and document each
- The “fire train” process
- How to conduct and document a pre-fire ammunition examination
- The limitations associated with malfunctioning ammunition

LITERATURE REVIEW

The trainee will be provided a list of suggested literature; however, the trainee may utilize all appropriate resources to achieve the objectives and complete the assignments in this module.

WRITTEN/DISCUSSION QUESTIONS

PRACTICAL EXERCISES

FINAL WRITTEN EXAM

- Trainee must receive 80% or better with evaluation.

COMPETENCY

- Trainee must receive 100% with evaluation.

TRAINING: EXAMINATION OF AMMUNITION PART 2

INTRODUCTION

This training is designed to familiarize Criminalist trainees with advanced ammunition examinations in order to answer investigative questions pertaining to design and functionality. Furthermore, successful completion of this training will prepare a Criminalist to testify as a subject matter expert.

OBJECTIVES

The trainee should develop knowledge and skills in the following areas:

- History and development of ammunition
- Ammunition manufacturing techniques
- Caliber families
- Reloaded ammunition

TRAINING

The following topics will be covered in this training module:

- Early ammunition and the factors which drove the evolution to modern designs
- Black powder versus smokeless powder
- FBI Protocol for modern ammunition
- Modern manufacturing techniques of projectiles
- Modern manufacturing techniques of cartridge cases
- Modern manufacturing techniques of primers
- American versus European caliber designations
- Nominal versus Specific caliber and interchangeability
- General reloading process and associated safety and toolmark concerns

LITERATURE REVIEW

The trainee will be provided a list of suggested literature; however, the trainee may utilize all appropriate resources to achieve the objectives and complete the assignments in this module.

WRITTEN/DISCUSSION QUESTIONS

PRACTICAL EXERCISES

FINAL WRITTEN EXAM

- Trainee must receive 80% or better with evaluation.

COMPETENCY

- Trainee must receive 100% with evaluation.

TRAINING: EXAMINATION OF FIRED CARTRIDGE CASES

INTRODUCTION

This training is designed to familiarize all trainees with basic fired cartridge case examinations in order to conduct database searches and detect investigative leads.

OBJECTIVES

The trainee should develop knowledge and skills in the following areas:

- Initial examination and documentation
- IBIS screening protocol
- IBIS Brasstrax entry and Matchpoint correlation review

TRAINING

The following topics will be covered in this training module:

- How to recognize and document class characteristics
- How to recognize and document potential subclass characteristics
- How to recognize and document fired versus cycling marks
- How to recognize and document possible manufacturing marks
- The protocol for “screening” cartridge cases prior to database entry
- The protocol for entering samples into the IBIS database*
- The protocol for reviewing correlation results and how to document possible links*
- Reporting results for general cartridge case examinations and database searches

**These topics require external training provided by FTI or the Department of Justice.*

LITERATURE REVIEW

The trainee will be provided a list of suggested literature; however, the trainee may utilize all appropriate resources to achieve the objectives and complete the assignments in this module.

WRITTEN/DISCUSSION QUESTIONS

PRACTICAL EXERCISES

FINAL WRITTEN EXAM

- Trainee must receive 80% or better with evaluation.

COMPETENCY

- Trainee must receive 100% with evaluation.

TRAINING: EXAMINATION OF FIRED BULLETS

INTRODUCTION

This training is designed to familiarize Criminalist trainees with basic fired bullet examinations in order to conduct database searches and detect investigative leads.

OBJECTIVES

The trainee should develop knowledge and skills in the following areas:

- Initial examination and documentation
- Determining nominal caliber
- General Rifling Characteristic (GRC) database searches

TRAINING

The following topics will be covered in this training module:

- How to recognize and document class characteristics
- How to recognize and document potential subclass characteristics
- How to determine nominal caliber based on weight, diameter, and/or rifling characteristics and the limitations associated with determining specific caliber
- How to generate a list of possible firearms based on GRC database search
- Reporting results for general bullet examinations and database searches

LITERATURE REVIEW

The trainee will be provided a list of suggested literature; however, the trainee may utilize all appropriate resources to achieve the objectives and complete the assignments in this module.

WRITTEN/DISCUSSION QUESTIONS

PRACTICAL EXERCISES

FINAL WRITTEN EXAM

- Trainee must receive 80% or better with evaluation.

COMPETENCY

- Trainee must receive 100% with evaluation.

TRAINING: EXAMINATION OF FIRED SHOTSHELL COMPONENTS

INTRODUCTION

This training is designed to familiarize Criminalist trainees with basic fired shotshell component examinations in order to generate investigative leads.

OBJECTIVES

The trainee should develop knowledge and skills in the following areas:

- Shotshell components and compositions
- Gauge versus caliber
- Initial examination and documentation
- Range of conclusions

TRAINING

The following topics will be covered in this training module:

- How to recognize and document class characteristics
- How to recognize and document potential subclass characteristics
- How to recognize and document fired versus cycling marks
- How to recognize and document possible manufacturing marks
- How to determine shot composition and size
- Examination of wads, shot collars, shot cups, and buffer materials
- Reporting results for general shotshell component examinations

LITERATURE REVIEW

The trainee will be provided a list of suggested literature; however, the trainee may utilize all appropriate resources to achieve the objectives and complete the assignments in this module.

WRITTEN/DISCUSSION QUESTIONS

PRACTICAL EXERCISES

FINAL WRITTEN EXAM

- Trainee must receive 80% or better with evaluation.

COMPETENCY

- Trainee must receive 100% with evaluation.

TRAINING: FIREARM/TOOLMARK IDENTIFICATION

INTRODUCTION

This training is designed to familiarize Criminalist trainees with advanced microscopic analyses in order to answer investigative questions pertaining to source conclusions. Furthermore, successful completion of this training will prepare a Criminalist to testify as a subject matter expert.

OBJECTIVES

The trainee should develop knowledge and skills in the following areas:

- History of Toolmark Identification and the subdiscipline of Firearms Identification
- AFTE's Theory of Identification and the possible range of conclusions
- Light Comparison Microscopy
- Virtual Comparison Microscopy
- Current criticisms and challenges to the discipline

TRAINING

The following topics will be covered in this training module:

- Historical contributors to the field of firearm/toolmark identification
- Evolution of instrumentation used for firearm/toolmark identification
- The scope, role, and benefits of the Association of Firearm and Toolmark Examiners
- Microscopic comparisons of fired cartridge cases/shotshells
- Microscopic comparisons of fired projectiles
- Microscopic comparisons of traditional tool/toolmarks*
- How to determine and document suitability for microscopic comparison
- How to recognize and document striated versus impressed toolmarks
- How to evaluate and document areas of agreement/disagreement
- How class, subclass, and individual characteristics contribute to source conclusions
- Factors that can contribute to disagreement and or variability
- Limitations and considerations in "no tool" cases
- Objective versus Subjective evaluations and conclusions
- Daubert criteria for admissibility
- Kelly-Frye criteria for admissibility

**Traditional tool/toolmark comparisons are optional and at the discretion of the coach and unit supervisor. The practical exercises may be completed at a later date with a separate competency test.*

LITERATURE REVIEW

The trainee will be provided a list of suggested literature; however, the trainee may utilize all appropriate resources to achieve the objectives and complete the assignments in this module.

WRITTEN/DISCUSSION QUESTIONS

PRACTICAL EXERCISES

FINAL WRITTEN EXAM

- Trainee must receive 80% or better with evaluation.

COMPETENCY

- Trainee must receive 100% with evaluation.

TRAINING: SERIAL NUMBER RESTORATION

INTRODUCTION

This training is designed to familiarize Criminalist trainees with advanced firearm examinations in order to answer investigative questions pertaining to the restoration of obliterated serial numbers. Furthermore, successful completion of this training will prepare a Criminalist to testify as a subject matter expert.

OBJECTIVES

The trainee should develop knowledge and skills in the following areas:

- Plastic deformation
- Obliteration techniques
- Restoration techniques

TRAINING

The following topics will be covered in this training module:

- The methods used by private industry to mark items
- The effects of these methods on the underlying surface
- How to recognize and document signs and types of obliteration/alteration
- How to conduct and document surface preparation prior to restoration
- How to conduct and document chemical etching restorations
- Magnetic restoration theory and techniques
- Barcode deciphering theory and techniques
- How to evaluate and document partially/fully restored characters
- Reporting results for serial number restorations
- Disposal of restoration materials

LITERATURE REVIEW

The trainee will be provided a list of suggested literature; however, the trainee may utilize all appropriate resources to achieve the objectives and complete the assignments in this module.

WRITTEN/DISCUSSION QUESTIONS

PRACTICAL EXERCISES

FINAL WRITTEN EXAM

- Trainee must receive 80% or better with evaluation.

COMPETENCY

- Trainee must receive 100% with evaluation.

TRAINING: GUNSHOT RESIDUE (GSR) DETECTION AND PROXIMITY TESTING

INTRODUCTION

This training is designed to familiarize Criminalist trainees with advanced firearm examinations in order to answer investigative questions pertaining to GSR detection and muzzle-to-target distance determinations. Furthermore, successful completion of this training will prepare a Criminalist to testify as a subject matter expert.

OBJECTIVES

The trainee should develop knowledge and skills in the following areas:

- Sources of GSR
- Chemical detection of GSR
- GSR pattern evaluations
- Shot pattern evaluations

TRAINING

The following topics will be covered in this training module:

- How to conduct and document visual examinations of GSR/shot patterns
- How to prepare and administer chemical solutions for the detection of nitrates, nitrites, copper, and lead
- How to produce test patterns for comparison
- How to determine muzzle-to-target distance based on evaluation of size and density
- Factors/variables that may affect the size and density of a pattern
- Reporting results for GSR detection and distance determinations

LITERATURE REVIEW

The trainee will be provided a list of suggested literature; however, the trainee may utilize all appropriate resources to achieve the objectives and complete the assignments in this module.

WRITTEN/DISCUSSION QUESTIONS

PRACTICAL EXERCISES

FINAL WRITTEN EXAM

- Trainee must receive 80% or better with evaluation.

COMPETENCY

- Trainee must receive 100% with evaluation.

TRAINING: TESTIMONY & MOOT COURT

INTRODUCTION

This training is designed to familiarize all trainees with basic courtroom procedures and prepare them to testify in a court of law.

OBJECTIVES

The trainee should develop knowledge and skills in the following areas:

- General courtroom terms and proceedings
- Proper courtroom demeanor
- Scope and limitations of testimony

TRAINING

The following topics will be covered in this training module:

- Terms associated with expert testimony and standard “qualifying questions”
- Practices, protocols, and various jurisdictional rules that may apply to pre-trial conferences and defense attorneys
- Establishing objectivity and personal credibility with judge and jurors
- The scope, purpose, and utility of demonstrative evidence
- Proper handling of firearms in court
- Commonly encountered defense tactics utilized during cross examination
- The 2009 National Academy of Sciences (NAS) report*
- The 2016 President’s Council of Advisors on Science and Technology (PCAST) report*

**These topics are required for trainees who will be testifying to firearm/toolmark identification only.*

LITERATURE REVIEW

The trainee will be provided a list of suggested literature; however, the trainee may utilize all appropriate resources to achieve the objectives and complete the assignments in this module.

WRITTEN/DISCUSSION QUESTIONS

PRACTICAL EXERCISES

FINAL WRITTEN EXAM

- Trainee must receive 80% or better with evaluation.

COMPETENCY

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