Washington State Patrol

Crime Laboratory Division

Firearms/Tool Marks
Training Manual

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INTRODUCTION

The following training manual will allow you as an examiner trainee to guide yourself through the various areas of knowledge integral to the field of firearms/toolmark identification. This manual is generic in its layout and allows some modification by the individual training scientist or technical lead to meet local conditions. It is paramount that you keep before you the primary and ultimate objective of this training period: to independently and competently examine and compare evidence relating to firearms and toolmark identification; to independently and competently render an opinion and reach conclusions relating to your examinations and comparisons; and to give expert testimony in court in matters encompassed within the broad definition of firearms/toolmark identification and to do this in a professional, competent and an impartial manner. The obligation is yours to maximize on the effectiveness of the training period as an opportunity to learn everything possible in this field. The extent to which you exert yourself during this training and evaluation period will bear directly on the quality of your performance in the laboratory and on the witness stand. Note well that your technical abilities and your testimony will, in turn, bear directly on the future situations of accused persons, and especially in the discipline of firearms/toolmark identification, the lives of accused persons can hang in the balance. You have a moral and ethical obligation to prepare yourself technically and professionally during training in order to be able to perform according to the most rigid standards.

You will be expected to carry out a study of all pertinent section equipment, the Firearms and Toolmarks Technical Manual, the Standard Operations Manual, the Quality Procedure Manual, the Safety Manual, and this training manual, as well as print, video and physical reference files. Integral to your course of study will be frequent daily contacts with section personnel with special expertise in certain areas. Do not hesitate to ask anyone a question, whether an examiner, supervisor, or technical lead.

Your study will include many printed references, including the basic material listed after each area of study. It is expected that during the training period that you will become thoroughly familiar with these basic references. Further, it should be noted that you should not restrict your efforts and research to those basic references. One of your primary sources of additional information will be the Firearm Section reference library. Familiarize yourself with the library's contents of all types, including the reference files, related indices, manufacturers' literature and the journal of the Association of Firearm and Tool Mark Examiners.

It is required that you keep a loose-leaf notebook of your study notes on each of the items shown in the syllabus for research, discussion, demonstration, study or practical work. Your notebook can include handwritten notes, charts, graphs, photographs, brief photocopied material, etc., at your discretion, but it must address and broaden on each of the required items of study set out in the syllabus. Organization of your notebook in a format that parallels the syllabus is suggested. This notebook will serve as a ready reference in the months and even years following your qualification, and will assist in documenting your progress during training.

A research project or projects, in addition to certain collateral duties assigned as a learning experience may supplement your training syllabus. You should be prepared to discuss your preferences in regard to a project or projects and collateral duties with your supervisor.

This training manual provides a framework for addressing the most important part of your training: preparing you to independently and competently examine firearms/toolmark related evidence and independently and to competently reach conclusions and render opinions concerning your examinations and comparisons. This on-the-job, hands-on experience is the core of your training and you will be assigned to work with experienced examiners during your training period. This will insure that you have sufficiently covered each aspect of this training manual and have a basis for continuing to develop after you have graduated beyond your initial qualification and certification.

Your training will be monitored and assisted by your Technical Lead, who has responsibility for training matters. The Technical Lead may coordinate outside schools, tours, lectures and contacts. The Laboratory Director, Supervisor and/or your Technical Lead will evaluate your progress through this training manual and will generate IOCs as modules are completed.

The order of completion for the training modules may be modified from the original order due to external training opportunities and/or the trainer's discretion. If the trainee attends NFEA, CCI or another training program for the majority of their training, the trainee along with their trainer will review the training material supplied by the external training program and compare it to the WSP training manual to assess whether the training objectives set forth in each module were achieved thorough the external training program. If an objective was not completed, the trainer will determine an appropriate procedure for completion.

External training courses (i.e. armorer's courses) and reworked cases may be used as a substitute for training assignments and practical exercises according to the trainer's discretion.

If a firearm listed in a training assignment or practical exercise is not available within the WSP CLD firearms reference collection, a similar design or type of firearm may be substituted with the trainer's approval.

Continuing Education

This manual is based on the Association of Firearm and Toolmark Examiners (AFTE) training manual, and serves as a basis for training. The trainee is expected to continue training after the completion of the modules in order to stay current with the field. This continuing education may include AFTE meetings, factory tours, armorer's courses, gelatin tests, local police ranges, the SHOT show, and reading current firearms literature.

A. ADMINISTRATIVE MATTERS AND PROCEDURES

1. Discuss the laboratory Quality Assurance Process and the Proficiency Testing with your Laboratory Director or Supervisor. Become knowledgeable about the proficiency-testing program administered by the outside independent testing services. Particularly be aware of testing and the results of testing conducted within the field of firearms and toolmark identification by this organization.

_____ _____
Lab Director/Supervisor Date

2. Discuss the laboratory policy regarding the reexamination of evidence with your Laboratory Director/Supervisor.

_____ _____
Lab Director/Supervisor Date

3. Discuss the opportunities for advancement within the Firearm Section and the laboratory system with your Lab Director/Supervisor.

_____ _____
Lab Director/Supervisor Date

4. Meet with the Lab Director and discuss the laboratory's mission, organization and capabilities.

_____ _____
Lab Director/Supervisor Date

5. Meet with representatives from other functional areas to observe how evidence is processed by their section and discuss how evidence may be examined by more than one functional area, which may affect firearms evidence examination.

_____ _____
Supervisor Date

6. Discuss with your Lab Director/Supervisor the laboratory policies regarding the following:

   a. Providing verbal results prior to release of a written laboratory report.

   b. Inquiries from submitting agencies and/or attorneys.

   c. Handling of phone logs and subpoenas.

   d. Administrative documents commonly seen in case files.

   e. Providing a laboratory report to user agencies.

   f. Laboratory policy concerning confidentiality.

_____ _____
Lab Director/Supervisor Date

7. Become familiar with the requirements and the facilities available for the secure storage of evidence within the section. Observe the evidence submission process and discuss this with a Property and Evidence Custodian. Review the request for laboratory examination (RFLE), and understand the importance of maintaining the chain of custody.

_____ _____
Lab Director/Supervisor Date

8. Become familiar with the requirements of section security in regard to firearms, evidence while under examination, controlled access, and section space security. Discuss this with the Supervisor and/or an examiner from the section.

_____ _____
Supervisor/Examiner Date

9. Familiarize yourself with the Firearms Reference Collection (FRC):

   a. Learn how to locate firearms in the FRC using the FRC inventory listings.

   b. - Know the correct procedure for checking a firearm out of the FRC.

_____ _____
Supervisor/Examiner Date

10. Be briefed by the Supervisor in regard to their files, records and procedures in regard to delinquent cases, annual and sick leave, time and attendance, report files, ordering expendable supplies, purchase orders and obtaining necessary tools, equipment and protective clothing.

_____ _____
Supervisor Date

11. Review the use of the Laboratory Information Management System (LIMS).

_____ _____
Supervisor Date

12. Read the WSP CLD PowerPoint presentation on Cognitive Bias and be able to discuss types of bias and identify ways to minimize cognitive bias.

_____ _____
Supervisor Date

13. Read the pertinent sections of the Safety Manual regarding the use of Personal Protective Equipment (PPE) as well as the proper handling and examination of evidence that may be contaminated with infectious diseases.

(Use Training Assignment #1 to complete this objective.)

_____ _____
Student Date

REFERENCE MATERIALS/ ADMINISTRATIVE MATTERS

The following reference materials serve several purposes:

- to provide a wider range of resources for use in completing pre-course assignments should you have a particular interest in a given topic.
- to provide reference materials for your future professional use.
- to allow you to gain additional depth in particular subject areas.

Should you encounter other references in this category, you are encouraged to make additional notes about them at the end of this listing.

Basic

Policies and procedure manuals for the laboratory

Firearms Safety

Dutton, G., "Firearms Safety in the Laboratory", AFTE Journal, 1997; 29(1):37-41.

National Laboratory Center, Bureau of Alcohol, Tobacco and Firearms, "Firearms Safety Guidelines for the Forensic Firearms Examiner," current edition.

Chemical Safety

Safety Data Sheets (SDS), as applicable, can be obtained in print or on disk from chemical supply houses.

National Laboratory Center, Bureau of Alcohol, Tobacco and Firearms, "National Laboratory Center Safety Procedures Manual," current edition.

Occupational Safety and Health Administration, 29 CFR Part 1910, Occupational Exposures to Hazardous Chemicals in Laboratories; Final Rule.

Biohazards

Bigbee, P.D., "Collecting and Handling Evidence Infected with Human Disease-Causing Organisms," FBI Law Enforcement Bulletin, Jul. 1987.

---. The Law Enforcement Officer and Aids, U.S. Government Printing Office, current edition.

FBI Laboratory, Bloodborne Pathogen Exposure Control Plan, current edition.

Occupational Safety and Health Administration, Bloodborne Facts - Hepatitis B Vaccination, Protection for You, current edition.

---. Bloodborne Facts - Holding the Line on Contamination, current edition.

---. Bloodborne Facts - Personal Protective Equipment Cuts Risk, current edition.

---. Bloodborne Facts - Protect Yourself When Handling Sharps, current edition.

---. Bloodborne Facts - Reporting Exposure Incidents, current edition.

---. 29 CFR Part 1910.1030, Occupational Exposure to Bloodborne Pathogens; Final Rule, current version.

"AIDS/HIV Carriers, An Organizational Response" FBI Law Enforcement Bulletin, June 1989.

Personal Protective Equipment

Ball, P. and Mikko, D., "Protective Optics," AFTE Journal, 1992; 24(1):80-81.

Occupational Safety and Health Administration, Hearing Conservation, current edition.

---. Personal Protective Equipment, current edition.

---. Respiratory Protection, current edition.

Lead Poisoning

Cayton, J.C., "Blood Lead Tests," AFTE Journal, 1975; 7(1):40.

Geibel, J., "Ammunition Can Be Hazardous to Your Health (In More than the Obvious Way)," Police and Security News, May-Jun. 1992, p. 11.

Gregory, A.M., "At Close Range," American Society of Law Enforcement Trainers Journal, Vol. 4, No. 2.

Martinez, A.M., "Lead Poisoning," FBI Law Enforcement Bulletin, Aug. 1993, pp. 1-4.

Occupational Safety and Health Administration, Standards for Occupational Exposure to Lead, Chapter XVII, Title 29, U.S. Department of Labor, Section 1910.1025.

"Publication Availability: Lead Poisoning in Shooting Range - A Menace or a Hoax," AFTE Journal, 1980; 12(4):101.

Physical Plant Safety

Occupational Safety and Health Administration, 29 CFR 1910.155, Fire Protection Regulations, Subpart L.

Quality Assurance

Washington State Patrol Crime Laboratory Division Quality Manual.

Association of Firearms and Tool Mark Examiners, "Association of Firearm and Tool Mark Examiners Quality Assurance Program, 1986," AFTE Journal, 1986; 18(3):10.

Bradford, L.W., "Barriers to Quality Achievement in Crime Laboratory Operations," AFTE Journal, 1983; 15(2): 71.

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Brundage, D.J., “Proficiency Testing in Illinois,” 1980; 12(4):76.

Hodge, E.E., “Guarding Against Error,” AFTE Journal, 1988; 20(3):290-293.

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Serrill, M.S., “Forensic Sciences: Overburdened, Underutilized,” AFTE Journal, 1980; 12(4):58.

Lucas, D.M., “American Proficiency Testing Program,” AFTE Journal, 1985; 17(1):26.

“Proficiency Testing Recommended for Crime Labs,” AFTE Journal, 1979; 11(2):22.

Thornton, J.I., “Nationwide Crime Laboratory Proficiency Project,” AFTE Journal, 1979; 11(2):23.

Individual Certification

Kopera, J., “Summary of the Study of the Feasibility of Certification,” AFTE Journal, 1992; 24(1):84-90.

Kowalski, K.F., “AFTE Certification Program,” AFTE Journal, 1996; 28(4):287-290.

Laboratory Accreditation

American Society of Crime Laboratory Directors, Laboratory Accreditation Board Manual, current edition.

Rabren, C.L., “Laboratory Accreditation,” AFTE Journal, 1982; 14(3):36.

AFTE History and Development

“Association of Firearm and Tool Mark Examiners Bylaws,” AFTE Journal, 1990; 22(1):61-70.

Howe, W.J., “Report on the Formation of the Association of Firearm and Tool Mark Examiners,” AFTE Journal, 1989; 21(2):118-119.

Ethics

“AFTE Code of Ethics,” AFTE Journal, 1991; 24(3):342-345.

“AFTE Code of Ethics,” AFTE Journal, 1993; 25(1): ix.

“AFTE Procedures for Enforcement of the Code of Ethics,” AFTE Journal, 1990; 22(4):457-470.

WSP CLD Cognitive Bias PowerPoint presentation, WSP CLD Intranet

B. BACKGROUND/HISTORY OF FIREARMS IDENTIFICATION AND CURRENT TRENDS

1. Define the following terms:

   Firearm identification

   Ballistics

(Use Training Assignment #1 to complete this objective.)

_____ _____
Examiner Date

2. Read the applicable sections from the basic references and prepare a report on the history, principles, evolution and scope of firearms identification in its broadest sense. Support your report by data accumulated in your notebook. Discuss this with the Training Officer from the section who will review your report.

(Use Training Assignment #1 and #2 to complete this objective.)

_____ _____
Examiner Date

3. Formulate an answer to the following questions:

   a. Is the Forensic Science Discipline of Firearm and Toolmark Identification an art or science?

   b. What are the types of conclusions that can be reached in firearm identification comparisons?

   c. What is the basis for each of the above conclusions?

   d. Is it possible for experts in the Forensic Science Discipline of Firearm and Toolmark Identification to disagree regarding their conclusions? Why or Why Not?

   e. How does "probability" relate to firearm identification?

(Use Training Assignment #2 to complete this objective.)

_____ _____
Examiner Date

4. Familiarize yourself with the "*Association of Firearm and Tool Mark Examiners*" (*AFTE*), to include its history, current officers, criteria for membership, committees, the AFTE glossary and the AFTE journal and be able to discuss them.

_____ _____
Examiner Date

5. Discuss with system operators the status of the ongoing research initiatives to link shootings using computer imagery such as NIBIN (National Integrated Ballistics Information Network-formerly DRUGFIRE and IBIS). Attend training at NFSTC in Largo, FL if applicable.

_____ _____
Examiner Date

6. Visit and tour the various laboratories that provide firearms and toolmark examinations within your region. Coordinate these visits with your Technical Lead.

_____ _____
Examiner Date

7. Be able to demonstrate a practical working knowledge of firearm terminology using the AFTE Glossary as the standard.

(Use Training Assignment #4 and #5 to complete this objective.)

_____ _____
Examiner Date

8. Select a topic for a research project to be completed during your training period. Obtain approval from your Technical Lead before initiation of the project. This project should contribute to the overall fund of information in the field of firearm identification. These results will be shared with the section upon completion. In addition, your results should be formatted for publication in the AFTE Journal and for presentation at an AFTE Meeting.

(Use Training Assignment #3 to begin this objective.)

_____ _____
Examiner Date

REFERENCE MATERIALS

FIREARMS IDENTIFICATION - HISTORY, PRINCIPLES, EQUIPMENT AND CURRENT DEVELOPMENTS

The following reference materials serve several purposes:

- to provide a wider range of additional resources should you have a particular interest in a given topic.
- to provide reference materials for your future professional use.
- to allow you to gain additional depth in particular subject areas.

Should you encounter other references in this category, you are encouraged to make additional notes about them at the end of this listing.

Books

Association of Firearm and Tool Mark Examiners Standardization Committee, Glossary of the Association of Firearm and Tool Mark Examiners 6th edition, available on ATFE's website.

Burrard, G., The Identification of Firearms and Forensic Ballistics, 1st edition, Charles Scribner Sons, NY, 1934, revised edition, A.S. Barnes & Co., NY, 1964.

Davis, J.E., An Introduction to Tool Marks, Firearms and the Striagraph, Charles C. Thomas, Springfield, IL, 1958.

Gunther, J.D., and Gunther, C.O., The Identification of Firearms, John Wiley and Sons, Inc., New York, 1935.

Hatcher, J.S., Hatcher's Notebook, Military Service Publishing Company, Harrisburg, PA, 1947.

---. Firearms Investigation, Identification and Evidence, and Textbook of Pistols and Revolvers, Small Arms Publishing Company, Plantersville, SC, 1946.

Hatcher, J.S., Jury, F.J. and Weller, J., Firearms Investigation, Identification and Evidence, 2nd edition, Stackpole Books, Harrisburg, PA, 1957.

Himmelwright, A.L.A., "Forensic or Legal Ballistics" in Pistol and Revolver Shooting, The Macmillan Company, NY, 1928.

Heard, B.E., Handbook of Firearms and Ballistics: Examining and Interpreting Forensic Evidence, John Wiley & Sons, New York, 1997.

Mathews, J.H., Firearms Identification, Volumes I - III, Charles C. Thomas, Springfield, IL, 1962.

NRA Firearms Fact Book, 3rd edition, National Rifle Association, Fairfax, VA, 1989.

Rowe, W. H., "Firearms Identification", Forensic Science Handbook, Vol. II, 1988, Saferstein, R. (Ed.), Prentice Hall, Englewood Cliffs, NJ, pp. 393 – 461

AFTE Journal

AFTE Criteria For Identification Committee Report, "Theory of Identification, Range of Stria Comparison Reports and Modified Glossary Definitions", 1992; 24(3)

Barrett, M.R., "Microchip and the Bullet: A Vision of the Future, 1991; 23(3): 876-883.

Bates, J.S., "Investigation of the Assassination of President John F. Kennedy," 1981; 13(1):64.

Berg, S.O., "Drama of Forensic Ballistics," 1979; 11(3):44.

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Beck, R., "Alexander von Inostranzeff and the Technical Development of Optical Comparison Systems," 1989; 21(1):67-72.

Biasotti, A.A., "Bullet Bearing Surface Composition: Variables: Fired Bullets," 1981; 13(2):94.

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---. “Firearms and Toolmark Identification: A Forensic Science Discipline,” 980;12(3):12.

---. “Methods Applied to the Comparison of Class and Individual Characteristics in Firearms and Toolmark Identification,” 1989; 21(2):260-263.

---. “Photomicrography and Illumination: Some Critical Factors,” 1979; 11(4):60.

---. “Proposal for a Computer Based Firearms Class Characteristics Information System,”1970; 2(1):12.

Biasotti, A.A. and Murdock, J., “State of the Art of Firearm & Toolmark Identification, “ 1984; 16(4):16.

Blackwell, R.J., and Framan, E.P., “Automated Firearms Identification System (AFIDS) Phase I,” 1980; 12(4):11.

Bradford, L.W., “Forensic Firearms Identification: Competence or Incompetence,” 1979; 11(2):12.

Brent, W., “Proved Guilty by Ballistics (Hadley vs Arizona),” 1973; 5(6):5.

Byron, D., “Computerized System for Identifying Firearms,” 1982; 82(3):157.

Cassidy, F.H., “Information on History of Comparison Microscopes,” 1989; 21(1):67-72.

Chamberlain, D., “Microscope Comparison Bridge,” 1972; 4(1):9.

Collins, J.M., “IBIS Manual Bullet Acquisition: Mounting Stub Modification, “1997;29(1):70-72.

Crossman, E.B., “Qualifications of a Ballistics Expert,” 1985; 17(3):119.

Dillon, J.H. and Sibert, R.W., “FBI Laboratory’s DRUGFIRE Program,” 1990; 22(2) :216.

Gardner, G.Y., “Computer Identification of Bullets,” 1979; 11(2):26

Garland, P.V., “Reexamination of Firearms Evidence in the Robert F. Kennedy Assassination,” 1976; 8(3): complete issue.

Garrison, D.H., “Guns of Brownsville,” 1986; 18(4):65.

---. “Gunsmith and the Soldier”, (Churchill vs. Burrard), 1987; 19(2): 181-187.

Goddard, C.H., “Criminal Investigation Laboratory as an Aid to Law Enforcement in the Far East,” 1985; 17(3):100.

---. “Firearms as Evidence,” 1980; 12(4):93.

---. “History of Firearms Identification,” 1980; 12(4):38.

---. “History of Firearms Identification,” 1985; 17(1):55.

---. “History of Firearms Identification,” 1989; 21(2):263-278.

---. “History of Firearms Identification to 1930,” 1993; 25(3):214-228.

---. “Identification of Projectiles in Criminal Cases,” 1987; 19(4):393-402.

---. “Scientific Identification of Firearms and Bullets,” 1979; 11(4):97.

---. “Valentine Day Massacre: A Study in Ammunition Tracing,” 1980; 12(1):44.

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Inbau, F.E., “Scientific Evidence in Criminal Cases: Firearms Identification - Ballistics”, 1981; 13(2):75.

---. “Scientific Evidence in Criminal Cases: Firearms Identification - Ballistics,” 1989; 21(2):280-293.

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Katterwe, H., “Comparison Scanning Electron Microscope,” 1983: 15(3):141.

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Lee, H.C., “Firearm Related Evidence: The Nicola Sacco and Bartolomeo Vanzetti Case,” 1985; 17(3):13.

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Computerized Technology,” 1997; 29(1):42-44.

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---. “Comparison of Three Individual Barrels Produced from One Button Rifled Barrel Blank,” 1989; 21(2):370-374.

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---. “Objective vs. Subjective Boondoggle,” 1987; 19(1):24-30.

---. “Objective vs. Subjective Boondoggle,” 1989; 21(2):413-419.

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Miller, J., “Book Review: The Law and Forensic Ballistics by T.A. Warlow,” 1997; 29(2):239, 173.

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---. “What is a Firearms Examiner: Some Provocative Thoughts,” 1970; 2(7):36.

---. “What is a Firearms Examiner: Some Provocative Thoughts,” 1989; 21(2):128-131.

Moran, B., “Building an Inexpensive High Intensity Fluorescent Lighting System for the Comparison Microscope,” 1997; 29(1):49-54.

---. “Manual and Automated Bullet and Cartridge Case Comparison Systems: A Commentary,” 1997; 29(1):55-57.

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---. “Forensic Examination of Firearms and Ammunition,” 1987; 19(2):188-197. (Lecture by Robert Churchill Feb. 25, 1931.)

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Ogihara, Y., “5000 Consecutively Fired Bullets and Cartridge Cases from .45 Caliber M1911A1 Pistol,” 1983; 15(3):127.

Ogihara, Y., Kubota, M., Sanada, M., Fukudo, K., Uchiyama, T., and Hamby, J.E., “Comparison of 5000 Consecutively Fired Bullets and Cartridge Cases from a .45 Caliber M1911A1 Pistol,” 1989; 21(2):331-343.

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Belveal, D.N., "Firearms Identification Based Upon Bullet Comparisons: Expertise or Guesswork," California Attorneys for Criminal Justice Forum, Vol. 4, No. 2, Mar. - Apr. 1977, p. 17.

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Buxton, J.T., "The Science of Ballistics: Judicial Applications," Law Notes, Vol. 34, May 1930, pp. 24 -28.

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C. FIREARMS & AMMUNITION DEVELOPMENT AND CURRENT TRENDS

1. Review the history of early firearms and ammunition development up to the advent of metallic cartridges, with particular emphasis on lock mechanisms, early rifling techniques, percussion systems, priming methods and pre-metallic cartridges. Prepare a chronological outline of this early development.

(Use Training Assignment #3 to complete this objective.)

_____ _____
Examiner Date

2. Visit the firearm collection of a museum in your region and observe first-hand those firearms that constitute examples of early firearms and ammunition development. Meet the curator of the collection and obtain their views and opinions on those firearms that are developmental benchmarks. Coordinate this tour with your Technical Lead.

_____ _____
Examiner Date

3. Tour each of the firearms reference collections, noting in particular the types of firearms that are representative of commercial and military firearm development since the advent of metallic cartridges.

_____ _____
Examiner Date

4. Trace the evolution of the rimfire cartridge from the mid-nineteenth century to the current generation of modern .22 caliber rimfire cartridges.

(Use Training Assignment #4 to complete this objective.)

_____ _____
Examiner Date

5. Study the history of centerfire cartridge development starting with black powder cartridges to the current generation of modern centerfire cartridges. Make notes to show the chronological history of this development.

(Use Training Assignment #5 to complete this objective.)

_____ _____
Examiner Date

6. Study the Firearm Section Standard Ammunition File (*SAF*) with the Firearms examiner to whom it is assigned, noting in particular cartridges and shotshells that are representative of commercial and military ammunition development during the past three decades.

_____ _____
Examiner Date

7. Conduct an in depth study of exterior bullet coatings which have been developed in the last three decades. Prepare a report concerning how this technology impacts the firearm examiner.

(Use Training Assignment #5 to complete this objective.)

_____ _____
Examiner Date

8. Obtain a copy of the (most recent) studies concerning cartridge effectiveness conducted by the FBI. Prepare a report listing trends you see unfolding in cartridge and bullet development and show any historical significance to these findings.

_____ _____
Examiner Date

9. Prepare an overview of the recent development in handguns and how this information might be of significance to the firearm examiner.

_____ _____
Examiner Date

REFERENCE MATERIALS

HISTORY OF BLACK POWDER AS A PROPELLANT

The following reference materials serve several purposes:

- to provide a wider range of resources should you have a particular interest in a given topic.
- to provide reference materials for your future professional use.
- to allow you to gain additional depth in particular subject areas.

Should you encounter other references in this category, you are encouraged to make additional notes about them at the end of this listing.

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D. MANUFACTURE OF MODERN FIREARMS

1. Numerous techniques are used in the manufacture of modern firearms. Research in detail these processes and set these out in your notes. Include but do not restrict your study to the following machining methods:

   a. Shaping
   b. Planing
   c. Drilling
   d. Reaming
   e. Turning
   f. Boring
   g. Milling-include both face milling and peripheral (slab) milling
   h. Broaching
   i. Abrasive machining-include honing, lapping, grinding, sanding, and ultrasonic methods
   j. Sawing
   k. Filing
   l. Swaging
   m. Electrochemical machining (ECM)
   n. EDM
   o. Investment casting
   p. Stamping
   q. MIM

(Use Training Assignment #6 to complete this objective.)

_____ _____
Examiner Date

2. Demonstrate your knowledge of the basic nomenclature of handguns, rifles, and shotguns.

   Include but do not restrict your study, to the following: breechface, breech bolt, bolt, bolt face, extractor, ejector, firing pin, rifling, barrel, lands, grooves, ramp, magazine, clip, ejection port, chamber and receiver.

   Point out these parts in several handguns, rifles and shotguns as applicable.

   Discuss the manufacturing techniques that would have been used to fabricate and finish each of the parts and note the machining marks on each part.

   Point out any "*mark of abuse*" which could contribute to the uniqueness of each part.

Identify areas that machining marks might "*carry over*" to another firearm.

(Use Training Assignment #7 to complete this objective.)

_____ _____
Examiner Date

3. Research in detail the following rifling techniques:

   a. Broach
   b. Button
   c. Hammer Forging
   d. Hook method
   e. Scrape method
   f. ECM
   g. EDM
   h. Flow forming

(Use Training Assignment #8 to complete this objective.)

_____ _____
Examiner Date

4. Obtain broaches and buttons for study from the section training materials. Determine the difference between barrels, which have been button rifled and those, which have been broach rifled.

(Use Training Assignment #8 to complete this objective.)

_____ _____
Examiner Date

5. Discuss and define the following terms as they relate to firearm manufacture or firearms identification.

   a. Chambering
   b. Crowning
   c. Ballizing
   d. Bore slugging
   e. Forcing cone
   f. Bore
   g. Choke
   h. Choke tube

(Use Training Assignment #8 to complete this objective.)

_____ _____
Examiner Date

6. Research the history and current significance of proof marks as they relate to the manufacture of firearms.

(Use Training Assignment #8 to complete this objective.)

_____ _____
Examiner Date

7. Visit the manufacturing facilities of at least six firearms and/or barrel manufacturers such as Wilson barrels, Ruger, Smith and Wesson, Mossberg, Marlin and US Repeating Arms. Record notes in your notebook on each visit and produce a written report of your visit for the Firearm Section files and an oral report for Firearm Section members. Particular emphasis should be placed on manufacturing and rifling techniques used by each manufacturer, noting methods and procedures which leave unique manufacturing toolmarks on firearm parts which, in turn, produce individual microscopic marks on bullets, cartridge cases and shotshell casings. Coordinate these visits with your Technical Lead.

_____ _____
Examiner Date

REFERENCE MATERIALS

MODERN FIREARMS DEVELOPMENT AND OPERATING SYSTEMS

The following reference materials serve several purposes:

- to provide a wider range of additional resources should you have a particular interest in a given topic.
- to provide reference materials for your future professional use.
- to allow you to gain additional depth in particular subject areas.

Should you encounter other references in this category, you are encouraged to make additional notes about them at the end of this listing.

Books

Association of Firearm and Tool Mark Examiners Standardization Committee, Glossary of the Association of Firearm and Tool Mark Examiners, Firearm Ignition Systems), AFTE website

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Colt 1911 .45 Auto Pistol (111 min.)

Browning Hi-Power Pistol (97 min.)

Remington 1100 Shotguns (120 min.)

Remington 870 Shotguns (95 min.)

AR-15 Rifles (120 min.)

Winchester 94 Rifles (120 min.)

SKS Rifles (120 min.)

Ruger Standard Auto MKI/MKII (90 min)

AKS/MAK 90 Type Rifles (91 min.)

Ruger Mini-14 Rifles (90 min.)

Glock 17,19,21,23 Pistols (60 min.)

Makarov Pistols (60 min.)

H&K Models 91,93,94 Rifles (60 min.)

S&W, 1st, 2nd, 3rd, Generation Pistols (105 min.)

S&W Revolvers (120 min.)

M1 Garand/M1A Rifles (90 min.)

Ruger 10/22 Rifles (60 min.)

Mossberg 500 Shotgun (90 min.)

Beretta 92/Taurus P-92 Pistols (90 min.)

M1/M2 .30 Carbine (90 min.)

FN FAL Rifles (128 min.)

Hi-Standard Auto Pistols (111 min.)

Lenny Magill Productions “Bill Wilson Presents” videotapes series including the following titles:

CZ-75 (72 min.)
Sig Sauer P226 (74 min.)

Lenny Magill productions videotapes under the following titles:

Mastering the AR-15 (120 min.)

Center X M1A/M14 (120 min.)

Mastering Revolvers (70 min.)

Rock’n Roll #1(45 min.)

Complete Ruger P-Series (45 min.)

Rock‘n Roll # 2 (50 minutes)

Complete Sigma (45 min.)

U.S. Marines Firepower (75 min.)

Complete Ruger .22 Pistol (67 min.)

Mastering the Mini-Glock (110 min)

U.S. Government training films converted to videotape and marketed by GunVideo, 4585 Murphy Canyon Road, San Diego, CA:

Thompson Sub-Machine Gun (97 min)

Infantry Weapons and Their Effects (30 min.)

Weapons of the Infantry (41 min.)

Fundamentals of Small Arms (30 min.)

B.A.R.-Browning Automatic Rifle (20 min.)

Videotapes from other sources marketed by Lenny Magill Productions under the following titles:

- Firestorm (60 min.)
- Shooting the Uzi the Israeli Way (70 min.)

- Knob Creek Machine Gun Shoot (60 min.)
- The Colt M-16 Rifle (20 min.)

Anite Productions, P.O. Box 375, Pinole, CA, videotapes under the following titles:

- Deadly Force (100 min.)
- Deadly Weapons (106 min.)
- Deadly Effects (60 min.)

Dillon Productions, 8009 East Dillon's Way, Scottsdale, AZ. videotape:

- Firestorm in the Desert - Machine Gun Magic (117 min.)

A & E Television Networks, 126 Fifth Avenue, New York, NY, videotape series:

- The Story of the Gun, Vol. I-IV (50 min. each volume)

Magnum Research, Inc., 7110 University Avenue, N.E., Minneapolis, MN, videotape:

- Desert Eagle Pistol and Friends (20 min.)

REFERENCE MATERIALS

MANUFACTURE OF MODERN FIREARMS

Books

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"Machinery Handbook, 25th Edition"

Mathews, J.H., Firearms Identification, Volume I, Charles C. Thomas, Springfield, IL, 1962, pp. 1-9.

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Oberg, Jones & Horton, Machinist's Handbook Revised 21st Edition

"Ruger Investment Casting (Company Brochure)"

Steindler, Firearms Dictionary

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E. MANUFACTURE OF MODERN AMMUNITION

1. Define in your notebook and know the meaning of the following terms as they relate to modern ammunition and its manufacture:

Cartridge
Jacketed bullet
Cartridge case
Bullet sizing
Primer
Wadcutter bullet
Shotshell
Semi-wadcutter bullet
Shotshell casing
Soft point bullet
Bottleneck cartridge
Spitzer bullet
Rebated-rim cartridge
Swaging
Rimless cartridge
Cast lead bullet
Rimmed cartridge
Mold marks
Semi-rimmed cartridge
Truncated-nosed bullet
Shoulder
Cannelure
Neck
Ogive
Mouth
Brass-coated lead bullet
Head
Copper-coated lead bullet
Headstamp
Nylon-coated lead bullet
Proof cartridge
"Silvertip" bullet
Tapered cartridge
Antimony
Extractor groove
Arsenic
Gauge
Chilled shot
Battery cup
High brass, low brass
Brass
Lubaloy
"Rule of 17"
Dram equivalent
Wadding
Single base, double base
Shot collar
Boattail bullet
Crimp
Casting seam
Bunter
Sprue
Bullet
Round-nosed bullet

Student	Date Assigned	Date Due

(Use Training Assignment #9 and Practical Exercise #1 to complete this objective.)

_____ _____
Examiner Date

2. Sketch the cross-section of Berdan and Boxer primers, showing their relationship to the head of the cartridge.

(Use Training Assignment #10 to complete this objective.)

_____ _____
Examiner Date

3. Discuss the purpose and essential ingredients of priming mixture used in modern cartridges including lead-free primers.

(Use Training Assignment #10 to complete this objective.)

_____ _____
Examiner Date

4. Know and discuss the difference between caliber and caliber type. Illustrate this difference by relating these terms to a discussion of the .22 caliber, .30 caliber and .38 caliber families of cartridges.

(Use Training Assignment #10 and Practical Exercise #2 to complete this objective.)

_____ _____
Examiner Date

5. Visit at least one ammunition-manufacturing facility such as Remington, Federal or Winchester to observe the manufacture of rimfire and centerfire cartridges and shotshells. Make detailed notes of the manufacturing processes and generate a written report for section files. Also, prepare an oral presentation for section members upon your return. Particular emphasis should be placed on pellet and bullet manufacture, shotshell casing and cartridge case manufacture and the steps involved in the loading of cartridges and shotshells. Coordinate this visit with your Technical Lead.

_____ _____
Examiner Date

REFERENCE MATERIALS

MODERN AMMUNITION EVOLUTION AND MANUFACTURE

The following reference materials serve several purposes:

Student	Date Assigned	Date Due

- to provide a wider range of resources should you have a particular interest in a given topic.
- to provide reference materials for your future professional use.
- to allow you to gain additional depth in particular subject areas.

Should you encounter other references in this category, you are encouraged to make additional notes about them at the end of this listing.

Books

ANSI/SAAMI Centerfire Pistol & Revolver Voluntary Performance Standards, Sporting Arms and Ammunition Manufacturers' Institute, Wilton, CT, current edition.

ANSI/SAAMI Centerfire Rifle Voluntary Performance Standards, Sporting Arms and Ammunition Manufacturers' Institute, Wilton, CT, current edition.

ANSI/SAAMI Rimfire Voluntary Performance Standards, Sporting Arms and Ammunition Manufacturers' Institute, Wilton, CT, current edition.

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Student	Date Assigned	Date Due

F. INSTRUMENTATION

1. Differentiate between the following:

   compound microscope

   stereo microscope

   comparison microscope

(Use Training Assignment #30 and Practical Exercise #7 to complete this objective.)

_____ _____
Examiner Date

2. Study the instruction manual for the various brands of stereo microscopes.

(Use Training Assignment #30 and Practical Exercise #7 to complete this objective.)

_____ _____
Examiner Date

3. Familiarize yourself with the instruction manuals and the mechanical and optical aspects of the various brands of comparison microscopes in the Firearm Section as well as other commercially available brands. Note the differences and similarities in each, both mechanically and optically.

(Use Training Assignment #30 and Practical Exercise #7 to complete this objective.)

_____ _____
Examiner Date

4. Familiarize yourself with the following types of light sources, which are in use in the Firearm Section on the comparison microscopes.

   Fluorescent

   Fiber optics (*with and without filters*)

   LED

(Use Training Assignment #30 and Practical Exercise #7 to complete this objective.)

_____ _____
Examiner Date

5. Using each type of light source in the field of view on a comparison microscope, note the differences in the quality of each using the following different surfaces: lead bullets, jacketed bullets, various types of cartridge cases, and various types of surfaces containing impressed and striated toolmarks. Manipulate the above light sources with respect to angle and vary the intensity of the light source, if possible.

Student	Date Assigned	Date Due

Gain an appreciation for the effects of varying the angle and intensity for each light source on each type of surface. Discuss this with your Training Officer.

(Use Training Assignments #30 and #31 and Practical Exercises #7 and #8 to complete this objective.)

_____ _____
Examiner Date

6. Set up a comparison microscope for your vision requirements and focus the "*hairline*." Prepare the microscope for your personal use, and familiarize yourself with each set of objective lenses on your comparison microscope. Become familiar different photographic systems used in the Firearm Section with the comparison microscopes. Using all of the objective lenses, make exposures of the same objects while varying the exposure, intensity and angle of the light sources. Calculate the magnification for each set of objective lenses on your comparison microscope.

(Use Training Assignment #30 and Practical Exercise #7 to complete this objective.)

_____ _____
Examiner Date

7. Become familiar with and demonstrate the use of the following equipment:

   a. micrometer
   b. inertia bullet puller
   c. steel rule (NIST traceable measuring devices)
   d. reticle in ocular lens of binocular microscope
   e. balances and scales located in the Firearm Section
   f. Stage micrometer
   g. Digital (electronic) micrometer

(Use Training Assignment #31 and Practical Exercise #7 to complete this objective.)

_____ _____
Examiner Date

REFERENCE MATERIALS

MICROSCOPY AND INSTRUMENTATION

The following reference materials serve several purposes:

- to provide a wider range of additional resources should you have a particular interest in a given topic.
- to provide reference materials for your future professional use.
- to allow you to gain additional depth in particular subject areas.

Student	Date Assigned	Date Due

Should you encounter other references in this category, you are encouraged to make additional notes about them at the end of this listing.

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---. “The Leica Universal Forensic Microscope”

---. “Reference Manual, Photostar Automatic Camera System”

---. “The Leica DMC Comparison Microscope”

Student	Date Assigned	Date Due

Basic References

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Bartels, P., "Microscope Optics"

Needham, G.H., "The Microscope A Practical Guide"

Student	Date Assigned	Date Due

G. EXAMINATION OF FIREARMS

1. Define each of the following types of firearms and explain in detail the operation of each type to include the loading of cartridges and the subsequent movement of the cartridge case and/or bullet after firing.

   a. revolver, single and double action
   b. autoloading pistol, single and double action
   c. derringer and single shot pistols
   d. bolt-action rifle
   e. autoloading rifle
   f. pump-action rifle
   g. various single shot rifles
   h. various submachine gun
   i. assault rifle
   j. muzzle loading firearm
   k. percussion revolvers

(Use Training Assignment #11 to complete this objective.)

_____ _____
Examiner Date

2. Explain and illustrate the differences between a gas-operated and a recoil-operated autoloading shotgun.

(Use Training Assignment #12 to complete this objective.)

_____ _____
Examiner Date

3. Explain and illustrate the differences between the following types of autoloading pistols:

   blowback action
   delayed blowback action
   gas-delayed blowback action
   short recoil action

(Use Training Assignment #12 to complete this objective.)

_____ _____

Student	Date Assigned	Date Due

Examiner Date

4. Partially disassemble and reassemble the following (or similar) revolvers. Photograph and note the differences in their mechanisms. Identify each part by name.

   Smith & Wesson double-action revolver

   Colt double-action revolver

   Ruger double-action revolver

   "*Old style*" Ruger single-action revolver

   "*New style*" Ruger single-action revolver

(Use Training Assignment #15 to complete this objective.)

_____ _____
Training Officer Date

5. Field strip and reassemble the following (or similar) pistols. Note and photograph differences in their mechanisms. Identify each part by name.

   a. 9mm Luger Browning, Hi-power, pistol
   b. 45 Auto caliber U.S. Pistol, Model 1911A1, pistol
   c. 9mm Luger Steyr, GB, pistol
   d. 9mm Luger Glock, Model 17, pistol
   e. 9mm Luger Beretta, Model 92F, pistol
   f. 9mm Luger SIG-Sauer, Model 226, pistol
   g. 9mm Luger Smith & Wesson, Model 669, pistol
   h. 9mm Luger H&K, P7, pistol
   i. 357 Magnum Desert Eagle pistol
   j. 9mm Luger Walther P38 pistol
   k. 380 Automatic Walther PPK pistol
   l. 8mm Arisaka Type 14 pistol
   m. 9mm Luger P08 pistol

(Use Training Assignments #16, #17, and #18 to complete this objective.)

_____ _____
Examiner Date

6. Field strip and reassemble the following (or similar) submachine guns. Note differences in the mechanism and operation of each. Make appropriate photographs for your notes and identify the major parts by name.

Student	Date Assigned	Date Due

a. .45 Auto caliber RPB Industries, M10, submachine gun (open bolt and closed bolt)

b. 9mm Luger SWD Inc., M11/Nine, submachine gun

c. 9mm Uzi submachine gun

d. 9mm H&K, MP5, submachine gun

e. .45 Auto caliber US M3 submachine gun

f. 9mm Intratec, TEC 9, submachine gun

g. .45 Auto caliber Thompson submachine gun

(Use Training Assignment #19 to complete this objective.)

_____ _____
Examiner Date

7. Familiarize yourself with the operation of each of the following (or similar) firearms. Identify the major parts by name and make appropriate notes.

a. 308 Winchester caliber U.S. Rifle, Model 70 rifle

b. 223 Remington caliber Colt Rifle, Model AR-15

c. 25-06 caliber Ruger model M77 rifle

d. 7.62 x 39mm caliber SKS rifle

e. 7.62 x 39mm caliber AK47 rifle

f. 30-30 Win. Caliber Winchester 94 rifle

g. 303 British caliber Lee Enfield rifle

h. 30-06 Springfield caliber Browning BAR rifle

i. 30-06 Springfield caliber Remington, Model 03-A3

(Use Training Assignments #21 and #22 to complete this objective.)

_____ _____
Examiner Date

8. Familiarize yourself with the operation of each of the following (or similar) shotguns. Identify the major parts by name and make appropriate notes.

a. Remington, Model 870, shotgun

b. Winchester, Model 12, shotgun

c. Mossberg, Model 500, shotgun

d. Browning, Model A5, shotgun

e. Remington, Model 1100, shotgun

Student	Date Assigned	Date Due

f. NEF, model Pardner, shotgun

g. Stevens/J.C. Higgins, Model 311, side-by-side, double-barrel, shotgun

h. Beretta, over-under, double-barrel, shotgun

i. A long recoil action shotgun, such as the Browning A5.

(Use Training Assignment #23 and #24 to complete this objective.)

_____ _____
Examiner Date

9. Familiarize yourself with the operation of each of the following (or similar) firearms. Identify the major parts by name and make appropriate notes.

a. .22 caliber Marlin, Model 60 rifle

b. .22 caliber Winchester, Model 62, rifle

c. .22 caliber Ruger, Model 10/22, rifle

d. .22 caliber Ruger, MKII, pistol

e. .22 caliber Browning, Challenger III, pistol

f. .22 caliber High Standard, Dura-Matic, pistol

(Use Training Assignment #25 to complete this objective.)

_____ _____
Examiner Date

10. Familiarize yourself with the operation of each of the following (or similar) firearms. Identify the major parts by name and make appropriate notes.

a. .25 Auto caliber Raven Arms pistol

b. .25 Auto caliber Colt Jr. pistol

c. .25 Auto caliber Beretta pistol

d. .25 Auto caliber Lorcin pistol

e. .25 Auto caliber Bauer pistol

f. .25 Auto caliber Titan pistol

g. .25 Auto caliber Browning pistol

(Use Training Assignment #20 to complete this objective.)

_____ _____
Examiner Date

11. Familiarize yourself with the Firearm Section Range Rules and Safety Rules regarding firearms. Demonstrate, using firearms from No. 4 through No. 9 above and others, how to place firearms in a safe condition, how to load and unload each, how to handle

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and carry these firearms in the Laboratory, and how to safely test fire each of these different types of firearms.

(Use Training Assignments #15 through #25 to complete this objective.)

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Examiner Date

12. Using the firearms in No. 4 through No. 9 above, study the various safety mechanisms employed in each design. Include thumb safety, grip safety, magazine safety, firing pin block, transfer bar, and any other mechanical safety. Illustrate how the firing mechanisms are blocked, interrupted, or otherwise stopped from operating.

(Use Training Assignments #15 through #29 and Practical Exercises #3 through #6 to complete this objective.)

_____ _____
Examiner Date

13. Familiarize yourself with the Firearm Section equipment used for measurement of trigger pull. Determine the trigger pull on at least one firearm from each of the firearms listed in the No. 4 through No. 9 groups, using various methods and compare the results.

(Use Training Assignments #15 through #29 and Practical Exercises #3 through #6 to complete this objective.)

_____ _____
Examiner Date

14. Discuss with your Training Officer the protocol to be used in determining whether a firearm "*can be made to fire without pulling the trigger*." Demonstrate, using one firearm from each of the No. 4 through No. 9 groups of firearms above, how to conduct this type of examination.

(Use Training Assignments #15 through #29 and Practical Exercises #3 through #6 to complete this objective.)

_____ _____
Examiner Date

15. Research, define, and/or determine the implications of the following terms as they relate to safety in the operation of a firearm.

    a. excessive headspace
    b. bore obstruction
    c. barrel bulge
    d. broken extractor

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e. push off
f. trigger shoe
g. false half-cock
h. slam-fire
i. inadequate/improper sear engagement
j. defective safety
k. high primer
l. rail splitting
m. hairline cracks
n. improper timing
o. excessive pressure
p. dented barrel
q. jar-off

(Use Training Assignment #28 and Practical Exercise #5 to complete this objective.)

_____ _____
Examiner Date

16. Become familiar with the Section firearm range including its physical dimensions, construction of walls and backstop, and bullet velocity limitations. Know how to test fire firearms thought to be possibly unsafe. Become familiar with the use of all the equipment on the range. Know the range rules and emergency medical treatment procedures.

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Examiner Date

17. Attend armorer training offered by various manufacturers of firearms, at their manufacturing facilities, if possible. Coordinate these with your Technical Lead.

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Examiner Date

18. Explore the capabilities in restoring an inoperable evidence firearm to operating condition and also know the limitations and reservations, which must be considered. Discuss these with your Technical Lead/experienced examiner.

_____ _____
Examiner Date

19. Review and record the references in the Firearm Section library, which can be used to identify the manufacturer and/or source of a firearm using the following criteria:

a. proof marks

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b. inspector marks

c. factory numbers and markings

d. serial number

e. part numbers

f. company logos

(Use Training Assignment #29 and to complete this objective.)

_____ _____
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20. Discuss the following topics with your Technical Lead/experienced examiner and become familiar with the capabilities and limitations of the section in regard to these areas:

    a. Marking evidence firearms, recognition, documentation, recovery, and retention of trace evidence from the bore of a firearm prior to test firing.

    b. Determining whether an evidence firearm has been "*recently*" fired

    c. Determining the manufacturer of a firearm from an examination of a part from a firearm.

    d. Determining the manufacturer of a firearm from a photograph and comparing an evidence firearm to a photograph

(Use Training Assignment #29 and Practical Exercise #6 to complete this objective.)

_____ _____
Examiner Date

21. Become knowledgeable about how to submit evidence firearms to the Laboratory when they have been recovered from water or when they are in a rusted condition. Also, become familiar with the capabilities, limitations, and reservations, which must be considered when restoring such firearms to operating condition to obtain test specimens from them.

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Examiner Date

22. Discuss with your Training Officer how to conduct an examination to determine if a firearm has been altered to fire full automatic. Using a firearm, which has been altered to fire full automatic, conduct this type of examination and verbally report your findings.

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Examiner Date

Student	Date Assigned	Date Due

REFERENCE MATERIALS

GENERAL PRELIMINARY EXAMINATIONS OF FIREARMS

The following reference materials serve several purposes:

- to provide a wider range of additional resources should you have a particular interest in a given topic.
- to provide reference materials for your future professional use.
- to allow you to gain additional depth in particular subject areas.

Should you encounter other references in this category, you are encouraged to make additional notes about them at the end of this listing.

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Student	Date Assigned	Date Due

H. BULLET EXAMINATIONS AND COMPARISONS

1. Define what is meant by or determine the significance of the following terms or phrases as they relate to the examination and comparison of fired bullets. Discuss these with your training officer:

   a. slippage
   b. shaving
   c. obturation
   d. leading edge and trailing edge
   e. melting
   f. blow-by
   g. striation
   h. individual microscopic marks
   i. ogive
   j. bearing surface
   k. class characteristics
   l. general rifling "insufficient individual microscopic marks"
   m. corrosion
   n. leading
   o. "limited individual microscopic marks"
   p. "single-action" firing
   q. "double-action" firing
   r. knurled & grooved cannelure
   s. stab crimp
   t. Boattail
   u. open base
   v. closed base
   w. recessed base
   x. skived tip/hollow point
   y. trace evidence aspects (lacquers, sealants, painted tips, tip inserts)

(Use Training Assignment #32 to complete this objective.)

_____ _____
Examiner Date

Student	Date Assigned	Date Due

2. As they relate to the examination and comparison of fired bullets or bullet fragments, know the importance of, and limitations of, determining the following:

   a. weight
   b. caliber
   c. caliber type
   d. manufacturer
   e. general rifling characteristics
   f. pitch of rifling
   g. depth of rifling
   h. jacket construction/composition

Discuss this with your Technical Lead/experienced examiner.

(Use Training Assignment #33 and Practical Exercise #9 to complete this objective.)

_____ _____
Examiner Date

3. Familiarize yourself with the Standard Ammunition File (SAF). Know how to search this file manually and by use of the computer in order to determine the manufacturer of fired bullets. Demonstrate your proficiency in using this file to your Technical Lead/experienced examiner.

(Use Training Assignment #33 and Practical Exercise #9 to complete this objective.)

_____ _____
Examiner Date

4. Become familiar with the IBIS/NIBIN system. Observe the IBIS technician enter fired cartridge cases and/or shotshells into the system and conduct correlations using MatchPoint.

(Use Training Assignment #33 and Practical Exercise #9 to complete this objective.)

_____ _____
Examiner Date

5. Familiarize yourself with the General Rifling Characteristics (GRC) database. Know how to use this file to compile a list of firearms in a "no-gun case." Demonstrate your proficiency in using the GRC file to your Technical Lead/experienced examiner.

(Use Training Assignment #33 and Practical Exercise #9 to complete this objective.)

_____ _____
Examiner Date

Student	Date Assigned	Date Due

6. Using test bullets and other fired bullets and bullet fragments provided to you, demonstrate your proficiency in accurately determining caliber, caliber type, manufacturer, and rifling characteristics of these fired bullets. Also, prepare a list of firearms that could have been used to fire these bullets provided to you. As necessary, use the test fire, SAF, and GRC files in conducting these examinations.

(Use Training Assignments #34, and #35 and Practical Exercises #8a, #9 and #10 to complete this objective.)

_____ _____
Examiner Date

7. Determine the methods and techniques used to differentiate between lead bullets and bullet cores.

(Use Training Assignment #43 to complete this objective.)

_____ _____
Examiner Date

8. Using test bullets fired from polygonal rifled barrels, demonstrate your proficiency in accurately determining the rifling characteristics of these fired bullets. Compile a list of firearms that could have been used to fire these bullets using the GRC file.

(Use Training Assignment #38 to complete this objective.)

_____ _____
Examiner Date

9. Become knowledgeable about the facilities in the section for the recovery of fired test bullets. Know when and how to use the horizontal recovery tank and cotton boxes and their limitations. Observe and assist an experienced examiner in the recovery of fired bullets using each of these methods. Know and observe all safety rules.

(Use Training Assignment #39 and Practical Exercise #14 to complete this objective.)

_____ _____
Examiner Date

10. Familiarize yourself with the ammunition storage areas in the section. Know how to locate test ammunition after correctly selecting test ammunition using the SAF. Discuss with an experienced examiner the reasons for using substitute ammunition or downloading ammunition for test firing. Know the proper procedure for downloading ammunition for test firing. Under supervision of an experienced examiner, prepare and fire downloaded test ammunition.

(Use Training Assignment #39 and Practical Exercise #14 to complete this objective.)

_____ _____

Student	Date Assigned	Date Due

Examiner Date

11. Test fire "*consecutively-made*" barrels and/or microscopically compare test bullets from "*consecutively-made*" barrels. Observe the differences and similarities in the striations and discuss this with your Technical Lead/experienced examiner.

(Use Training Assignment #41 to complete this objective.)

_____ _____
Examiner Date

12. Using the same .22 caliber firearm, test fire two each of the following cartridges and attempt to identify the test bullets with each other. Take appropriate photographs and notes.

    a. .22 Long Rifle caliber Remington with lead bullets
    b. .22 Long Rifle caliber Winchester with lead bullets
    c. .22 Long Rifle caliber Remington with brass-coated lead bullets
    d. .22 Long Rifle caliber Winchester with copper-coated lead bullets
    e. .22 Long caliber Remington with lead bullets

(Use Training Assignment #40 and Practical Exercise #15 to complete this objective.)

_____ _____
Examiner Date

13. Using the same .357 Magnum caliber revolver, test fire two each of the following cartridges and attempt to identify the test bullets with each other. Take appropriate photographs and notes.

    a. .38 Special caliber Remington lead round-nosed bullet
    b. .38 Special caliber Remington jacketed bullet
    c. .357 Magnum caliber Remington jacketed bullet
    d. .357 Magnum caliber Winchester Silvertip bullet
    e. .357 Magnum caliber Federal Nyclad bullet

(Use Training Assignment #37 and Practical Exercise #12 to complete this objective.)

_____ _____
Examiner Date

14. Using the same 9mm Luger pistol, test fire two each of the following cartridges and attempt to identify the test bullets with each other. Take appropriate photographs and notes.

    a. 9mm Luger Federal Hydra-shok

Student	Date Assigned	Date Due

b. 9mm Luger PMC Starfire

c. 9mm Luger Remington full metal jacket

d. 9mm Luger Winchester Silvertip

e. 9mm Luger CCI total metal jacket

f. 9mm Luger Black Talon/Ranger SXT

g. 9mm Luger Federal Nyclad

(Use Training Assignment #36 and Practical Exercise #11 to complete this objective.)

_____ _____
Examiner Date

15. Using a .22 caliber rifle, test fire and recover two test bullets and identify these bullets with each other. Cut off approximately three inches of the muzzle of the barrel and crown the muzzle end of the barrel. Test fire and recover two test bullets using the same ammunition as above. Microscopically compare these bullets with each other and with the previously fired test bullets.

(Use Training Assignment #14 to complete this objective.)

_____ _____
Examiner Date

16. Using a 30 caliber rifle, test fire two each of the following cartridges and compare the tests with each other. Conduct this test with an experienced examiner.

    30 caliber Remington jacketed soft-point bullet

    30 caliber Remington Accelerator cartridges

    Test fire and inter-compare steel jacket bullets vs. Copper jacket bullets from the same barrel

(Use Training Assignment #42 to complete this objective.)

_____ _____
Examiner Date

17. Using a .32 S & W caliber Harrington & Richardson revolver, test fire two each of the following cartridges and compare the test bullets with each other. Conduct this test with an experienced examiner.

    .32 S & W caliber Remington with lead bullet

    .32 Auto caliber Remington with full metal case jacketed bullet

_____ _____
Examiner Date

Student	Date Assigned	Date Due

18. Test fire each of the following pistols. Using two test bullets from each pistol or a similar type, make microscopic comparisons of the test bullets. Conduct this test with an experienced examiner.

    9mm Glock pistol

    9mm H&K, Model P7, pistol

    9mm Steyr, Model GB, pistol

_____ _____
Examiner Date

19. Compile a list of reasons as to why bullet identifications cannot be made in some cases, and why some barrels and bullets can preclude or tend to preclude identifications. This list should include, but not be limited to, the results of the above testing.

_____ _____
Examiner Date

20. Discuss the significance of identifying manufacturing toolmarks on a fired bullet from a victim with those on unfired bullets loaded into cartridges from the suspect. Read the article in the April 1985 issue of the Crime Laboratory Digest concerning "*Manufacturing Toolmark Identification on the Base of Jacketed Bullets*."

(Use Training Assignment #44 to complete this objective.)

_____ _____
Examiner **Date**

21. Discuss the feasibility of determining caliber and/or the rifling characteristics of a fired bullet from an examination of a bullet hole in metal.

(Use Training Assignment #44 to complete this objective.)

_____ _____
Examiner Date

22. Test fire a .22 caliber firearm. Compare and identify test bullets with each other. Using this same firearm, "slug" the barrel and compare the previously fired test bullets with the bullets used to "*slug*" the barrel. Cut off approximately 25 percent of the barrel at the muzzle and "*slug*" this portion of the barrel and compare these tests with the previous test bullets. Conduct this exam with an experience examiner.

(Use Training Assignment #14 to complete this objective.)

_____ _____
Examiner Date

Student	Date Assigned	Date Due

23. Obtain a copy of and familiarize yourself with the Firearm and Toolmark technical manual for the examination of fired bullets.

(Use Training Assignment #44 to complete this objective.)

_____ _____
Examiner Date

REFERENCE MATERIALS

BULLET EXAMINATIONS AND COMPARISONS; SHOTSHELL PROJECTILES

The following reference materials serve several purposes:

- to provide a wider range of additional resources should you have a particular interest in a given topic.
- to provide reference materials for your future professional use.
- to allow you to gain additional depth in particular subject areas.

Should you encounter other references in this category, you are encouraged to make additional notes about them at the end of this listing.

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Student	Date Assigned	Date Due

I. CARTRIDGE/CARTRIDGE CASE EXAMINATIONS AND COMPARISONS

1. Describe "*class characteristics*" as the phrase applies to markings on a cartridge or a fired cartridge case. Determine the types of marks that may be left on a cartridge case/cartridge during loading/extracting and firing. Review video regarding the slow motion of firing sequences using semiautomatic firearms.

(Use Training Assignment #45 to complete this objective.)

_____ _____
Examiner Date

2. Test fire each of the following firearms (or similar) at least twice. Using the test fired cartridge cases, visually relate the markings imparted to the fired cartridge case with the part on the firearm which produced these markings. Also load and extract at least two cartridges from each of the following firearms and visually relate the markings imparted to the unfired cartridges with the part on the firearm that will produced these markings.

   a. 9mm SWD Inc., M11/Nine, submachine gun
   b. 9mm Glock pistol
   c. .45 Auto caliber U.S. Pistol, Model 1911 (or similar)
   d. 9mm Beretta pistol, model 92F
   e. .22 Long Rifle caliber Ruger, MKII, pistol
   f. .22 Long Rifle caliber Ruger, 10/22, rifle

(Use Training Assignment #46 to complete this objective.)

_____ _____
Examiner Date

3. Using the test cartridge cases and cartridges from paragraph 2, above, microscopically examine all of the markings with each other. Include the following types of markings in your microscopic comparisons: firing pin impression, breechface marks, chamber marks, anvil marks, extractor marks, ejector marks, ramp marks, and slide drag marks, slide scuff marks, ejection port scuffmarks and magazine lip marks. Photograph the results of your comparisons.

(Use Training Assignment #46 to complete this objective.)

_____ _____
Examiner Date

4. Test fire the following firearms (or similar) using comparable CCI, Remington, Federal, and Winchester ammunition of the appropriate caliber type for each firearm. Select ammunition with both nickel and brass primers. Test fire each firearm at least twice

Student	Date Assigned	Date Due

using each brand of ammunition. Microscopically examine and photograph the markings as in paragraph 3, above.

a. 38 Special caliber Smith & Wesson, Model 10, revolver
b. 357 Magnum caliber Smith & Wesson, Model 19, revolver
c. 9mm Smith & Wesson, Model 669, pistol
d. 22 Long Rifle caliber Colt, Woodsman, pistol

(Use Training Assignment #47 to complete this objective.)

_____ _____
Examiner Date

5. Test fire a .22 Long Rifle caliber six-shot revolver, fire six .22 Long Rifle caliber cartridges, six .22 Long caliber cartridges, and six .22 Short caliber cartridges of the same manufacturer. Mark each cartridge to note the chamber in which it is fired. Examine and photograph the markings imparted to the fired cartridge cases.

(Use Training Assignment #48 to complete this exercise.)

_____ _____
Examiner Date

6. Discuss the possibility of comparing and identifying reloading-type marks on cartridges/cartridge cases. Identify the various types of marks that may be indicative of reloaded ammunition. Become familiar with the reloading equipment in the Section and the procedures used in reloading cartridges. Reload several cartridges and compare reloading-type marks on these cartridges with each other.

(Use Training Assignment #49 to complete this objective.)

_____ _____
Examiner Date

7. Discuss the feasibility of comparing and identifying manufacturing toolmarks on a fired cartridge case from the scene of a crime with cartridges that can be associated with the suspect. Identify the various types of manufacturing toolmarks that may be present on cartridges or cartridge cases.

(Use Training Assignment #49 to complete this objective.)

_____ _____
Examiner Date

8. Test fire a .30 Carbine caliber U.S. Carbine and compare the test cartridge cases with each other. Compare all of the marks imparted to the fired cartridge cases. Load and extract cartridges from this same firearm. Note and compare all of the marks imparted to the test cartridges.

Student	Date Assigned	Date Due

(Use Training Assignment #50 to complete this objective.)

_____ _____
Examiner Date

9. Read the following two articles in the October 1989 issue of the AFTE journal and discuss them with your Technical Lead or an experienced examiner.
   a. "Firing Pin Impressions - Their Measurement and Significance"
   b. "Firing Pin Impressions - Their Relation to Hammer Fall Conditions"

_____ _____
Examiner Date

10. Obtain a copy of and be familiar with the Firearm Section protocol for the examination of cartridges and cartridge cases.

(Use Training Assignment #45 to complete this objective.)

_____ _____
Examiner Date

11. Compare test firings from various firearms before the breech and bore are cleaned and after the breech and bore are cleaned.

(Use Training Assignment #51 to complete this objective.)

_____ _____
Examiner Date

12. Use a series of examinations that incorporate bullets, cartridge cases, firearms and the comparison microscope during an “on going investigation.”

(Use Practical Exercises #13. #16, #18 and #19 to complete this objective.)

_____ _____
Examiner Date

REFERENCE MATERIALS

CARTRIDGE AND CARTRIDGE CASE EXAMINATIONS AND COMPARISONS

The following reference materials serve several purposes:

- to provide a wider range of additional resources should you have a particular interest in a given topic.
- to provide reference materials for your future professional use.

Student	Date Assigned	Date Due

- to allow you to gain additional depth in particular subject areas.

Should you encounter other references in this category, you are encouraged to make additional notes about them at the end of this listing.

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Sharpe, Complete Guide to Hand Loading

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Student	Date Assigned	Date Due

J. SHOTSHELL AND SHOTSHELL COMPONENT EXAMINATIONS AND COMPARISONS

1. Determine what type of examinations may be conducted and what conclusions can be reached from an examination of the following components. Discuss this with your Technical Lead or experienced examiner.

   Shot, deformed and undamaged

   Fired card or fiber wads

   Fired plastic wads

   Fired shotshell casings

   Unfired shotshells

   Shot buffer material

   Shot collar and shot cup

(Use Training Assignment #56 and Practical Exercise #17 to complete this objective.)

_____ _____
Examiner Date

2. Familiarize yourself with the use of the SAF in regard to the determination of gauge and manufacturer of fired shotshell components. Know the limitations in regard to making such determinations. Demonstrate your proficiency in using the SAF to conduct this type of search to your Technical Lead or an experienced examiner.

(Use Training Assignment #55 to complete this objective.)

_____ _____
Examiner Date

3. Using a shotgun, saw off a portion of the barrel. Test fire this shotgun using a Remington shotshell with a power piston wad. Recover the test shotshell wads and make microscopic comparisons of marks imparted to the test wads.

(Use Training Assignment #59 to complete this objective.)

_____ _____
Examiner Date

4. Test fire the following (or similar) shotguns using at least two test shotshells from each shotgun and microscopically compare the marks imparted to these fired shotshells. Include in your comparisons the following types of marks: firing pin impression, breechface marks (*primer, battery cup, and head*), extractor marks, ejector marks, chamber marks, and any other mechanism marks. Photograph these marks and discuss the significance of identifying any of these types of marks.

Student	Date Assigned	Date Due

Mossberg, model 500, pump-action shotgun

Remington, Model 1100, semiautomatic shotgun

Marlin, model 55, bolt-action shotgun

J.C. Higgins, Model 1011, top-break single shot shotgun

Beretta, Silver Snipe model, over-under double barrel shotgun

Stevens, Model 311, side by side double barrel shotgun

(Use Training Assignment #58 to complete this objective.)

_____ _____
Examiner Date

5. Using a 12-gauge Remington, Model 1100, shotgun, obtain at least two test shotshell casings with each of the following types of ammunition. Also, recover a representative number of the fired pellets and fired wadding from each test firing. Compare markings on these test fired shotshells with each other. Examine the fired components that are recovered and compare them to unfired components of the same type. Discuss the significance of your findings.

12-gauge Remington, 2 3/4" Magnum, 00 Buck

12-gauge Remington, 2 3/4" Shur-Shot, #8 shot

12-gauge Federal, 2 3/4" Magnum, 00 Buck

12-gauge Federal, 2 3/4" Field load, #9 shot

12-gauge Activ, 2 3/4" Field load, #7 shot

12-gauge Activ, 2 3/4" Magnum, BB shot

12-gauge Winchester, 2 3/4" Xpert, #6 shot

12-gauge Winchester, 2 3/4" Super-X, #7 shot

(Use Training Assignment #57 to complete this exercise.)

_____ _____
Examiner Date

6. Discuss in detail the procedures used in reloading shotshells and familiarize yourself with the shotshell reloading equipment in the Firearm Section. Know how to recognize reloaded shotshells from an examination of the shotshell casing and/or its components. Reload shotshells using the shotshell reloading equipment in the section and examine the reloaded shotshells for reloading-type marks.

(Use Training Assignment #60 to complete this objective.)

_____ _____
Examiner Date

Student	Date Assigned	Date Due

7. Research the current U.S. shot sizes and weights and obtain a chart reflecting the data. Familiarize yourself with the variations worldwide in shot size and composition. Learn the significance of the "*Rule of 17*" as it applies to shot size.

(Use Training Assignment #55 to complete this objective.)

_____ _____
Examiner Date

8. Coordinate with your Technical Lead or an experienced examiner to go to a shotgun range to pattern shotguns. A variety of shotguns, chokes, and ammunition are required for this assignment. You will create patterns at differing distances using different combinations of shotguns, chokes, and ammunition. Different target surfaces will be used.

(Use Training Assignment #60 to complete this objective.)

_____ _____
Examiner Date

REFERENCE MATERIALS

SHOTSHELL AND FIRED SHOTSHELL EXAMINATIONS AND COMPARISONS

The following reference materials serve several purposes:

- to provide a wider range of additional resources should you have a particular interest in a given topic.
- to provide reference materials for your future professional use.
- to allow you to gain additional depth in particular subject areas.

Should you encounter other references in this category, you are encouraged to make additional notes about them at the end of this listing.

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Student	Date Assigned	Date Due

K. GUNSHOT RESIDUE EXAMINATIONS AND DISTANCE DETERMINATIONS

1. Successfully complete the Gunpowder and Primer Residues Course at the FBI Academy, Quantico, Virginia, or equivalent course. Coordinate this with your Technical Lead.

(Use Training Assignment #52 to complete this objective.)

_____
Instructor, Location, and Date

_____ _____
Technical Lead Date

2. Demonstrate your proficiency in preparing the chemicals and the test papers used in the modified Griess test, the Sodium Rhodizonate test and copper testing, including the test media and the photographic paper.

(Use Training Assignment #53 to complete this objective.)

_____ _____
Examiner Date

3. Describe in detail the chemical reactions that take place in the burning of smokeless powder, the modified Griess test, the Sodium Rhodizonate test and copper testing.

(Use Training Assignment #53 to complete this objective.)

_____ _____
Examiner Date

4. Demonstrate your proficiency in conducting the following techniques, using the techniques set out in the Firearm Section protocol manual:

   a. conventional Modified Griess test
   b. reverse Griess test
   c. sodium rhodizonate test
   d. copper testing
   e. Bashinsky transfer
   f. blotting transfer

_____ _____
Examiner Date

5. Using specimens provided to you by your Technical Lead or an experienced examiner, demonstrate your proficiency in conducting "*muzzle-to-garment*" distance

Student	Date Assigned	Date Due

tests in cases involving the deposition of gunshot residues. Your examination should include note taking, microscopic and chemical examinations, test firing to produce test patterns and accurately determining "*muzzle-to-garment*" distance.

(Use Practical Exercises #21, 22, 24, 25, 26 to complete this objective.)

_____ _____
Examiner Date

6. Using specimens provided to you by your Technical Lead, demonstrate your proficiency in conducting "*muzzle-to-garment*" distance tests in cases involving shot patterns. Your examination should include note taking; microscopic; and chemical examinations; test firing of shot patterns; gunshot residue patterns; and accurately determining *"muzzle-to-garment*" distance; orientation of the firearm; sources and patterns of gunshot residues (e.g., muzzle perpendicular vs. muzzle oblique; GSR patterns from flash suppressors; sound suppressors; and revolver cylinder gap); and geometric aspects of powder and GSR patterns.

(Use Practical Exercises #23 to complete this objective.)

_____ _____
Examiner Date

7. Read the article entitled "*Graphical Analysis of the Shotgun/Shotshell Performance Envelope in the Distance Determination Cases*" in the AFTE Journal, October 1989, issue. Discuss this article with your Technical Lead or an experienced examiner.

(Use Training Assignment #54 to complete this objective.)

_____ _____
Examiner Date

8. Attend an autopsy of a shooting victim at the Medical Examiner's facilities. Document any indications of gunshot residue deposits photographically. Also, document the physical effects of the projectile on the body. Prepare a report on your observations and include any information obtained by medical examiner personnel concerning their opinions on distance determination and bullet effects, cause of death, direction of bullet travel and other information pertinent to firearm identification.

_____
Medical Examiner, Location, and Date

_____ _____
Training Officer Date

Student	Date Assigned	Date Due

REFERENCE MATERIALS

TERMINAL BALLISTICS: GUNSHOT RESIDUES, SHOT TERMINAL BALLISTICS: GUNSHOT RESIDUES, SHOT PATTERNS, DISTANCE DETERMINATIONS, BULLET PATH ANALYSES AND WOUND EFFECTS ANALYSES AND WOUND EFFECTS

The following reference materials serve several purposes:

- to provide a wider range of additional resources should you have a particular interest in a given topic.
- to provide reference materials for your future professional use.
- to allow you to gain additional depth in particular subject areas.

Should you encounter other references in this category, you are encouraged to make additional notes about them at the end of this listing.

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Student	Date Assigned	Date Due

L. TOOLMARK EXAMINATIONS AND COMPARISONS

1. Review your notes in reference to the section entitled "*Manufacture of Modern Firearms*." Those machining methods are the basis for toolmark identification as they were for firearm identification. However, it should be noted that in the broad definition of toolmarks identification, certain other related types of examinations are also performed.

(Use Training Assignment #61 to complete this objective.)

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Examiner Date

2. Define the word "tool" and "toolmarks identification" in the narrow sense of the expression. Also define toolmark identification in its broadest sense, and determine the kinds of conclusions that may be reached in toolmark identification. Set these out in detail and be prepared to discuss these with your Technical Lead or an experienced examiner.

(Use Training Assignment #61 to complete this objective.)

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Examiner Date

3. Discuss the significance of examining submitted tools first for trace evidence and itemize several types of such deposits.

(Use Training Assignment #61 to complete this objective.)

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Examiner Date

4. In a case involving a toolmark examination wherein no tool is submitted, determine the types of conclusions which can be reached. Consider such things as the type of tool, size of the tool, action employed by tool, value of toolmark for comparison purposes, and unusual tool features. Discuss the "*no tool*" case with your Technical Lead or an experienced examiner.

(Use Training Assignment #61 to complete this objective.)

_____ _____
Examiner Date

5. Define the following terms as they relate to toolmark identification and give three examples of tools or methods that could produce each category:

   a. Shearing

   b. Pinching

Student	Date Assigned	Date Due

c. Fracture
d. Scrape mark
e. Impression
f. Slicing

(Use Training Assignment #62 to complete this objective.)

_____ _____
Examiner Date

6. Define the term "*class characteristics*" as it applies to toolmark identification. Using the tools or methods selected as examples in the above, describe their respective class characteristics in detail.

Select at least two tools representative of each category listed in paragraph 5, above. Produce toolmarks with each tool and observe the class characteristics of the toolmark. Vary the angle and force with which each tool is used.

(Use Training Assignment #62 to complete this objective.)

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Examiner Date

7. Using soft copper wire of approximately 1/4-inch diameter, make cuts through it with the tools that employ a shearing, pinching and slicing action. Make test cuts in lead using the same tools. Attempt to identify the cuts in the copper wire as having been made by the same tool as that which cut the test lead. Support your results with photographs and note any lighting considerations made necessary by the color difference between copper and lead.

_____ _____
Examiner Date

8. Select a flat-bladed tool such as a screwdriver, and a pry bar and make marks in a piece of copper or brass sheeting. Make the same type of marks in lead with both tools. Microscopically compare those in the brass or copper sheeting with the test marks in the lead. Attempt to identify the appropriate marks with the appropriate tool. Photograph your results and comment on the difference in the quality of marks made by each tool.

_____ _____
Examiner Date

9. Using a drive pin punch, produce an impression in a piece of brass sheeting. Produce a set of test marks in lead and examine these two marks. Attempt to identify these as having been made by the same tool. Support your results by photographs.

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Student	Date Assigned	Date Due

Examiner Date

10. Using a junked doorknob and a serrated-jawed tool, have your Technical Lead or an experienced examiner produce impressions and scrape marks like those produced by an attempt at an entry. Devise a method of obtaining test marks in lead like those produced by the serrated-jawed tool on the doorknob. Microscopically examine the marks on the doorknob with those on the test material. Identify the tool with the marks on the doorknob and reproduce the tool-doorknob orientation and relate each mark to its respective serration on the tool.

_____ _____
Examiner Date

11. Learn the technique of reverse lighting. Obtain a piece of brittle material such as Plexiglas or pot metal and fracture it into two fragments. Attempt to identify the two fragments as having once been a single object. Take notes and support your results by photographs.

_____ _____
Examiner Date

12. Obtain an ax blade that contains numerous defects. Cut a piece of seasoned wood such as dowel rod with the ax blade and attempt to identify the blade with the cut. Insure that your test cuts are consistent with your "*unknown*" with respect to the orientation of the ax to the wood and the direction of the grain. Support your results with sketches and photographs.

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Examiner Date

13. Obtain a section of large-diameter telephone cable and cut it with the ax used above and study the effects of a slicing action on a multi-stranded cable. Note the quality and extent of microscopic marks of each strand and comment on the problems involved in identifications of this sort. Photograph the sliced end of the cable.

_____ _____
Examiner Date

14. Discuss the fact that generally saws, files and abrasive tools are not identifiable with the marks they produce. Cite any exceptions to this rule.

_____ _____
Examiner Date

15. Obtain a used tire and make cuts and stabs into the sidewall with a fixed blade knife. Attempt to make comparisons of the toolmarks produced by the knife. Support your results with photographs and notes. Discuss how the results of your examinations might be altered if the knife had been sharpened after making the questioned cuts, or if the knife had been used for an extended period of time after making the initial questioned cuts.

Student	Date Assigned	Date Due

_____ _____
Examiner Date

16. Investigate pressure/contact examinations in regard to objects that may have been in contact with each other for an extended time. Research several cases of this type and set these out in your notes.

(Use Training Assignment #61 to complete this objective.)

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Examiner Date

17. Discuss and demonstrate the making of casts of toolmarks. Also, discuss the potential of such casts and of photographs alone in making toolmarks identifications.

_____ _____
Examiner Date

18. Conduct examinations of toolmark evidence submitted from crime scenes that are part of an ongoing investigation. Conduct all examinations as if it were a real case and prepare the proper notes and reports that might be required.

(Use Practical Exercises #20, 27, and 28 to complete this objective.)

_____ _____
Examiner Date

REFERENCE MATERIALS

TOOLMARK EXAMINATIONS, COMPARISONS AND IDENTIFICATIONS

The following reference materials serve several purposes:

- to provide a wider range of additional resources should you have a particular interest in a given topic.
- to provide reference materials for your future professional use.
- to allow you to gain additional depth in particular subject areas.

Should you encounter other references in this category, you are encouraged to make additional notes about them at the end of this listing.

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Student	Date Assigned	Date Due

M. SERIAL NUMBER RESTORATION

1. Read the Handbook of Methods for the Restoration of Obliterated Serial Numbers, by Treptow. Be prepared to discuss the theory of number restoration.

(Use Training Assignment #63 to complete this objective.)

_____ _____
Examiner Date

2. Sketch the entire stressed area above and below the indentation of a stamped item and depict what remains when the indented area is removed.

(Use Training Assignment #63 to complete this objective.)

_____ _____
Examiner Date

3. Make a list of the various methods used to mark items by private industry. This list should include but not be restricted to: casting, stamping, embossing, debossing, coining, vibratory pencil, laser and electrical discharge machining.

   Discuss with the Technical Lead or an experienced examiner the effect each of these marking techniques has on the subsurface of the marked area.

   Discuss with the Technical Lead or an experienced examiner the marking methods used that can directly affect the ability of the examiner to restore any obliterated markings and why.

(Use Training Assignment #63 to complete this objective.)

_____ _____
Examiner Date

4. Define in your notebook the term "*plastic deformation*" of metal.

(Use Training Assignment #63 to complete this objective.)

_____ _____
Examiner Date

5. Briefly discuss in your notebook and with your Technical Lead or an experienced examiner the difference between cold rolled steel and cast iron metal.

(Use Training Assignment #63 to complete this objective.)

_____ _____
Examiner Date

Student	Date Assigned	Date Due

6. Discuss with your Technical Lead or an experienced examiner the effect that the following types of alterations will have on the subsurface of the marked item and how it will impact on the results of the examiner.

   grinding

   over stamping

   pinging

   gouging

   heating

   puddling

   welding

   removal

   combinations of the above

(Use Training Assignment #63 to complete this objective.)

_____ _____
Examiner Date

7. Determine the telltale signs that can be left by the various alteration methods. Discuss how these signs will determine your specific approach to the restoration attempt.

(Use Training Assignment #64 to complete this objective.)

_____ _____
Examiner Date

8. Discuss with your Technical Lead or an experienced examiner the different types of lighting (*e.g., incandescent, infrared, UV, and fluorescent*) and how they can improve or enhance the restoration results. Be prepared to explain how the angle of incidence of these lighting techniques might vary the results.

(Use Training Assignment #64 to complete this objective.)

_____ _____
Examiner Date

9. Discuss the various methods of surface preparation such as sanding and polishing and how they will affect the results in the restoration attempt.

(Use Training Assignment #64 to complete this objective.)

_____ _____
Examiner Date

Student	Date Assigned	Date Due

10. Determine the chemical reaction that takes place when etching is conducted and document in your notebook the appropriate chemical formulations for the general reactions of acid with steel and aluminum.

(Use Training Assignment #64 to complete this objective.)

_____ _____
Examiner Date

11. Determine whether the reaction rate for the stressed area is faster or slower than the etching rate of the rest of the surface and why.

(Use Training Assignment #64 to complete this objective.)

_____ _____
Examiner Date

12. Determine the specialized equipment that might be used in number restoration and discuss these with your Technical Lead or an experienced examiner.

(Use Training Assignment #64 to complete this objective.)

_____ _____
Examiner Date

13. Discuss with your Technical Lead or an experienced examiner the appropriate photography techniques and procedures to be used before, during, and after restoring obliterated serial numbers.

(Use Training Assignment #64 to complete this objective.)

_____ _____
Examiner Date

14. Research the various kinds of magnifying and enhancing equipment used for number restoration and explain when and why each would be used.

(Use Training Assignment #64 to complete this objective.)

_____ _____
Examiner Date

15. Become familiar with the following chemicals:

    a. $CuNH_4Cl_2$
    b. $CuCl_2$
    c. NaOH

Student	Date Assigned	Date Due

d. HCl

e. HNO_3

f. KCN

g. K_2SO_4

h. H_2SO_4

i. $FeCl_3$

j. H_2O_2

k. Tartaric acid

l. Ammonium Persulfate

(Use Training Assignment #64 to complete this objective.)

_____ _____
Examiner Date

16. Obtain the proper safety equipment (*e.g., eyewear, masks, gloves, and lab coats*) before attempting any chemical restorations. Review the appropriate sections of the Safety Manual to insure proper safety precautions are used. If you have any questions, be sure to ask your Technical Lead or an experienced examiner before making or using any chemical reagents.

_____ _____
Examiner Date

17. Define and place in your notebook these common chemical terms:

    Frye's Reagent

    Turner's Reagent

    Davis' Reagent

(Use Training Assignment #65 to complete this objective.)

_____ _____
Examiner Date

18. Become knowledgeable of the numbering systems and methods used by various firearm manufacturers including but not limited to Colt, Ruger, Smith & Wesson, US Repeating Arms (Winchester) and Remington.

(Use Training Assignment #65 to complete this objective.)

_____ _____
Examiner Date

Student	Date Assigned	Date Due

19. Determine the best chemicals and techniques to use in number restoration of the following firearms:

    a. Colt pistol
    b. Smith & Wesson revolver
    c. RG Industries revolver
    d. Ruger stainless steel revolver
    e. chrome/nickel 25 caliber autoloading pistol
    f. shotgun alloy receiver
    g. shotgun casehardened receiver
    h. Winchester rifle

(Use Training Assignment #65 to complete this objective.)

_____ _____
Examiner Date

20. Obtain several firearms from your Technical Lead or an experienced examiner, alter the serial numbers using different methods and then attempt to restore them. Prepare notes and photographs to substantiate your conclusions and results.

(Use Training Assignment #65 to complete this objective.)

_____ _____
Examiner Date

21. Be prepared to discuss with your Technical Lead or an experienced examiner the methods used and lessons learned during the restoration process.

(Use Training Assignment #65 to complete this objective.)

_____ _____
Examiner Date

22. Obtain several pieces of aluminum that have had stamped numbers removed. Attempt to restore these numbers using various techniques. Prepare notes and photographs to substantiate your conclusions and results.

(Use Training Assignment #66 to complete this objective.)

_____ _____
Examiner Date

23. Discuss with your Technical Lead or an experienced examiner how the combination of brief application of $CuNH_4Cl_2$ followed by normal NaOH application can shorten the processing time on aluminum.

Student	Date Assigned	Date Due

(Use Training Assignment #65 to complete this objective.)

_____ _____
Examiner Date

24. Discuss with your Technical Lead or an experienced examiner why alternating HNO_3 and HCl can work so well on chrome or nickel plated firearms.

(Use Training Assignment #65 to complete this objective.)

_____ _____
Examiner Date

25. Research the effect of D. C. electricity (Include the proper polarity and voltage for enhance etching/development of obliterated numbers and letters) on the reaction time of the different chemical techniques you have learned. Conduct restorations using this method.

(Use Training Assignment #65 to complete this objective.)

_____ _____
Examiner Date

26. You will receive a total of sixteen metal bars made from four different metals. Each bar has four altered serial numbers. Using the reagents found in Treptow and Training Assignment 65, restore these numbers. Make note of how the different reagents react with the metals and determine which reagents work the best. Consult with your Technical Lead or an experienced examiner for how to record the restoration process. If possible, make use of the direct current and/or magnaflux during some of the restorations.

(Use Training Assignment #66 to complete this objective.)

_____ _____
Examiner Date

REFERENCE MATERIALS

RESTORATION OF OBLITERATED MARKINGS

The following reference materials serve several purposes:

- to provide a wider range of additional resources should you have a particular interest in a given topic.
- to provide reference materials for your future professional use.
- to allow you to gain additional depth in particular subject areas.

Student	Date Assigned	Date Due

Should you encounter other references in this category, you are encouraged to make additional notes about them at the end of this listing.

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Student	Date Assigned	Date Due

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Student	Date Assigned	Date Due

N. RESEARCH PROJECT, REPORT WRITING, EXPERT TESTIMONY AND EXTERNAL LABORATORY REVIEW AND TOURS

1. Review the methods of taking notes in cases and observe other examiners taking notes during the examination of evidence. Make note of how to record essential data on which conclusions are based, photo documentation, and how case forms are used. Review the Standard Operating Procedures manual for general information on case files and reports.

Discuss the above areas with your Technical Lead or an experienced examiner.

_____ _____
Examiner Date

2. Read through copies of reports generated by all of the examiners for the purpose of familiarization with report format and phraseology. Compile a reference file which reflects correct phraseology divided into appropriate categories, i.e., bullet examination, bullet "*no conclusion*," bullet identification, cartridge case identification, firearms function, accidental discharge, gunshot residues, etc. Discuss this with your Technical Lead or an experienced examiner.

_____ _____
Examiner Date

3. Attend moot courts of other trainees during your training period and evaluate the demeanor and professionalism of the trainee, if applicable. Discuss this with your Technical Lead or an experienced examiner

_____ _____
Examiner Date

4. Attend the testimony of several examiners. Discuss their testimony with each examiner.

_____ _____
Examiner Date
_____ _____
Examiner Date
_____ _____
Examiner Date

5. Discuss the meaning and/or definition of the following terms or phrases, as they apply to testimony in the field of firearms/toolmark identification, with your Technical Lead or an experienced examiner.

   a. expert witness
   b. reasonable degree of scientific certainty
   c. hearsay

Student	Date Assigned	Date Due

d. opinion

e. voir dire

f. Daubert

_____ _____
Examiner Date

6. Prepare a list of "*qualification questions*" which can be used by the prosecutor in court to qualify you as an expert witness. Include in this questions which can be used as a guide for the introduction in court of evidence which you have examined.

_____ _____
Examiner Date

7. Confer with other examiners regarding personal hints and recommendations in regard to courtroom testimony. This discussion should be lengthy and cover all aspects of the topic.

_____ _____
Examiner Date

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Examiner Date

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Examiner Date

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Examiner Date

_____ _____
Examiner Date

REFERENCE MATERIALS

RESEARCH PROJECT

The following reference materials serve several purposes:

- to provide a wider range of additional resources should you have a particular interest in a given topic.
- to provide reference materials for your future professional use.
- to allow you to gain additional depth in particular subject areas.

Should you encounter other references in this category, you are encouraged to make additional notes about them at the end of this listing.

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REFERENCE MATERIALS

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The following reference materials serve several purposes:

- to provide a wider range of additional resources should you have a particular interest in a given topic.

Student	Date Assigned	Date Due

- to provide reference materials for your future professional use.
- to allow you to gain additional depth in particular subject areas.

Should you encounter other references in this category, you are encouraged to make additional notes about them at the end of this listing.

General

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REFERENCE MATERIALS

EXTERNAL LABORATORY REVIEW AND TOURS

The following reference materials serve several purposes:

- to provide a wider range of additional resources should you have a particular interest in a given topic.

Student	Date Assigned	Date Due

- to provide reference materials for your future professional use.
- to allow you to gain additional depth in particular subject areas.

Should you encounter other references in this category, you are encouraged to make additional notes about them at the end of this listing.

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Student	Date Assigned	Date Due

APPENDIX A – TRAINING ASSIGNMENTS

Student	Date Assigned	Date Due

Training Assignment 1

The following areas will be the topics of a short discussion session.

You will need to know the procedures in the pertinent sections of the Safety Manual regarding the use of Personal Protective Equipment (PPE) as well as the proper handling and examination of evidence that may be contaminated with infectious diseases.

The following two areas are written assignments. Your answers should be concise and complete.

Define the following terms:

a. **Firearm Identification**

b. **Ballistics**

Read the applicable sections from the basic references and prepare an outline for a future report concerning the history, principles, evolution and scope of firearms identification in its broadest sense. Begin to accumulate documentation in your notebook for this report.

References:

"Firearms Identification" Vol. I, MATHEWS.

"Firearms Investigation, Identification and Evidence" HATCHER, JURY and WELLER.

"The Identification of Firearms and Forensic Ballistics" BURRARD.

"The Identification of Firearms" GUNTHER and GUNTHER.

This will complete Section A #12, B #1 and begins Section B #2 of your training manual.

Technical Lead or Experienced Examiner	Date Completed

Student	Date Assigned	Date Due

Training Assignment 2

The following areas will be the topics of a discussion session.

Formulate an answer to each of the following questions:

a. Is firearms identification an art or science?

b. What are the types of conclusions that can be reached in firearms identification comparisons?

c. What is the basis for each of the above conclusions?

d. Can experts in the field of firearms identification disagree regarding their conclusions? Why?

e. How does "probability" relate to firearms identification?

Continue to work on your report concerning the history, principles, evolution and scope of firearms identification.

References:

"Firearms Identification" Vol. I, MATHEWS.

"Firearms Investigation, Identification and Evidence" HATCHER, JURY and WELLER.

"The Identification of Firearms and Forensic Ballistics" BURRARD.

"The Identification of Firearms" GUNTHER and GUNTHER.

Continue to work on your list of definitions.

This will complete Section B #2 and 3 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Training Assignment 3

1. Be able to discuss the early development of gunpowder.

2. Prepare a chronological outline of early firearms development from "*cannon lock"* through "*percussion lock*". The listing should be in proper historical order. Be prepared to discuss how each type of development was an improvement over the previous system.

   Areas of consideration:

   What features of these early firearms are still in use today?

   What were the advantages of each of these systems?

   What were the disadvantages of each of these systems?

   Was there a common disadvantage to all these systems?

   What was it and how was it overcome?

   DIRECTIONS: The chronological outline should be in written form including a brief description of each type of action. It does not need to be elaborate but complete. Be prepared to answer questions concerning these areas**.**

READING LIST:

Book of Rifles by W. H. B. Smith, pages 3 through 43.

Book of Pistols & Revolvers by W. H. B. Smith, pages 6 through 20.

Small Arms of the World 8th Edition by Smith & Smith, pages 15 through 38

Firearms Investigation, Identification and Evidence by Hatcher, Jury & Weller, Chapter 2, pages 23 through 39

United States martial Pistols and Revolvers by Gluckman, Part I, pages 13 through 22.

Guns through the Ages by Boothroyd, Chapters 1 through 4, pages 15 through 37.

Encyclopedia of Firearms by Peterson.

Encyclopedia of Firearms by Ian Hogg

American Rifleman 1960 March, April, May & June "The Development of Firearms" by Peterson.

The Age of Firearms by Robert Held

This will complete Section C #1 of your training manual.

Be prepared to discuss your selection of a topic for a research project. This will be a preliminary look and will be designed to be completed for presentation to the Association of Firearm and Tool Mark Examiners. Think of something that has caught your interest or curiosity.

This will begin Section B #8 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Training Assignment 4

1. Trace the evolution of the rimfire cartridge from the mid-nineteenth century to the current generation of modern .22 caliber rimfire cartridges. Be able to discuss this topic.

2. Prepare a chronological outline of rimfire ammunition development including firearms types that were developed for this type ammunition. It should be in proper historical order. Be prepared to discuss how each type of development was an improvement over the previous system.
   Areas of consideration:

   What features of these early ammunition/firearms are still in use today?

   What were the advantages of each of these systems?

   What were the disadvantages of each of these systems?

   Was there a common disadvantage to all these systems?

   What was it and how was it overcome?

DIRECTIONS:

The chronological outline should be in written form similar to previous assignments. It does not need to be elaborate <u>but complete</u>.

Be prepared to answer questions concerning these areas.

You will be tested on the vocabulary list you received.

This will complete Section B #7, and C #4 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Training Assignment 5

1. Trace the evolution of the centerfire cartridge from the mid-nineteenth century to the present. Pay particular attention to the transition from black powder to smokeless powder. Include any information developed concerning caseless ammunition. Be able to discuss this topic.

2. Prepare a chronological outline of center fire ammunition development including firearms types that were developed for this type ammunition. It should be in proper historical order. Be prepared to discuss how each type of development was an improvement over the previous system.

   Areas of consideration:

   What features of these early firearms are no longer in use today?

   What were the advantages of each of the systems?

   What were the disadvantages of each of the systems?

   What areas are still open to improvement to any of these systems?

   Include information regarding exterior bullet coatings which have been developed in the last three decades and how they have impacted firearms examiners.

DIRECTIONS:

The chronological outline should be in written form similar to previous assignments. It does not need to be elaborate but complete.

Be prepared to answer questions concerning these areas.

Prepare a statement regarding your research project for review. This should include your goal, rough outline and some detail regarding your project.

This will complete Section B #7, C #5 and #7 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Training Assignment 6

Research in detail these processes and prepare a short written definition of each term listed below. The definitions should be concise and complete. You should also have an understanding of how these different procedures apply to firearms manufacturing.

a. Shaping
b. Planing
c. Drilling
d. Reaming
e. Turning
f. Boring
g. Milling-include both face milling and peripheral (slab) milling
h. Broaching
i. Abrasive machining-include honing, lapping, grinding, sanding, and ultrasonic methods
j. Sawing
k. Filing
l. Swaging
m. Electrochemical machining (ECM)
n. EDM
o. Investment casting

This will complete Section D #1 of your training manual.

Technical Lead or Experienced Examiner	Date Completed

Student	Date Assigned	Date Due

Training Assignment 7

This assignment is designed to demonstrate your knowledge of the basic nomenclature of handguns, rifles, and shotguns.

a. Obtain the following firearms from the FRC:

1. rifle (bolt action; semiautomatic; lever)
2. semiautomatic pistol (blowback & recoil)
3. revolver (single-action & double-action)

b. Be able to point out the following parts on these firearms:

breech face, breech bolt, bolt, bolt face, extractor, ejector, firing pin, rifling, barrel, lands, grooves, ramp, magazine, clip, ejection port, receiver.

c. Be able to describe the cycle of fire for each firearm.

d. Discuss the manufacturing techniques which would have been used to fabricate and finish each of the parts and note the machining marks on each part.

e. Point out any "*mark of abuse*" which could contribute to the uniqueness of each part.

f. Identify areas that machining marks might "*carry over*" to another firearm.

Be prepared to give a short talk on one of each type of firearm you have examined. This talk should last no more than approximately five minutes per firearm and include the cycle of fire and nomenclature. This presentation will be for the entire section.

This will complete Section D #2 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Training Assignment 8

Research in detail the following rifling techniques:

a. Broach
b. Button
c. Hammer Forging
d. Hook method
e. Scrape method
f. ECM
g. EDM
h. Flow forming

Prepare a short paper discussing the differences in these rifling techniques including the advantages and disadvantages for each as viewed by industry and the firearms examiner.

Obtain broaches and buttons for study from your Technical Lead. Determine the difference between barrels which have been button rifled and those which have been broach rifled.

Discuss and define the following terms as they relate to firearms manufacture or firearms identification:

a. chambering
b. crowning
c. ballizing
d. bore slugging
e. forcing cone
f. bore
g. choke
h. choke tubes

Research the history and current significance of proof marks as they relate to the manufacture of firearms. You need to understand how these will be helpful in firearms identification and where to obtain necessary information.

This will complete Section D# 3, 4, 5 and 6 of your training manual.

Technical Lead or Experienced Examiner	Date Completed

Student	Date Assigned	Date Due

Training Assignment 9

Define the following terms as they relate to modern ammunition and its manufacture. Prepare a brief written outline of these terms for your notebook. These terms coincide with the practical exercise which is attached. Ensure that you understand these terms and use them often.

a. Cartridge
b. Cartridge case
c. Primer
d. Shotshell
e. Shotshell casing
f. Bottleneck cartridge
g. Rebated-rim cartridge
h. Rimless cartridge
i. Rimmed cartridge
j. Semi-rimmed cartridge
k. Shoulder
l. Neck
m. Mouth
n. Head
o. Headstamp
p. Proof cartridge
q. Tapered cartridge
r. Extractor groove
s. Gauge
t. Battery cup
u. Brass
v. "Rule of 17"
w. Wadding
x. Shot collar
y. Crimp
z. Bunter

aa. Bullet
bb. Round-nosed bullet
cc. "Hollow-point" bullet
dd. Jacketed bullet
ee. Bullet sizing
ff. Wadcutter bullet
gg. Semi-wadcutter bullet
hh. Soft point bullet
ii. Spitzer bullet
jj. Swaging
kk. Cast lead bullet
ll. Mold marks
mm. Truncated-nosed bullet
nn. Cannelure
oo. Ogive
pp. Brass-coated lead bullet
qq. Copper-coated lead bullet
rr. Nylon-coated lead bullet
ss. "Silvertip" bullet
tt. Antimony
uu. Arsenic
vv. Chilled shot
ww. High brass, low brass
xx. Lubaloy
yy. Dram equivalent
zz. Single base, double base

As part of this week's assignment, you are to complete Practical Exercise #1.

This will complete Section E #1 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Training Assignment 10

Be prepared to discuss in detail Berdan and Boxer primer. Prepare a cross-section sketch of both Berdan and Boxer primers, showing their relationship to the head of the cartridge and illustrating how each functions.

Be prepared to discuss the purpose and essential ingredients of priming mixture used in modern cartridges.

Know and discuss the difference between caliber, caliber type and caliber designation. To accomplish this assignment, obtain as many different cartridges from the following caliber families: .22 caliber, .30 caliber and .38 caliber. Identify each one as to caliber designation and be able to explain and demonstrate the differences between the different caliber types.

This should be as complete as possible and will require you to research the ammunition files and standards, obtain different examples and disassemble them for presentation. You need to take into account different cartridge case sizes and shapes within the caliber family and also the variations in bullets (*weight, jacketing, design, cannelures, etc.*). Your examples should be such that you and other members of the unit can use them in the future for references.

Practical Exercise #2 is required for completion of this assignment.

This will complete Section E #2, 3, and 4 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Training Assignment 11

Define each of the following types of firearms and explain in detail the operation of each type to include the loading of cartridges and the subsequent movement of the cartridge case and/or bullet after firing. Be able to understand and explain the cycle of fire for each general type of firearm listed below.

a. revolver, single and double action

b. auto loading pistol, single and double action

c. derringer and single shot pistols

d. bolt-action rifle

e. auto loading rifle

f. pump-action rifle

g. various single shot rifles

h. various submachine gun

i. assault rifle

This will complete Section G #1 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Training Assignment 12

Using shotguns from the Firearms Reference Collection (FRC), explain and illustrate the differences between a gas-operated and a recoil-operated auto loading shotgun.

Using firearms from the FRC, explain and illustrate the differences between the following types of auto loading pistols:

a. blowback action
b. delayed blowback action
c. gas-delayed blowback action
d. short recoil action
e. long recoil action

This will complete Section G #2 and #3 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Training Assignment 13

You have been assigned Practical Exercise #8. This exercise is self-explanatory.

You will need Practical Exercise #8 to complete this assignment.

This will be a part of Section H #6 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Training Assignment 14

Using a .22 caliber rifle, test fire and recover two test bullets and identify these bullets with each other. Using this same firearm, “slug’ the barrel and compare the previously-fired test bullets with the bullets used to “slug” the barrel. Cut off approximately three inches (approximately 25 percent) of the muzzle of the barrel and crown the muzzle end of the barrel. Test fire and recover two test bullets using the same ammunition as above. “Slug” this portion of the barrel and compare these tests with the previous test bullets. Microscopically compare these bullets with each other and with the previously-fired test bullets.

Compile a list of reasons as to why bullet identifications cannot be made in some cases, and why some barrels and bullets can preclude or tend to preclude identifications. This list should include, but not be limited to, the results of the testing you have conducted on the various assignments and practical exercises.

This will complete Section H #15 and 22 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Training Assignment 15

Partially disassemble (*field strip*) and reassemble the following (or similar) revolvers from the Firearm Reference Collection (FRC). Obtain a copy of an exploded drawing of each one of the revolvers listed below. Ensure that the drawing identifies all of the parts of the firearm. Be able to describe the differences in their mechanisms and identify each part by name.

a. Smith & Wesson double-action revolver
b. Colt double-action revolver
c. Ruger double-action revolver
d. "Old style" Ruger single-action revolver
e. "New style" Ruger single-action revolver "New Model"
f. Colt single-action revolver

Use the following references:

Firearms Assembly, NRA #4

Firearms Assembly/Disassembly Part II Revolvers

Exploded Firearms Drawings 2d Edition

Manufacturer's information

This will complete Section G #4, 11, 12, 13, and 14 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Training Assignment 16

Disassemble and reassemble the following (or similar) pistols from the Firearm Reference Collection (FRC). Obtain a copy of an exploded drawing of each of the pistols listed below. Ensure that the drawing identifies all of the parts of the firearm. Learn the names of the major components and how they interact. Be able to describe the differences in their mechanisms and identify each part by name. Observe the evolution of firearm development between the Browning and Walther designed firearms.

a. Browning Hi-Power pistol
b. US Pistol Model 1911A1 pistol
c. Walther P38 pistol
d. Walther PP pistol
e. Walther P1 pistol

Use the following references:

Firearms Assembly, NRA #2

Firearms Assembly/Disassembly Part I Automatic Pistols

Exploded Firearms Drawings 2d Edition

Manufacturer's information

This will complete Section G #5, 11, 12, 13 and 14 of your training manual.

Technical Lead or Experienced Examiner	Date Completed

Student	Date Assigned	Date Due

Training Assignment 17

Partially disassemble (*field strip*) and reassemble the following pistols from the Firearms Reference Collection (FRC). Obtain a copy of an exploded drawing of each of the pistols listed below. Ensure that the drawing identifies all of the parts of the firearm. Be able to describe the differences in their mechanisms and identify each part by name.

a. Beretta Model 92F Semiautomatic pistol
b. Ruger P-Series Semiautomatic pistol
c. Smith & Wesson Semiautomatic pistol
d. Desert Eagle Semiautomatic pistol

Use the following references:

Firearms Assembly, NRA #2

Firearms Assembly/Disassembly Part I Automatic Pistols

Exploded Firearms Drawings 2d Edition

Manufacturer's information

This will complete section G #5, 11, 12, 13, and 14 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Training Assignment 18

Partially disassemble (*field strip*) and reassemble the following pistols from the Firearm Reference Collection (FRC). Obtain a copy of an exploded drawing of each of the pistols listed below. Ensure that the drawing identifies all of the parts of the firearm. Be able to describe the differences in their mechanisms and identify each part by name.

a. Glock, Model 17 or 19 Semiautomatic pistol
b. SIG-Sauer, Model P220, P225, P226, P228, or P229 Semiautomatic pistol
c. Heckler & Koch Semiautomatic pistol
d. Mauser "Broomhandle" Self-loading pistol

Use the following references:

Firearms Assembly, NRA #2

Firearms Assembly/Disassembly Part I Automatic Pistols

Exploded Firearms Drawings 2d Edition

Manufacturer's information

This will complete Section G #5, 11, 12, 13, and 14 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Training Assignment 19

Disassemble and reassemble the following (or similar) pistols from the Firearm Reference Collection (FRC). Obtain a copy of an exploded drawing of each of the pistols listed below. Ensure that the drawing identifies all of the parts of the firearm. Be able to describe the differences in their mechanisms and identify each part by name. If you cannot locate the below pistols, contact your Technical Lead or Supervisor.

a. 9mm Interdynamic, KG-99, submachine gun
b. 9mm Intratec, TEC 9, submachine gun
c. 45 Auto caliber Thompson submachine gun
d. 9mm Luger SWD Inc., M11/Nine, submachine gun
e. 9mm A.A. Arm, Inc., model AP-9, submachine gun
f. 9mm Heckler & Koch, MP-5, submachine gun
g. 9mm Steyr, MPi, submachine gun
h. 45 Auto caliber RPB Industries, M10, submachine gun

Use the following references:

Firearms Assembly/Disassembly Part VI Law Enforcement Weapons

Manufacturer's information.

Military Small Arms of the World

This will complete Section G #6, 11, 12, 13, and 14 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Training Assignment 20

Disassemble and reassemble the following (or similar) pistols from the Firearm Reference Collection (FRC). Obtain a copy of an exploded drawing of each of the pistols listed below. Ensure that the drawing identifies all of the parts of the firearm. Be able to describe the differences in their mechanisms and identify each part by name.

a. 25 Auto caliber Raven Arms pistol
b. 25 Auto caliber Colt Jr. pistol
c. 25 Auto caliber Beretta pistol
d. 25 Auto caliber Lorcin pistol
e. 25 Auto caliber Bauer pistol
f. 25 Auto caliber Titan pistol
g. 25 Auto caliber Browning pistol

You will need to contact your Training Officer if you have difficulty locating these firearms.

Use the following references:

Firearms Assembly/Disassembly Books

Manufacturer's Information

Gun Parts Corp. Catalog

This will complete Section G #10, 11, 12, 13, and 14 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Training Assignment 21

Disassemble and reassemble the following (or similar) rifles from the Firearm Reference Collection (FRC). Obtain a copy of an exploded drawing of each of the rifles listed below. Ensure that the drawing identifies all of the parts of the firearm. Be able to describe the differences in their mechanisms and identify each part by name.

a. 30-30 Win. caliber Winchester 94 rifle
b. 303 British caliber Lee Enfield rifle
c. 30-06 Springfield caliber Browning BAR rifle
d. 30-06 Springfield caliber Remington model 03-A3

You will need to contact your Training Officer if you have difficulty locating these firearms.

This will complete Section G # 7, 11, 12, 13, and 14 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Training Assignment 22

Disassemble and reassemble the following (or similar) rifles from the Firearm Reference Collection (FRC). Obtain a copy of an exploded drawing of each of the rifles listed below. Ensure that the drawing identifies all of the parts of the firearm. Be able to describe the differences in their mechanisms and identify each part by name.

a. 308 Win. caliber Winchester model 70 rifle

b. 223 Remington caliber Colt rifle model AR-15

c. 25-06 caliber Ruger model M77 rifle

d. 7.62x39mm caliber SKS rifle

e. 7.62x39mm caliber AK-47 rifle

You will need to contact your Technical Lead or Supervisor if you have difficulty locating these firearms.

This will complete Section G # 7, 11, 12, 13, and 14 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Training Assignment 23

Disassemble (field strip) and reassemble the following (or similar) shotguns from the Firearm Reference Collection (FRC). Obtain a copy of an exploded drawing of each of the rifles listed below. Ensure that the drawing identifies all of the parts of the firearm. Be able to describe the differences and similarities of their mechanisms and identify each part by name.

a. Remington, Model 870, shotgun
b. Winchester, Model 12, shotgun
c. Mossberg, Model 500, shotgun
d. Browning, Model A5, shotgun
e. Remington, Model 1100, shotgun

Research the historical derivation of the various shotgun gauges and define gauge. Prepare a chart concerning the diameter of various modern gauges you might encounter. Define any differences in foreign and domestic shotgun gauges.

This will complete Section G # 8, 11, 12, 13, and 14 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Training Assignment 24

Disassemble (field strip) and reassemble the following (or similar) shotguns from the Firearm Reference Collection (FRC). Obtain a copy of an exploded drawing of each of the rifles listed below. Ensure that the drawing identifies all of the parts of the firearm. Be able to describe the differences and similarities of their mechanisms and identify each part by name.

a. NEF, model Pardner, shotgun
b. Stevens/ J.C. Higgins model 311, side-by-side, double-barrel, shotgun
c. Beretta, over-under, double-barrel, shotgun

Define the purpose of a choke on a shotgun. Name the various chokes and break them down into their dimensions and geometry.

This will complete Section G # 8, 11, 12, 13, and 14 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Training Assignment 25

Partially disassemble (field strip) and reassemble the following (or similar) firearms from the Firearm Reference Collection (FRC). Obtain a copy of an exploded drawing of each of the firearms listed below. Ensure that the drawing identifies all of the parts of the firearm. Be able to describe the differences in their mechanisms and identify each part by name.

a. 22 caliber Marlin, Model 60, rifle
b. 22 caliber Winchester, Model 62, rifle
c. 22 caliber Ruger, Model 10/22, rifle
d. 22 caliber Ruger, MKII, pistol
e. 22 caliber Browning, Challenger III, pistol
f. 22 caliber High Standard, Dura-Matic, pistol

This will complete Section G #9, 11, 12, 13, and 14 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Training Assignment 26

You have been assigned Practical Exercise #3 as your weekly assignment. Practical exercises are to be treated as casework and evidence (except for marking the actual firearm). Follow the directions carefully and if you have any questions please do not hesitate to ask.

You will need PRACTICAL EXERCISE #3 to complete this assignment.

This will complete Section G #12, 13, and 14 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Training Assignment 27

You have been assigned Practical Exercise #4 as your weekly assignment. Practical exercises are to be treated as casework and evidence (except for marking the actual firearm). Follow the directions carefully and if you have any questions please do not hesitate to ask.

You will need PRACTICAL EXERCISE #4 to complete this assignment.

This will complete Section G #12, 13, and 14 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Training Assignment 28

You have been assigned Practical Exercise #5 as part of your weekly assignment. Practical exercises are to be treated as casework and evidence (except for marking the actual firearm). Follow the directions carefully and if you have any questions please do not hesitate to ask.

Research, define, and determine the implications of the following terms as they relate to safety in the operation of a firearm:

a. excessive headspace
b. barrel obstruction
c. barrel bulge
d. broken extractor
e. push off
f. trigger shoe
g. false half-cock
h. disconnector
i. defective safety
j. high primer
k. rail splitting
l. hairline cracks
m. improper timing
n. excessive pressure
o. dented barrel

Become familiar with the Firearm Section firearms range including its physical dimensions, construction of walls and backstop, and bullet velocity limitations. Become familiar with the “Range Rules” and determine how to test fire firearms thought to be possibly unsafe. Become familiar with the use of all the equipment on the range. Know the range rules and emergency medical treatment procedures.

You will need PRACTICAL EXERCISE #5 to complete this assignment.

This will complete Section G #12, 13, 14, 15 and 16 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Training Assignment 29

You have been assigned Practical Exercise #6 as part of your weekly assignment. Practical exercises are to be treated as casework and evidence (except for marking the actual firearm). Follow the directions carefully and if you have any questions please do not hesitate to ask.

Research, define, and determine the implications of the following terms as they relate to identifying the manufacturer and/or source of a firearm:

a. proof marks
b. inspector marks
c. factory numbers and markings
d. serial number
e. part numbers
f. company logos

Discuss the following topics with your Technical Lead or an experienced examiner and become familiar with the capabilities and limitations of the Firearm Section in regard to these areas:

a. Marking evidence firearms
b. Determining whether an evidence firearm has been "recently" fired
c. Determining the manufacturer of a firearm from an examination of a part from a firearm
d. Determining the manufacturer of a firearm from a photograph and comparing an evidence firearm to a photograph

You will need PRACTICAL EXERCISE #6, to complete this assignment.

This will complete Section G #12, 13, 14, 19 and 20 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Training Assignment 30

You have been assigned Practical Exercise #7. This exercise is self-explanatory. This is your formal introduction to the comparison microscopes and you should take your time learning everything you can about the instrument. Be ready to demonstrate to an experienced examiner what you have learned and if you have any questions do not hesitate to ask. It would be prudent to obtain copies of all the literature you can find concerning the microscopes. See the Performance Check Policy for the Firearm and Toolmark Section for the procedure to check the calibration of the comparison microscope.

Differentiate between the following:

a. compound microscope

b. stereo microscope

c. comparison microscope/macroscope

Study the instruction manual for the various brands of stereo microscopes. Determine how to insert a reticule and/or how to check the calibration of the microscope.

You will need PRACTICAL EXERCISE #7 to complete this assignment. Microscopic comparison practice can be substituted for practical exercise #7 including reworked cases, examining test fires, etc., with trainer and/or technical lead approval.

This will complete Section F #1, 2, 3, 4, part of 5, and 6 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Training Assignment 31

You have been assigned Practical Exercise #8 as part of your weekly assignment. This exercise is self-explanatory.

Become familiar with and demonstrate the use of the following equipment:

a. micrometer
b. inertia bullet puller
c. steel rule (NIST traceable measuring devices)
d. reticle in ocular lens of binocular microscope
e. digital calipers
f. balances located in the Firearm Section
g. comparison microscopes
h. stereo microscopes

You will need PRACTICAL EXERCISE #7 to complete this assignment.

This will complete Section F # 5 and 7 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Training Assignment 32

Define what is meant by or determine the significance of the following terms or phrases as they relate to the examination and comparison of fired bullets. Prepare written answers concerning these items.

a. slippage
b. shaving
c. obturation
d. leading edge and trailing edge
e. melting
f. blow-by
g. striation
h. individual microscopic marks
i. ogive
j. bearing surface
k. class characteristics
l. general rifling characteristics
m. "insufficient individual microscopic marks"
n. corrosion
o. leading
p. "limited individual microscopic marks"
q. "single-action" firing
r. "double-action" firing

This will complete Section H # 1 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Training Assignment 33

As they relate to the examination and comparison of fired bullets or bullet fragments, know the importance of and limitations of determining the following:

a. weight
b. caliber
c. caliber type
d. manufacturer
e. general rifling characteristics
f. pitch of rifling
g. depth of rifling

Write a short descriptive answer describing the how these terms apply to firearms examination.

Familiarize yourself with the Standard Ammunition File (SAF). Know how to search this file in order to determine the manufacturer of fired bullets. Discuss the problems encountered when using this file and possible solutions.

Familiarize yourself with the General Rifling Characteristics (GRC) database. Know how to use this database to compile a list of firearms in a "no-gun case". Demonstrate your proficiency in using the GRC database while working on Practical Exercise #9 which is being assigned as part of this assignment.

PRACTICAL EXERCISE #9 is required for completion of this assignment.

This will complete Section H # 2, 3, 4 and 5 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Training Assignment 34

Tour an Ammunition Manufacturing Facility and observe the various processes taking place. Pay particular attention to the assembly process and any potential toolmarks that may be transferred to ammunition components.

Prepare a detailed report of your tour and discuss what you observed and any potential toolmarks which may find their way to the cartridges we use and evaluate in testing here in the laboratory.

Discuss the tour with your Training Officer and describe the most interesting aspect of the Ammunition Manufacturing process.

You have been assigned Practical Exercise #8a as part of your weekly assignment. This exercise is self explanatory.

You will need PRACTICAL EXERCISE #8a to complete this assignment.

This will be a part of Section H #6 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Training Assignment 35

You have been assigned Practical Exercise #10 as your weekly assignment.

Using the GRC database, create a list of possible firearms which may have been used to fire these bullets.

You will need PRACTICAL EXERCISE #10 to complete this assignment.

This will complete Section H #6 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Training Assignment 36

You have been assigned Practical Exercise #11 as part of your weekly assignment. This exercise is self-explanatory.

Using one of the 9mm Luger pistols included with your practical exercise, test fire two each of the following cartridges and attempt to identify the test bullets with each other. Take appropriate photographs and notes.

a. 9mm Luger Federal Hydra-shok
b. 9mm Luger Federal Nyclad
c. 9mm Luger military ball 115 grain FMJ
d. 9mm Luger Winchester Silvertip
e. 9mm Luger CCI Total Metal Jacket

You will need PRACTICAL EXERCISE #11 to complete this assignment.

This will complete Section H #14 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Training Assignment 37

You have been assigned Practical Exercise #12 as part of your weekly assignment. This exercise is self-explanatory.

Using the 357 magnum revolver included with your practical exercise, test fire two each of the following cartridges and attempt to identify the test bullets with each other. Take appropriate photographs and notes.

a. 38 Special caliber Remington lead round-nosed bullet
b. 38 Special caliber Remington jacketed bullet
c. 357 Magnum caliber Remington “Golden Saber” bullet
d. 357 Magnum caliber Winchester “Silvertip” bullet
e. 357 Magnum caliber Federal Nyclad bullet

You will need PRACTICAL EXERCISE #12 to complete this assignment.

This will complete Section H #13 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Training Assignment 38

Using the attached test fired bullets, demonstrate your proficiency in accurately determining the rifling characteristics of these fired bullets. Compile a list of firearms which could have been used to fire these bullets using the GRC database and make microscopic inter-comparisons of the bullets to determine if any have been fired through the same barrel.

Write a short paper on how polygonal rifling affects microscopic comparisons. Do you have any recommendations concerning these types of firearms?

This will complete Section H #8 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Training Assignment 39

Become knowledgeable about the facilities in the Firearm Section for the recovery of fired test bullets. Know. Test fire a 357 Magnum revolver into the bullet recovery tank and string box and observe the difference between the recovered bullets.

Use the following types of ammunition:

38 Special with round nose lead bullet

38 +P Special with jacketed hollow-point bullet

38 Special with full metal jacketed bullet

357 Magnum with jacketed soft-point bullet

Know and observe all safety rules.

Familiarize yourself with the ammunition storage areas in the Firearm Section. Know how to locate test ammunition after correctly selecting test ammunition using the Standard Ammunition (SAF). Discuss with your Technical Lead or an experienced examiner the reasons for using substitute ammunition or down-loading ammunition for test firing.

You will need Practical Exercise #13 to complete this assignment.

This will complete Section H #9 and 10 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Training Assignment 40

Using one of the .22 caliber firearm from PE#15, test fire two each of the following cartridges and attempt to identify the test bullets with each other. Take appropriate photographs and notes.

a. .22 Long Rifle caliber Remington with lead bullets
b. .22 Long Rifle caliber Winchester with lead bullets
c. .22 Long Rifle caliber Remington with brass-coated lead bullets
d. .22 Long Rifle caliber Winchester with copper-coated lead bullets
e. .22 Long caliber Remington with lead bullets.

You will need PRACTICAL EXERCISE #15 to complete this assignment. This exercise is self-explanatory.

This will complete Section H #12 of your training manual.

Technical Lead or Experienced Examiner	Date Completed

Student	Date Assigned	Date Due

Training Assignment 41

For this assignment you will be given bullets fired from five "consecutively-manufactured" barrels.

You need to conduct microscopic comparisons among all the bullets. Compare the two bullets from each envelope together and then compare one of those items to a bullet from each of the other envelopes.

Observe the differences and similarities in the striations, photograph them and prepare a short paper/report discussing your findings and observations.

Pay particular attention to any sub-class carry over that may be occurring between these fired bullets. Describe it in the narrative of your notes and document it with photographs.

This will complete Section H #11 of your training manual

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Training Assignment 42

Using a 30 caliber rifle, test fire two each of the following cartridges and compare the tests with each other. Discuss your plans with each other and assist one another with firing. Prepare notes and a report on your findings. All comparisons should be verified by your training officer. Photograph your comparisons.

a. 30 caliber Remington jacketed soft-point bullet
b. 30 caliber Remington accelerator cartridges

Obtain at least three different 7.62 x 39mm caliber rifles. Test fire each of these rifles three times using both steel jacketed and copper jacketed ammunition. Perform microscopic comparisons of the test bullets. Prepare notes, photographs and a report on your findings. All comparisons should be verified by your technical lead or an experienced examiner.

This will complete Section H #16 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Training Assignment 43

You have received a plastic bag containing mutilated bullets, bullet fragments and bullet cores of various calibers. Determine the methods and techniques used to differentiate between the lead bullets and bullet cores. Identify each of the items present in the assignment bag. Be as complete and thorough as possible. Prepare appropriate notes and photographs of your findings.

This will complete Section H #7 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Training Assignment 44

Obtain a copy of and familiarize yourself with the Firearm Section protocol for the examination of fired bullets.

Obtain different types of mediums to use in test firing. These should include aluminum, sheet metal similar to that used in automobiles, different types of plastic and glass (plain and laminated). Using several different calibers (22, 25, 9mm and 38) test fire each into the test mediums. Determine the feasibility of determining caliber and the rifling characteristics of a fired bullet from an examination of these bullet holes. Be prepared to discuss how much information you could provide to an investigator from your examination of these holes. Also change the angles of the shots to determine if this will change your findings.

Discuss the significance of identifying manufacturing toolmarks on a fired bullet from a victim with those on unfired bullets loaded into cartridges from the suspect. Read the article in the April 1985 issue of the Crime Laboratory Digest concerning “Manufacturing Toolmark Identification on the Base of Jacketed Bullets.”

This will complete Section H #20, 22, and 23 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Training Assignment 45

Obtain a copy of and be familiar with the Firearm Section protocol for the examination of cartridges and cartridge cases.

Describe "class characteristics" as the phrase applies to markings on a cartridge or a fired cartridge case. Determine the types of marks which can be left on a cartridge case/cartridge during loading/extracting and firing. Prepare a written report concerning your findings and conclusions.

Read the following four articles in the issue of the AFTE journal and be prepared to discuss them with your Training Officer.

a. “Pressure Effects on Firing Pin Impression Depths”, Miller, July 95, pg. 242
b. “Drop-Fired or Fired and Dropped?”, Haag, Spring 2000, pg. 154
c. “Anvil Bounce”, Tuira and Ziegler, October 95, pg. 318
d. “Anvil Bounce #2”, Dutton, October 96, pg. 243

This will complete Section I #1, 9 and 10 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Training Assignment 46

Test fire each of the following firearms three times. Using the test fired cartridge cases, visually relate the markings imparted to the fired cartridge case with the part on the firearm which produced these markings. Also load and extract at least two cartridges from each of the following firearms and visually relate the markings imparted to the unfired cartridges with the part on the firearm which produced these markings.

a. 9mm SWD Inc., M11/Nine
b. 9mm Glock pistol
c. 45 Auto caliber Colt Pistol, Model 1911 (or similar)
d. 9mm Beretta pistol, Model 92F
e. 22 Long Rifle caliber Ruger, MKII, pistol
f. 22 Long Rifle caliber Ruger, 10/22, rifle

Using the test cartridge cases and cartridges from above, microscopically compare all of the markings with each other. Include the following types of markings in your microscopic comparisons: firing pin impression, breechface marks, chamber marks, firing pin drag, firing pin aperture shear, anvil marks, extractor marks, ejector marks, ramp marks, and magazine marks. Photograph the results of your comparisons.

This will complete Section I #2 and 3 of your training manual.

Technical Lead or Experienced Examiner	Date Completed

Student	Date Assigned	Date Due

Training Assignment 47

Test fire the following listed (or similar) firearms, using comparable CCI, Remington, Federal, and Winchester ammunition of the appropriate caliber type for each firearm. Select ammunition with both nickel and brass primers when possible. Test fire each firearm three times using each brand of ammunition.

a. 38 Special caliber Smith & Wesson, Model 10, revolver
b. 357 Magnum caliber Smith & Wesson, Model 19, revolver
c. 9mm caliber Smith & Wesson, Model 39, pistol
d. 22 Long Rifle caliber Colt, Woodsman, pistol

Using the test cartridge cases from above, microscopically examine all of the markings with each other. Include the following types of markings in your microscopic comparisons: firing pin impression, breechface marks, chamber marks, anvil marks, extractor marks, ejector marks, ramp marks, and magazine marks. Write a short report regarding your findings. Photograph the results of your comparisons.

This will complete Section I #4 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Training Assignment 48

Test fire a 22 Long Rifle caliber Smith and Wesson (or similar) revolver using six 22 Long Rifle caliber cartridges and six 22 Short caliber cartridges of the same manufacturer. Mark each cartridge to note the chamber in which it is fired.

Using the test cartridge cases and bullets from the above, microscopically examine all of the markings with each other. Include the following types of cartridge case markings in your microscopic comparisons: firing pin impression, breechface marks, chamber marks, anvil marks. Pay particular attention to any changes you see in the bullets. Write a short report describing what you have encounter in this exercise. Photograph the results of your comparisons.

This will complete Section I #5 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Training Assignment 49

Prepare a written report concerning comparing and identifying reloading-type marks on cartridges and/or cartridge cases. Your report should cover the “tell-tale” signs of a reloaded cartridge and what types of things to look for. Identify the various types of marks which may be indicative of reloaded ammunition.

Become familiar with the equipment used in the reloaded of ammunition components and describe the functions of this equipment. Examine several cartridges and compare reloading-type marks of known reloaded cartridges in the Ammunition Reference Collection. Photograph the results of your comparisons.

Research the feasibility of comparing and identifying manufacturing toolmarks on a fired cartridge case from the scene of a crime with cartridges which can be associated with the suspect. Prepare a written report on your findings and cite your references. Obtain samples and examples of these toolmarks. Conduct microscopic comparison of these various types of manufacturing toolmarks which may be present on cartridges or cartridge cases.

This will complete Section I #6 and 7 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Training Assignment 50

Test fire a 30 caliber Carbine U.S. Carbine three times from the Firearm Reference Collection and examine the test fired cartridge cases with each other. Evaluate all of the marks present. Load and extract two cartridges from this same firearm. Note and compare all of the marks imparted to the test cartridges. Note any different or unusual markings. Make microscopic comparisons of these areas and photograph the results.

Examine and evaluate test fired cartridge cases from a Heckler & Koch rifle, MP-5 sub-machine gun, or P7 pistol (tests are attached to this assignment). Discuss the chamber marks produced by this type of firearm. Obtain photographs of your findings.

This will complete Section I #8 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Training Assignment 51

Obtain test firings from the following types of firearms and then thoroughly clean the breech and bore areas of each firearm. Test fire these firearms again and compare the bullets and cartridge cases. Note and photograph any differences determined.

a. Semiautomatic centerfire pistol

b. Semiautomatic rimfire pistol

c. Centerfire revolvers

d. Rimfire revolvers

e. Semiautomatic centerfire rifle (gas operated)

This will complete Section I #11 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Training Assignment 52

You have been selected to attend an FBI Gunpowder and Primer Residues Course. You will need to prepare an after action report on the class upon your completion. Your Technical Lead will coordinate class time and location.

This will complete Section K #1 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Training Assignment 53

Demonstrate your proficiency in preparing the chemicals used in the modified Griess test, the Sodium Rhodizonate test and copper testing, including the test media and the photographic paper.

Prepare a written report which describes in detail the chemical reactions which take place in the burning of smokeless powder, the modified Griess test, the Sodium Rhodizonate test and copper testing.

Review the policies related to distance determination

These policies can be found in the Firearms and Toolmark Technical Manual. Be prepared to discuss them.

This will complete Section K #2 and 3 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Training Assignment 54

Read the following articles and prepare a short report detailing the limitations of the examination performed for distance determinations in casework. Note the necessary evidence in a case request like this and all the variables that need to be considered and discussed with the requesting agency.

"Black Powder Background" in the AFTE Journal, Volume 23, Number 2, April 1991

"The Manufacture of Conventional Smokeless Powder" in the AFTE Journal, Volume 23, Number 2, April 1991

"The Sodium Rhodizonate Test: A Chemically Specific Chromophoric Test for Lead in Gunshot Residues" in the AFTE Journal, Volume 22, Number 3, July 1990

"A Protocol for Gunshot Residue Examinations in Muzzle-To-Target Distance Determinations" in the AFTE Journal, Volume 22, Number 3, July 1990

"Graphical Analysis of the Shotgun/Shotshell Performance Envelope in the Distance Determination Cases" in the AFTE Journal, October 1989

This will complete Section K#7 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Training Assignment 55

Familiarize yourself with the use of the Standard Ammunition File (SAF) in regard to the determination of gauge and manufacturer of fired shotshell components. Know the limitations in regard to making such determinations. Demonstrate your proficiency in using the SAF to conduct this type of search to your Training Officer.

Research the current U. S. Shot sizes and weights. Obtain a chart reflecting this data. Familiarize yourself with the variations worldwide in shot sizes and composition. Learn the significance of the “Rule of 17’ as it applies to shot size.

This will complete Section J #2 and 7 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Training Assignment 56

Determine what type of examinations may be conducted and the conclusions which may be reached from the examination of the following components. Prepare a written report concerning these examinations and obtain examples of each of the components. Photograph areas of interest where applicable.

a. shot, deformed and undeformed
b. fired card or fiber wads
c. fired plastic wads
d. fired shotshells
e. unfired shotshells
f. shot buffer material
g. shot collar and shot cup

As part of this week assignments, you are to complete PRACTICAL EXERCISE #17.

This will complete Section J #1 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Training Assignment 57

Using a 12 Gauge Remington 1100 (or similar) shotgun from the Firearm Reference Collection (FRC), obtain at least two test fired shotshells with each of the following types of ammunition. Also, recover a representative number of the fired pellets and fired wadding from each test firing. Compare markings on these test fired shotshells with each other. Examine the fired components which were recovered and compare them to unfired components of the same type. Discuss the significance of your findings. If you cannot locate the below ammunition, discuss with your Technical Lead or an experienced examiner as to what ammunition to shoot.

a. 12-gauge Remington, 2 3/4" Express, #4 Buck
b. 12-gauge Remington, 2 3/4" Dove/Quail, #8 shot
c. 12-gauge Federal, 2 3/4" Hi-Power, 00 Buck
d. 12-gauge Federal, 2 3/4" Game Load, #6 shot
e. 12-gauge Activ, 2 3/4" Field Load, #7 1/2 shot
f. 12-gauge Activ, 2 3/4" Penetrator, #6 shot
g. 12-gauge Winchester, 2 3/4" Xpert, #8 shot
h. 12-gauge Winchester, 2 3/4" Dove/Quail, #7 1/2 shot

This will complete Section J #5 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Training Assignment 58

Test fire the following (or similar) shotguns using at least two test fired shotshells from each shotgun and microscopically examine the marks imparted to these fired shotshells. Include in your examinations the following types of marks: *firing pin impression, breechface marks (primer, battery cup, and head), extractor marks, ejector marks, chamber marks, and any other mechanism marks*. Photograph these marks and discuss the significance of identifying any of these types of marks.

a. Mossberg, Model 500, pump—action shotgun
b. Remington, Model 1100, semiautomatic shotgun
c. Marlin, Model 55, bolt-action shotgun
d. J. C. Higgins, Model 1011, top-break single shot shotgun
e. Beretta, Silver Snipe Model, over-under double-barrel shotgun
f. Stevens, Model 311, side by side double barrel shotgun

Data in italic will vary from firearm to firearm depending on your Laboratory Firearm Reference Collection (FRC).

This will complete Section J #4 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Training Assignment 59

Obtain a sawed-off shotgun from the Firearm Reference Collection (FRC). Test fire this using three types of ammunition in order to recover the wads. Include both plastic wads and fiber wads in your test ammunition. Conduct microscopic examinations of the recovered wads. Photograph the results of your examinations.

Saw off one inch of the barrel. Test fire this shotgun again using a Remington shotshell with a power piston wad. Recover the shotshell wads and make microscopic comparisons of marks imparted to the test wads.

This assignment is to be worked together to obtain the test fires from a single shotgun. Microscopic comparison should be done independently.

This will complete Section J #3 of your training manual

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Training Assignment 60

Coordinate with your Technical Lead or an experienced examiner to go to a shotgun range to pattern shotguns. A variety of shotguns, chokes, and ammunition are required for this assignment. You will create patterns at differing distances using different combinations of shotguns, chokes, and ammunition. Different target surfaces will be used.

Prepare a report which discusses in detail the procedures used in reloading shotshells. List your references.

Know how to recognize reloaded shotshells from an examination of a shotshell and/or its components. Demonstrate you results to the Technical Lead or and Experience Examiner.

Familiarize yourself with shotshell reloading equipment.

Reload shotshells using reloading equipment and examine the reloaded shotshells for reloading-type marks. Make microscopic examination of the marks produced by the reloading equipment. Photograph the results of you examination.

This will complete Section J#6 and 8 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Training Assignment 61

Review your notes in reference to the section entitled “Manufacture of Modern Firearms”. Discuss your review with the Firearm Section Training Officer.

Define the word “tool” and “toolmark identification” in the narrow sense of the expression. Also, define toolmark identification in its broadest sense, and determine the kinds of conclusions which may be reached in toolmark identification casework. (See AFTE Glossary)

Be prepared to discuss the significance of examining submitted tools first for foreign deposits/trace evidence.

Discuss reports concerning cases involving a toolmark examination wherein no tool is submitted. Include the types of conclusions which can be reached. Also include such things as the type of tool, size of the tool, action employed by the tool, value of toolmarks for comparison purposes, and unusual tool features.

Investigate pressure/contact examinations in regard to objects which may have been in contact with each other for an extended time. Research several cases of this type and set these out in your notes.

Discuss and demonstrate the making of casts of toolmarks. Also discuss the potential of such casts and of photographs alone in making toolmark identifications.

This will complete Section L #1 through 4 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Training Assignment 62

Prepare a written report defining the following terms as they relate to toolmark identification. Give three examples of tools or methods which could produce each category:

a. Shearing
b. Pinching
c. Fracture
d. Scrape mark
e. Impression
f. Slicing

Be prepared to discuss the term "class characteristics" as it applies to toolmark identification. Using the tools or methods selected as examples in the paragraph above, describe their respective class characteristics in detail.

Select at least two tools which are representative of each category in the above paragraph from the Firearm Section. Produce toolmarks with each tool and observe the class characteristics of the toolmark. Vary the angle and force with which each tool is used. Be prepared to demonstrate how this might change or alter the questioned toolmarks.

This will complete Section L #5 and 6 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Training Assignment 63

Read the Handbook of Methods for the Restoration of Obliterated Serial Numbers, by Treptow. Be prepared to discuss the theory of serial number restoration.

Prepare a sketch of the entire stressed area above and below the indentation of a stamped item and depict what remains when the indented area is removed.

Make a list of the various methods used to mark items by private industry. This list should include but not be restricted to: casting, stamping, embossing, debossing, coining, vibratory pencil, laser and electrical discharge machining.

Prepare a written report which covers the following areas: (2-3 pages)

a. The effect each of the above methods of marking techniques has on the subsurface of the marked area.
b. How and why each of the above marking methods will affect the ability of the examiner to restore any obliterated markings.

Define in your notebook the term "plastic deformation" of metal and briefly discuss the difference between cold rolled steel and cast iron metal.

Prepare a short oral presentation discussing the effect that the following types of alterations will have on the subsurface of the marked item and how it will impact on the results of the examiner.

a. grinding
b. restamping
c. peening
d. gouging
e. heating
f. puddling
g. welding
h. removal
i. combinations of the above

This will complete Section M #1 through 6 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Training Assignment 64

Discuss the telltale signs that can be left by the various alteration methods and how these signs will determine your specific approach to the restoration attempt.

Be prepared to discuss the different types of lighting (e.g., incandescent, infrared, UV, and fluorescent) and how they can improve or enhance the restoration results.

Prepare a short written paper discussing the various methods of surface preparation and how they will affect the results in the restoration attempt.

Determine the chemical reaction that takes place when etching is done and place in your notebook the appropriate chemical formulations for the general reactions of acid with steel and aluminum.

Become familiar with the following chemicals:

a. $CuNH_4Cl_2$
b. $CuCl_2$
c. NaOH
d. HCl
e. HNO_3
f. KCN
g. K_2SO_4
h. Aqua Regia
i. H_2SO_4
j. $FeCl_3$
k. H_2O_2
l. Tartaric acid
m. Ammonium Persulfate

Be prepared to discuss the following areas:

If the reaction rate for a stressed area is faster or slower than the etching rate of the rest of the surface and why.

Specialized equipment that might be used in number restoration.

The appropriate photography techniques and procedures to be used before, during, and after restoring obliterated serial numbers.

The various kinds of magnifying and enhancing equipment used for number restoration and when and why each would be used.

This will complete Section M #7 through 15 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Training Assignment 65

Obtain a copy of the chemical hygiene policies of the Firearm Section. Know where the proper safety equipment (e.g., eye wear, masks, gloves, and lab coats) is maintained.

Define and place in your notebook these common chemical terms:

a. Frys Reagent
b. Acidic Ferric Chloride
c. Ferric Chloride
d. Turner's Reagent
e. 25% Nitric Acid
f. Atlanta Two Step

Determine the types of files contained in the National Crime Information Center NCIC and how they might assist the examiner in number restoration.

Prepare a written report discussing the numbering systems and methods used by various firearms manufacturers including but not limited to Colt, Ruger, Smith & Wesson, US Repeating Arms (Winchester) and Remington.

Be prepared to discuss the best chemicals and techniques to use in number restoration of the following firearms:

a. Colt pistol
b. Smith & Wesson revolver
c. RG Industries revolver
d. Ruger stainless steel revolver
e. chrome/nickel 25 caliber auto loading pistol
f. shotgun alloy receiver
g. shotgun case hardened receiver
h. Winchester rifle

Be prepared to discuss with your Training Officer the following subjects:

How the combination of brief application of $CuNH_4Cl_2$ followed by normal NaOH application can shorten the processing time on aluminum.

Why alternating HNO_3 and HCl can work so well on chrome or nickel plated firearms.

Obtain several firearms, alter the serial numbers using different methods and then attempt to restore them. Prepare notes and photographs to substantiate your conclusions and results.

Research the effect of electricity on the reaction time of the different chemical techniques you have learned. Be prepared to discuss and demonstrate this method.

This will complete Section M #17 through 21 and #23 through 25 of your training manual.

Technical Lead or Experienced Examiner	Date Completed

Student	Date Assigned	Date Due

Training Assignment 66

You will receive a total of sixteen metal bars made from four different metals. Each bar has four altered serial numbers. Using the reagents found in Treptow and Training Assignment 65, restore these numbers. Make note of how the different reagents react with the metals and determine which reagents work the best. Consult with your Technical Lead or an experienced examiner for how to record the restoration process. If possible, make use of the direct current and/or magnaflux during some of the restorations.

This will complete Section M #22 and 26 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Training Assignment 67

The purpose of this training is hands on experience for the well established methodology of soaking garments to eliminate blood masking of gunshot residue patterns. Using four soaking agents will allow each analyst the opportunity to personally evaluate their efficiency. The mapping exercise will assist in evaluating the value of microscopic examinations.

The trainee will be given four gunshot residue patterns. These patterns will be divided in half, numbered and one half of each pattern soaked with blood and dried.

Each four blood soaked gunshot residue patterns will be microscopically examined and identifiable gunpowder mapped onto a transparency marked for orientation.

Prior to the soaking exercise each person will chemically process one test pattern for nitrites, lead and copper to evaluate the masking properties of the blood.

Each of the four blood soaked gunshot residues patterns will be rinsed with:

- Saline solution
- Phosphate buffered saline solution
- Haemasol
- Fisher brand Sparkleen Detergent

The rinse solutions should be examined for powder particles and noted if any. The material will be left to dry overnight.

Each of the four blood soaked gunshot patterns will be microscopically examined again and any identifiable gunpowder particles mapped onto the original transparency with a different colored pen.

Each of the dried gunshot residue patterns will be chemically processed for nitrites.

Each of the corresponding halves to the rinsed patterns will be chemically processed for nitrites and the two halves of each pattern compared to each other.

The two halves will also be chemically tested for lead and copper residues.

Write a brief discussion about your results of this exercise; include photos and notes.

References:

Haag, L A method for improving the Griess and Sodium Rhodizonate Tests for GSR patterns on bloody garments, AFTE Journal volume 23, number 3, July 1991, page 808.

Hueske, E Gunshot residue testing of blood stained garments, AFTE Journal volume 26, number 1, January 1994, page 26

Haag, L Rebuttal to Hueske article, AFTE Journal volume 26, number 2, April 1994, page 155

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

APPENDIX B – PRACTICAL EXERCISES

Student	Date Assigned	Date Due

Practical Exercise 1

You have received a plastic bag which contains ammunition and ammunition components. These items are to be used in this exercise. Each term listed below is represented in at least one of the items of ammunition or ammunition components in the bag. Mark the items with the proper letter by the term. Some of the items will have more than one definition and each will have at least one.

a.	Cartridge	t.	Bullet
b.	Cartridge case	u.	Round-nosed bullet
c.	Primer	v.	"Hollow-point" bullet
d.	Shotshell	w.	Jacketed bullet
e.	Fired shotshell	x.	Wadcutter bullet
f.	Bottleneck cartridge	y.	Semi-wadcutter bullet
g.	Rebated-rim cartridge	z.	Soft point bullet
h.	Rimless cartridge	aa.	Spitzer bullet
i.	Rimmed cartridge	bb.	Cast lead bullet
j.	Semi-rimmed cartridge	cc.	Truncated-nosed bullet
k.	Shoulder	dd.	Cannelure
l.	Neck	ee.	Ogive
m.	Mouth	ff.	Copper-coated lead bullet
n.	Head	gg.	Nylon-coated lead bullet
o.	Headstamp	hh.	Crimp
p.	Brass-coated lead bullet	ii.	Lubaloy
q.	Tapered cartridge	jj.	Wadding
r.	Extractor groove	kk.	Berdan primer
s.	"Silvertip" bullet	ll.	Battery cup
		mm.	Boxer primer

Make sure the marks are legible.

This will complete Section E #1 of your training manual.

Technical Lead or Experienced Examiner	Date Completed

Student	Date Assigned	Date Due

Practical Exercise 2

Purpose: The purpose of this assignment is to update and maintain the Standard Ammunition File (SAF) used for reference. This reference file will contain examples of a particular caliber type typically examined in Firearm Section casework, such as 22 Long Rifle, 38 Special, 9mm Luger, 357 Magnum, 7.62 x 39mm and others.

Procedure:

1. Each trainee will meet with the Technical Lead or Supervisor to select a caliber type for this project. This coordination will preclude any duplication of effort.

2. Prepare corrugated cards similar to those already present in the SAF to accommodate the specimens. The cards will be labeled with appropriate information on the front (such as manufacturer, caliber, cartridge name, bullet type and weight, etc.). An unfired specimen shall be paired with each pulled specimen.

3. Survey the ammunition supply for examples to be included, consisting of common brands and their variations as far as cartridge case and bullet types within a given caliber type.

4. Number the various cartridge/pulled bullet pair sets and organize them into the proper storage units within the Section and update the SAF database.

5. Coordinate with the Technical Lead or Supervisor and other trainees to attain a degree of uniformity in the appearance of these specimens.

This will complete Section E #4 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Practical Exercise 3

Purpose: This exercise is designed to introduce the student to proper techniques in conducting examinations of revolvers submitted as evidence. The exercise is designed to familiarize the student with the proper unit forms used in note taking, proper methodology for determining operability, trigger pull and safety feature testing.

Procedure:

1. The trainee will receive three double-action revolvers.
2. The trainee will use the "Firearms Worksheet" and prepare a work sheet on each firearm examined.
3. The trigger pull in both single and double action modes should be determined on each of the submitted revolvers.
4. Test fire each revolver three times in the single-action mode and three times in the double-action mode. Keep the single-action test fires and double-action test fires separate. These will be used in a later practical exercise.
5. Prepare a written report concerning each of the submitted revolvers using Firearm Section standard terminology and style.
6. Upon completion of the above activities provide your reports, worksheets, notes, test fires and revolvers to the Technical Lead or experienced examiner for a critique of your work.

This will complete Section G #12, 13, and 14, of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Practical Exercise 4

Purpose: This exercise is designed to provide the student with an opportunity to develop proper techniques conducting examinations of revolvers submitted as evidence. The exercise is designed to familiarize the student with revolvers that may be damaged, dirty, rusted or unusual in design.

Procedure:

1. The trainee will receive three double-action type revolvers.
2. The trainee will use the "Firearms Worksheet" and prepare a work sheet on each firearm examined.
3. The trigger pull in both single and double action modes should be determined on each of the submitted revolvers.
4. Test fire each revolver three times and retain the test fires.
5. Prepare a written report concerning each of the submitted revolvers using Firearm Section standard terminology and style.
6. Upon completion of the above activities provide your reports, worksheets, notes, test fires and revolvers to the Technical Lead or experienced examiner for a critique of your work.

This will complete Section G #12, 13, and 14 of your training manual.

Technical Lead or Experienced Examiner	Date Completed

Student	Date Assigned	Date Due

Practical Exercise 5

Purpose: This exercise is designed to provide the student with an opportunity to develop proper techniques conducting examinations of handguns submitted as evidence. The exercise is designed to familiarize the student with different types of handguns that may have safety problems.

Procedure:

1. The trainee will receive three handguns.
2. The trainee will use the "Firearms Worksheet" and prepare a work sheet on each firearm examined.
3. The trigger pull in both single and/or double action modes should be determined on each of the submitted handguns.
4. Test fire each handgun three times and retain the test fires.
5. Prepare a written report concerning each of the submitted handguns using Firearm Section standard terminology and style.
6. Upon completion of the above activities provide your reports, work sheets, notes, test fires and handguns to the Technical Lead or experienced examiner for a critique of your work.

This will complete Section G #12 through 16 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Practical Exercise 6

Purpose: This exercise is designed to provide the student with an opportunity to develop proper techniques conducting examinations of handguns submitted as evidence. The exercise is designed to familiarize the student with semiautomatic pistols that may have been altered.

Procedure:

1. The trainee will receive three pistols.
2. The trainee will use the "Firearms Worksheet" and prepare a work sheet on each firearm examined.
3. The trigger pull should be determined on each of the submitted pistols.
4. Test fire each firearm three times and retain the test fires. Also test each firearm to determine if it functions as a full automatic firearm.
5. Prepare a written report concerning each of the submitted revolvers using Firearm Section standard terminology and style.
6. Upon completion of the above activities provide your reports, work sheets, notes, test fires and pistols to the Technical Lead or experienced examiner for a critique of your work.

This will complete Section G #12, 13, 14, 19 and 20 of your training manual.

Technical Lead or Experienced Examiner	Date Completed

Student	Date Assigned	Date Due

Practical Exercise 7

Purpose: The purpose of this assignment is to acquaint the student with the comparison microscope. This exercise is designed to familiarize the student with the controls and capabilities of the comparison microscopes located in the Firearm Section. It is not designed to test the student's ability to make comparative examinations.

Procedure:

1. Each trainee will use cartridge cases that have been fired from the same firearm. (Use test fires provided.)

2. The student will use the different styles of comparison microscopes present in the laboratory.

3. Learn and understand all of the control mechanisms that are present on each of the comparison microscopes. Be able to discuss each of these controls and how they function.

4. Determine if there are other lighting methods available within the laboratory. If there are different light sources available, use these with the various microscopes and discuss your findings.

5. Observe the comparisons with each of the objectives present. Note the differences in depth of field, field of view and individual stria comparison at each objective size. Also adjust the aperture and observe the difference in light and depth of field produced by constricting the opening.

6. Take images of the cartridge cases showing the comparison of the breech face impression and also of the firing pin impression (ejector marks if present). Keep all of your images for discussion and be able to discuss problems encountered in photographing comparisons through the comparison microscope.

7. Demonstrate to an experience examiner your ability to calibrate one of the comparison microscopes.

This will complete Section F # 1 through 6 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Practical Exercise 8

Purpose: The purpose of this assignment is to acquaint the student with the capabilities of the comparison microscope. This exercise is designed to familiarize the student with various types of evidence which will be examined with the comparison microscopes located in the Firearm Section. The student's ability to make comparative examinations is also a part of this assignment.

Procedure:

1. Each trainee will receive a plastic bag containing four items. Each item contains three bullets.

   Item 1. full metal jacketed bullets

   Item 2. coated lead bullets

   Item 3. Nyclad bullets

   Item 4. plain lead bullets

2. The student should conduct microscopic comparisons of each individual bullet within an item to determine if they have been fired from the same firearm. Proper notes and photographs should be made. Before proceeding, have all comparisons verified by one of the training officers.

3. After the microscopic comparisons have been completed on each individual item you should attempt to compare one item to another to determine how many firearms might have been used to discharge these bullets.

4. Prepare a written report indicating your findings on the differences encountered with the different bearing surfaces that you have examined. Detail those areas that seemed easier for comparison and those that were harder. What are your findings concerning the comparison of different type bullets? What are some of the pitfalls that might be present during these types of examinations?

This will be a part of Section F5 of your training manual.

Technical Lead or Experienced Examiner	Date Completed

Student	Date Assigned	Date Due

Practical Exercise 8A

Purpose: The purpose of this assignment is to acquaint the student with the capabilities of the laboratory reference material concerning “no gun” cases. This exercise is designed to familiarize the student with the Standard Ammunition File (SAF), the Manufacturers Literature file, the Firearms Section Reference Library, and the General Rifling Characteristics (GRC) database.

Procedure:

1. Each trainee will receive twelve bullets.
2. The student should determine the weight, diameter, number of land and groove impressions, and direction of twist. Measure the land and groove impressions for use with the GRC database. Use the forms that are currently in use by the section examiners.
3. Report verbally your findings as to the caliber, brand and type of each projectile of each exhibit. Provide a listing of the possible firearms which could have fired each exhibit.

Provide all documentation to your Training Officer upon completion of this exercise.

This will be a part of Section H #6 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Practical Exercise 9

Purpose: The purpose of this assignment is to acquaint the student with the capabilities of the laboratory reference material concerning "no gun cases." This exercise is designed to familiarize the student with the Standard Ammunition File (SAF), the Known Specimen File and the General Rifling Characteristics (GRC) database located in the Firearm Section.

Procedure:

1. Each trainee will receive a plastic bag containing seven bullets.
2. The student should determine the weight, diameter, number of lands and grooves, and direction of twist. Measure the land and groove impressions for use with the GRC database. Use the forms that are currently in use by unit examiners.
3. Prepare a written report indicating your findings as to the caliber, brand and type of bullet of each exhibit. Prepare a listing of the possible guns that could have fired each bullet. Also, include your notes when you turn in the assignment.
4. As with all Practical Exercises treat this as a case. Remember to mark your evidence and maintain custody records.

This will complete Section H #2 through 5 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Practical Exercise 10

Purpose: The purpose of this assignment is to acquaint the student with the capabilities of the laboratory reference material concerning "no gun cases." This exercise is designed to familiarize the student with the Standard Ammunition File (SAF), the Known Specimen File and the General Rifling Characteristics (GRC) database located in the Firearm Section.

Procedure:

1. Each trainee will receive six plastic bags each containing a bullet.
2. The student should determine the weight, diameter, number of lands and grooves, and direction of twist. Measure the land and groove impressions for use with the GRC database. Use the forms that are currently in use by the Firearms Section.
3. Prepare a written report indicating your findings as to the caliber, brand and type of bullet of each exhibit. Prepare a listing of the possible guns that could have fired each bullet. Also, include your notes when you turn in the assignment.
4. As with all Practical Exercises treat this as a case. Remember to mark your evidence and properly seal the items when completed.

This will be a part of Section H #6 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Practical Exercise 11

Purpose: The purpose of this assignment is to begin development of casework procedures and "real" case scenarios. The student will be provided with several items of evidence which will require firearm examinations, microscopic bullet comparisons and limited microscopic cartridge case comparisons. **In addition, the student will no longer be able to ask another qualified examiner for assistance.**

Procedure:

1. The student will receive the following (or similar) items of evidence:

Item #1	full metal jacketed bullet
Item #2	cartridge case
Item #3	Browning semi-auto pistol, 9mm Luger
Item #3A	three (3) cartridges from Item 3
Item #4	Browning semi-auto pistol, 9mm Luger
Item #4A	three (3) cartridges from Item 4

2. The student should examine all the evidence involved in this "case" and determine if the bullet (Item #1) and the cartridge case (Item #2) were fired by either pistol submitted.

3. Prepare a written report indicating your findings. Also, include your notes when you turn in the assignment.

4. As with all Practical Exercises treat this as a case. Remember to mark your evidence, but not the firearms.

This will complete Section H #14 of your training manual.

Technical Lead or Experienced Examiner	Date Completed

Student	Date Assigned	Date Due

Practical Exercise 12

Purpose: The purpose of this assignment is to begin development of casework procedures and "real" case scenarios. The student will be provided with several items of evidence which will require firearm examinations, microscopic bullet comparisons and limited microscopic cartridge case comparisons. **In addition, the student will no longer be able to ask another qualified examiner for assistance.**

Procedure:

1. The student will receive the following items of evidence:

Item #1	full metal jacketed bullet
Item #2	cartridge case
Item #3	round nose lead bullet
Item #4	three (3) cartridge cases from Item 5
Item #5	Ruger, double-action revolver, 357 Magnum

2. The student should examine all the evidence involved in this "case" and determine if the bullets (Item #1 and Item #3) and the cartridge cases (Item #2 and Item #4) were fired by the revolver (Item #5) submitted.

3. Prepare a written report indicating your findings. Also, include your notes when you turn in the assignment.

4. As with all Practical Exercises treat this as a case. Have your comparisons verified and remember to mark your evidence.

This will complete Section H #13 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Practical Exercise 13

Purpose: The purpose of this assignment is to begin development of casework procedures and "real" case scenarios. The student will be provided with several items of evidence which will require firearm examinations, microscopic bullet comparisons and limited microscopic cartridge case comparisons. **In addition, the student will no longer be able to ask another qualified examiner for assistance.**

Procedure:

1. The student will receive the following items of evidence:

   Item #1 One fired full metal jacketed bullet.

   Item #2 One fired cartridge case.

   Item #3 One Ruger double action revolver.

   Item #4 One Ruger double action revolver.

2. The student should examine all the evidence involved in this "case" and determine if the bullet (Item #1) and the cartridge case (Item #2) were fired by either revolver submitted.

3. Prepare a written report indicating your findings. Also, include your notes when you turn in the assignment.

4. As with all Practical Exercises treat this as a case. Remember to mark your evidence, except for the firearms.

This will complete Section I#12 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Practical Exercise 14

Purpose: The purpose of this assignment is to begin development of casework procedures and "real" case scenarios. The student will be provided with several items of evidence which will require firearm examinations, microscopic bullet comparisons and limited microscopic cartridge case comparisons. **In addition, the student will no longer be able to ask another qualified examiner for assistance.**

Procedure:

1. The student will receive the following items of evidence:

Item #1	full metal jacketed bullet
Item #2	round nose lead bullet
Item #3	round nose lead bullet
Item #4	full metal jacketed bullet
Item #5	cartridge case
Item #6	cartridge case
Item #7	H & R revolver
Item #8	Walther pistol

2. The student should examine all the evidence involved in this "case" and determine which (if any) of the bullets and cartridge cases were fired by either firearm submitted.

3. Prepare a written report indicating your findings. Also, include your notes when you turn in the assignment.

4. As with all Practical Exercises treat this as a case. Remember to mark your evidence, except the firearms.

This will complete Section H #17 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Practical Exercise 15

Purpose: The purpose of this assignment is to begin development of casework procedures and "real" case scenarios. The student will be provided with several items of evidence which will require firearm examinations, microscopic bullet comparisons and limited microscopic cartridge case comparisons. **In addition, the student will no longer be able to ask another qualified examiner for assistance.**

Procedure:

1. The student will receive the following (or similar) items of evidence:

   Item #1 three lead bullets
   Item #2 Smith & Wesson revolver
   Item #3 three cartridge cases
   Item #4 three lead bullets
   Item #5 Smith & Wesson revolver
   Item #6 three cartridge cases

2. The student should examine all the evidence involved in this "case" and determine which (if any) of the bullets and cartridge cases were fired by either firearm submitted.

3. Prepare a written report indicating your findings. Also, include your notes when you turn in the assignment.

4. As with all Practical Exercises treat this as a case. Remember to mark your evidence, except the firearms.

This will complete Section H #12 of your training manual.

Technical Lead or Experienced Examiner	Date Completed

Student	Date Assigned	Date Due

Practical Exercise 16

Purpose: The purpose of this assignment is to continue development of casework procedures and 'real' case scenarios. The student will be provided with several items of evidence which will require firearm examinations, microscopic bullet comparisons and cartridge case comparisons. This practical exercise is to be considered as an examination. You may ask the training officer for guidance, but all conclusions will be made by the trainee without benefit of verification. In addition, the student needs to prepare for moot court concerning this evidence. Unlike casework, the "no conclusion" answer is not an acceptable response on this exercise.

Procedure: 1. The student will receive the following items of evidence:

Item #1	*Caliber .45 Auto pistol, SN:*
Item #2	*Caliber .45 Auto pistol, SN:*
Item #3	*Caliber .45 Auto pistol, SN:*
Item #4	*Caliber .45 Auto pistol, SN:*
Item #5	*Caliber .45 Auto pistol, SN:*
Item #6	cartridge case
Item #7	cartridge case
Item #8	cartridge case
Item #9	cartridge case
Item #10	cartridge case
Item #11	bullet
Item #12	bullet
Item #13	bullet
Item #14	bullet
Item #15	bullet

Data in italic will vary from firearm to firearm depending on your Laboratory Firearm Reference Collection (FRC).

2. The student should examine all the evidence involved in this "case" and determine which (if any) of the bullets and cartridge cases were fired by the firearms submitted.

3. Prepare a written report indicating your findings. Also, include your notes when you turn in the assignment.

4. As with all Practical Exercises treat this as a case. Remember to mark your evidence and maintain custody records.

This will complete Section I#12 of your training manual.

Technical Lead or Experienced Examiner	Date Completed

Student	Date Assigned	Date Due

Practical Exercise 17

Purpose: The purpose of this assignment is to observe the differences and similarities in fired shotshell cases and determine identifiability by microscopic examination.

Procedure:

1. Each trainee will receive a plastic bag containing seven (7) fired shotshell cases.
2. The student should conduct all suitable examinations to determine how many firearms were involved and identify which (if any) of the fired shotshell cases were fired from the same firearm. Use the forms that are currently in use by unit examiners.
3. Prepare a written report indicating your findings concerning each exhibit. Prepare a listing the possible types of guns that could have fired each shotshell case. Also, include your notes when you turn in the assignment.
4. As with all Practical Exercises treat this as a case. Remember to mark your evidence and maintain custody records.

This will complete Section J #1 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Practical Exercise 18

Purpose: The purpose of this assignment is to conduct examinations of evidence submitted from crime scenes that are part of an ongoing investigation. The receipt of bullets and cartridge cases will be the first phase of this exercise. Conduct all examinations as if it were a real case and prepare the proper notes and reports that might be required.

Procedure:

1. The trainee will receive a plastic bag containing six (6) fired bullets and cartridge cases.

2. The student should conduct all suitable examinations to determine how many firearms were involved and identify which (if any) of the bullets and cartridge cases were fired from the same firearm. Use the forms that are currently in use by unit examiners.

3. Prepare a written report indicating your findings concerning each exhibit. Prepare a listing of the possible types of guns that could have fired the bullets and cartridge cases. Also, include your notes when you turn in the assignment.

4. As with all Practical Exercises treat this as a case. Remember to mark your evidence and maintain custody records.

This will complete Section I #12 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Practical Exercise 19

Purpose: The purpose of this assignment is to conduct examinations of evidence submitted from crime scenes that are part of an ongoing investigation. The receipt of three suspect firearms will be the second phase of this exercise. Conduct all examinations as if it were a real case and prepare the proper notes and reports that might be required.

Procedure:

1. The trainee will receive a plastic bag containing three firearms.

2. The student should conduct all suitable examinations to determine if any of these firearms were used to fire any of the bullets and cartridge cases received in Practical exercise #18. Use the forms that are currently in use by unit examiners.

3. Prepare a written report indicating your findings concerning each exhibit. Also, include your notes when you turn in the assignment.

4. As with all Practical Exercises treat this as a case. Remember to mark your evidence and maintain custody records.

This will complete Section I #12 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Practical Exercise 20

Purpose: The purpose of this assignment is to conduct examinations of toolmark evidence submitted from crime scenes that are part of an ongoing investigation. Conduct all examinations as if it were a real case and prepare the proper notes and reports that might be required.

Procedure:

1. The trainee will receive a paper bag containing three items, bolt cutters and two plastic bags with lead items that contain questioned toolmarks.
2. The student should conduct all suitable examinations to determine if any of these questioned toolmarks were made by the submitted bolt cutters. Use the forms that are currently in use by unit examiners.
3. Prepare a written report indicating your findings concerning each exhibit. Also, include your notes when you turn in the assignment.
4. As with all Practical Exercises treat this as a case. Remember to mark your evidence and maintain custody records.

This will complete Section L #18 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Practical Exercise 21

Purpose: The purpose of this assignment is to conduct examinations of evidence submitted from crime scenes that are part of an ongoing investigation. Conduct all examinations as if it were a real case and prepare the proper notes and reports that might be required.

Scenario: A shooting occurred involving at least two individuals. Suspect #1 the owner of the .380 Automatic pistol claims suspect #2 the owner of the .22 caliber rifle fired first from across a street and he returned fire in self-defense.

Procedure:

1. The student will receive a paper bag containing the evidence listed below.
2. The student should conduct all suitable examinations on all submitted evidence.
3. Prepare a written report indicating your findings concerning each exhibit. Also, include your notes when you turn in the assignment.
4. As with all Practical Exercises treat this as a case. Remember to mark your evidence and maintain custody records.

Evidence:

Item 1	*Marlin* brand 22 caliber rifle
Item 2	three (3) lead bullets
Item 3	three (3) cartridge cases
Item 4	Semiautomatic pistol caliber 380 automatic
Item 5	three (3) jacketed bullets
Item 6	three (3) cartridge cases
Item 7	piece of shirt from suspect #2

Data in italic will vary from firearm to firearm depending on your Laboratory Firearm Reference Collection (FRC).

This will complete Section K #5 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Practical Exercise 22

Purpose: The purpose of this assignment is to conduct examinations of evidence submitted from crime scenes that are part of an ongoing investigation. Conduct all examinations as if it were a real case and prepare the proper notes and reports that might be required.

Scenario: A homicide occurred in an apartment. The suspect claims he was cleaning the firearm when it went off accidentally and struck his wife in the chest. She was supposed to be standing in the doorway about six (6) feet from him when the shot was fired.

Procedure:

1. The student will receive a paper bag containing the evidence listed below.
2. The student should conduct all suitable examinations on all submitted evidence.
3. Prepare a written report indicating your findings concerning each exhibit. Also, include your notes when you turn in the assignment.
4. As with all Practical Exercises treat this as a case. Remember to mark your evidence and maintain custody records.

Evidence:

Item #1	cartridge case from crime scene.
Item #2	revolver from crime scene.
Item #3	portion of shirt from victim.
Item #4	bullet from victim.

This will complete Section K #5 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Practical Exercise 23

Purpose: The purpose of this assignment is to begin development of casework procedures and "real" case scenarios. The student will be provided with an item of evidence which will require a gunshot distance determination.

Procedure:

1. The student will receive the following items of evidence:

   Item #1 One pair of pants with apparent gunshot damage.
   Item #2 One Remington 20 ga. shotgun.
   Item #3 One box of remaining ammunition from Suspect's house.

2. The student should microscopically and chemically process the victim's pants in this "case" and attempt to determine if there are any bullet holes present and if so, the proximity from which the firearm was discharged.

3. Prepare a written report indicating your findings. Also, include your notes, photographs, and any diagrams when you turn in the assignment.

4. As with all Practical Exercises treat this as a case. Remember to mark your evidence, and photograph necessary items.

This will complete Section K #6 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Practical Exercise 24

Purpose: The purpose of this assignment is to begin development of casework procedures and "real" case scenarios. The student will be provided with an item of evidence which will require a gunshot distance determination.

Procedure:

1. The student will receive the following items of evidence:

   Item #1 One shirt with apparent gunshot damage.
   Item #2 One Ruger semiautomatic 22 caliber rifle.
   Item #3 One box of remaining ammunition from Suspect's house.

2. The student should microscopically and chemically process the victim's shirt in this "case" and attempt to determine if there are any bullet holes present and if so, the proximity from which the firearm was discharged.

3. Prepare a written report indicating your findings. Also, include your notes, photographs, and any diagrams when you turn in the assignment.

4. As with all Practical Exercises treat this as a case. Remember to mark your evidence, and photograph necessary items.

This will complete Section K #5 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Practical Exercise 25

Purpose: The purpose of this assignment is to begin development of casework procedures and "real" case scenarios. The student will be provided with an item of evidence which will require a gunshot distance determination.

Procedure:

1. The student will receive the following items of evidence:

   Item #1 One pair of pants with apparent gunshot damage.
   Item #2 One Bryco 58, 380 auto pistol.
   Item #3 One box of remaining ammunition from Suspect's house.

2. The student should microscopically and chemically process the victim's pants in this "case" and attempt to determine if there are any bullet holes present and if so, the proximity from which the firearm was discharged.

3. Prepare a written report indicating your findings. Also, include your notes, photographs, and any diagrams when you turn in the assignment.

4. As with all Practical Exercises treat this as a case. Remember to mark your evidence, and photograph necessary items.

This will complete Section K #5 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Practical Exercise 26

Purpose: The purpose of this assignment is to begin development of casework procedures and "real" case scenarios. The student will be provided with an item of evidence which will require a gunshot distance determination.

Procedure:

1. The student will receive the following items of evidence:

   Item #1 One dress with apparent gunshot damage.
   Item #2 One 30 caliber semiautomatic rifle.
   Item #3 One box of remaining ammunition from Suspect's house.

2. The student should microscopically and chemically process the victim's dress in this "case" and attempt to determine if there are any bullet holes present and if so, the proximity from which the firearm was discharged.

3. Prepare a written report indicating your findings. Also, include your notes, photographs, and any diagrams when you turn in the assignment.

4. As with all Practical Exercises treat this as a case. Remember to mark your evidence, and photograph necessary items.

This will complete Section K #5 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Practical Exercise 27

Purpose: The purpose of this assignment is to conduct examinations of toolmark evidence submitted from crime scenes. Conduct all examinations as if it were a real case and prepare the proper notes and reports that might be required.

Procedure:

1. The trainee will receive four items. A pair of bolt cutters and three cut sections of wire that contain questioned toolmarks.
2. The student should conduct all suitable examinations to determine if any of these questioned toolmarks were made by the submitted bolt cutters. Use the forms that are currently in use by unit examiners.
3. Prepare a written report indicating your findings concerning each exhibit. Also, include your notes when you turn in the assignment.
4. As with all Practical Exercises treat this as a case. Remember to mark your evidence and maintain custody records.

This will complete Section L #18 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**

Student	Date Assigned	Date Due

Practical Exercise 28

Purpose: The purpose of this assignment is to conduct examinations of toolmark evidence submitted from crime scenes. Conduct all examinations as if it were a real case and prepare the proper notes and reports that might be required.

Procedure:

1. The trainee will receive six items:

   Item 1 Craftsman 1" wood chisel.
   Item 2 Craftsman 1" wood chisel.
   Item 3 Piece of cut lead wire.
   Item 4 Piece of cut lead wire.
   Item 5 Piece of cut lead wire.
   Item 6 Piece of cut lead wire.

2. The student should conduct all suitable examinations to determine if any of these questioned toolmarks were made by the submitted chisels.

3. Prepare a written report indicating your findings concerning each exhibit. Also, include your notes when you turn in the assignment. Document your findings with photographs.

4. As with all Practical Exercises treat this as a case.

This will complete Section L #18 of your training manual.

Technical Lead or Experienced Examiner **Date Completed**