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Revision History:

August 30, 2010 – Initial version of manual.

March 28, 2011 - Revised Section 2 (Training Program Guidelines) to include ethics, general forensic science, quality assurance/quality control, and the basics of the legal system in the theoretical background training, and specified requirement for all Forensic Biology employees to attend an annual review of the ASCLD/LAB *Guiding Principles of Professional Responsibility for Crime Laboratories and Forensic Scientists;* Revised Section 3 and 4 by referencing a new "Required Training Lectures" list in the manual. This list is accessible through Section 4 (Modules).

July 16, 2012 – Entire manual revised for LIMS implementation. Names of approvers removed and replaced with general terminology. New training modules added: 12D, 22A, and 22B.

April 1, 2014 – Section 3.E was updated to state that competency in either organic or bone extractions satisfies the competency requirements for the mitochondrial hair extraction procedure.

1. PROGRAM OVERVIEW

The purpose of the training program is to provide analysts with the theoretical and practical means necessary to perform reliable testing. For staff members who are DNA Interpreting Analysts, this includes training to learn how to present information competently in court. By having a multi-phase program of practical exercises, written assignments, and oral examinations, an analyst's weak points should become obvious, and the staff can work with the analyst to bolster this aspect of his/her knowledge and competency.

Newly hired staff is trained to perform a variety of different procedures, each relating to analyzing physical evidence for DNA typing. Each trainee progresses through a series of training modules; the modules correspond to duty rotations in the laboratory: evidence examination, sexual assault kit processing, exemplar processing, extraction, quantitation, and PCR amplification and typing. The modules selected depend on the job title and eventual work group of the trainee. Completion of the complete set of required modules is necessary for a trainee to become a reporting analyst.

Current staff is trained in new procedures as they are added. For each new technique implemented an analyst must successfully complete the new training module before using the procedure in casework. If a current analyst's job duties change or retraining is necessary, supplemental training is done using the current training module for that technique. Successful completion of the module is required before the analyst will be allowed to perform the technique in casework. Successful completion of each module is documented in the training folder either directly on the competency test results record or on one of the training checklists.

During training periods, staff should spend as much time as possible in training in order to expedite the process and help it to proceed more smoothly. This means that flexible or compressed time schedules, attendance at professional meetings and participation in special projects will not generally be allowed.

In total, the training will cover the theoretical and practical aspects of forensic biology. In particular it covers aspects of evidence examination, identification of physiological fluids, molecular biology, separation technology, interpretation of complex DNA results, statistical concepts as they relate to forensic DNA analysis, and court testimony.

A. Training – evidence examination and serological methods

The goal of training and competency testing in the classical forensic biology methods is to establish consistency of performance between individual analysts and to maintain the highest possible level of performance over time. These analytical procedures for identifying physiological fluids are the foundation on which further individualization (DNA testing) is based, and their behavior and limitations must be understood.

The classical forensic biology training program is monitored by the Director, Deputy Directors, Assistant Directors, and/or Criminalist III/IV supervisors. The training may be provided by any Criminalist I or higher who is competent and has the appropriate level of experience (generally, at least six months completed past the training period for the specific procedure).

B. Training - DNA analysis

The goal of training and competency testing in the DNA laboratory is to establish consistency of performance throughout the laboratory and to maintain the highest possible level of performance over time.

The DNA training program is monitored by the Director, Deputy Directors, Assistant Directors, and/or Criminalist III/IV supervisors. The training may be provided by any Criminalist I or higher who is competent and has the appropriate level of experience (generally, at least six months completed past the training period for the specific procedure).

The trainee may not interpret DNA results (STR CE processing and signing DNA reports) until they become a DNA Interpreting Analyst. This means that they(1) meet or exceed the degree and educational requirements as defined by the applicable "FBI Quality Assurance Standards for Forensic DNA Testing Laboratories (2) have a minimum of six months of documented forensic human-DNA lab experience, (3) successfully completed all training modules, and (4) successfully completed a written exam, oral exam, and moot courts. They will be expected to manage their DNA cases and write DNA reports for their supervisor's signature in the interim.

If any new or additional federal and/or state requirements are imposed, they must be met by an analyst prior to interpreting and reporting DNA results.

Failure to satisfactorily complete competency tests, written or oral examinations, mock courts, required courses, or other required training activities, within a reasonable time frame after the beginning of training, may constitute grounds for demotion or termination.

C. Training record

The training is documented and maintained in a training record. The training record may contain notes, results, photographs, etc. generated during training. In addition, for each topic the date and initials of the trainer should be documented. The direct supervisor should regularly review the contents of the training record for accuracy and completeness.

The training record is the property of the Department of Forensic Biology and will be retained by the Department.

D. Training schedule

A training schedule must be provided to each trainee and all scientific staff responsible for any aspect of the training. Because the training schedule affects many aspects of department operations, it should be adhered to as carefully as possible. Each module has adequate time allotted for the training. If necessary, for example if equipment is unavailable, a trainee may be asked to substitute a weekend day for a week day.

For Criminalist I's the training is limited. As competency is attained in each module, the trainee may be given a one or two week assignment in that technical rotation performing analysis on casework samples.

For Criminalist II's and above, the training is continuous and does not include intermediate assignments to technical rotations. Once all required training modules and moot courts are complete, the trainee joins the rotation schedule.

E. Roles and responsibilities

Training Team

The training team is responsible for periodic review and/or revision of the Training Manual and reference articles.

The training team is responsible for preparation of training schedules, training assignments, and training records. This includes scheduling of training given by OCME staff other than those from the Department of Forensic Biology.

The training team is responsible for ensuring that practice samples and competency test samples are prepared.

The training team is responsible for ensuring that reference material is available.

The training team is responsible for maintaining the training records of current analysts.

Trainee

The trainee is expected to be ready by 9 am each day there is directly supervised training (observation or demonstration of a technique). A more flexible schedule may be possible on days where the trainee is working on practical exercises, practice samples, or competency tests.

The trainee is expected to do the required readings and be prepared to answer questions from the trainer or their supervisor on the topics as they are covered.

The trainee is expected to work on and complete the written questions during the time period of the training module and/or lecture. They should not be postponed until the end of hands-on training.

The trainee is responsible for retaining all training paperwork and documentation in the training record. At the completion of training the trainee is responsible for providing the complete training record to the Training Team for review.

Trainer

The trainer is expected to be ready to go by 9 am each day in which there is directly supervised training (observation or demonstration of a technique). The trainer must realize that training has the priority; meetings or other tasks may have to be postponed. *If the assigned trainer finds he/she is unavoidably unable to perform the training, they must make arrangements for the training to be re-assigned.*

The trainer is responsible for reinforcing the information from the required reading and lectures by discussing each technique in detail during the training, including theoretical and practical aspects.

The trainer must be available for questions on other days allocated for the module.

The trainer must review any paperwork/documentation/records generated during the demonstration of a technique by a trainee; the review should include checking for completeness and accuracy.

Supervisor

The direct supervisor of the trainee has the primary responsibility for monitoring the trainee's progress. The supervisor must plan on regularly spending time with the trainee, for example, by scheduling weekly or biweekly meetings in order to:

- Discuss the topics covered by the required reading and document completion of the reading.
- Review the answers to the written questions.
- Review the training record for completeness and accuracy.
- Review, determine and document the successful completion of competency tests.

The direct supervisor is responsible for helping the trainees choose cases for serology and DNA mock court, acting as prosecutor, and preparing them for testimony.

Technical Leader

The technical leader is responsible for final determination of the readiness of the trainee to enter the rotation. This includes:

- Final review of the training record, including review of competency tests as needed. The Technical Leader may designate a training supervisor and/or Assistant Directors to assist in this review.
- Final review of the answers to the written questions. The Technical Leader may designate a training supervisor and/or Assistant Director to assist in this review.
- Evaluation of the oral examination, including any needed remediation. The Technical Leader may designate a training supervisor and/or Assistant Director to assist in the evaluation and remediation of the oral exam.
- Determination of satisfaction of state and/or federal requirements, including review of college transcripts, course syllabi, and/or textbooks as needed.

The technical leader is responsible for issuing the notification of completion of training and the notification of achievement of DNA Interpreting Analyst status.

2. TRAINING PROGRAM GUIDELINES

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A. Theoretical background

In addition to requiring a minimum educational background for the job title(s), the Department provides additional theoretical background necessary for trainees to understand the scientific basis behind each analytical test. The training program also includes instruction in general topic areas such as ethics, general forensic science, quality assurance/quality control, and basics of the legal system. This training takes place over a number of weeks through the required lectures and reading assignments. Most lectures are also available as computer presentations maintained in the departmental directory.

Each member of the scientific staff has access to literature references and reference books maintained by the department including methods manuals used in the laboratory which contain reference bibliographies for the scientific procedures. Publications pertaining to in-house methods are given to each trainee in the form of an online Reference Binder/Articles. Additionally, OCME professional staff has library and Internet privileges at the neighboring New York University Medical School library.

B. Practical experience

Each analyst will be trained to perform the analytical procedures that are appropriate to the job title and specific work assignment. Practical training may include up to three phases: the trainee observes the procedure being performed; the trainee uses practice specimens to demonstrate the procedure to the trainer; and the trainee uses practice specimens to perform the procedure independently. It may be necessary for a trainee to demonstrate a procedure multiple times until a trainer determines that the trainee can perform the procedure independently. Practical training for procedures currently in use that have been updated or revised may or may not require all three training phases.

C. Competency testing

At the conclusion of the practical training in any particular analytical procedure, the trainee is expected to successfully complete a competency test using that procedure. In general, a competency test is prepared in-house with the key to the results being supplied to the supervisor, Assistant Directors, Technical Leader, and/or Director. Successful completion of each competency test is documented in the training record.

D. Written assignments and oral examination

New scientific staff must take and pass the written assignment for each module they are trained in. The written assignment is reviewed and graded by the direct supervisor and Technical Leader or designee.

New scientific staff, Criminalist II's and above must take and pass an oral examination covering several areas of DNA theory and analysis. The oral examination is attended by the trainee's direct supervisor and the test administrator, who is an Assistant Director or a DNA Technical Leader. Each Criminalist has a maximum of two attempts to pass the full examination. The determination of whether or not a Criminalist passes the examination is at the discretion of the examination committee. At the examination committee's discretion, the Criminalist shall have up to two attempts to remediate each full examination. The committee is not obligated to grant any remediation.

If a Criminalist has not passed the full oral examination after two attempts, the Criminalist may be subject to demotion or termination.

In addition to the basic DNA oral examination, mtDNA analysts are required to take and pass a mtDNA oral exam covering mtDNA theory and methods.

E. Court preparation

An important part of training is learning to present scientific information in court. There are several ways for trainees to prepare for court and public speaking: observing the testimony of laboratory personnel at court, attending pre-trial conferences, and testimony training. Before testifying in court or grand jury, Criminalist II's and above must successfully complete an internal courtroom testimony training module. The purpose of the courtroom testimony training module is to give the analyst an introduction to the courtroom process as well as practical testimony experience prior to actual testimony in a trial or grand jury. It is also a mechanism for the supervisory staff to identify and correct any problems the analyst may have in his/her knowledge or ability to communicate effectively.

Moot/Mock court training consists of practice testimony covering all areas of testimony including qualifications, voir dire, and direct and cross examination using case examples. The Criminalist practices giving testimony in those areas prior to being tested in a mock court. Minimally, two moot/mock courts are required. The first, early in training, is a serology mock court on an actual or training small case; this covers the initial forensic biology training topics. Serology moot/mock court preparation is generally conducted by the direct supervisor or designee. The second, two months after the analyst has completed training, is a DNA moot/mock court on an actual DNA case; this covers all forensic biology training topics. The DNA moot/mock court preparation is conducted by the training group and/or the direct supervisor or designee.

The Criminalist's testimony is evaluated by their direct supervisor, Assistant Director or designee, and a jury comprised of court qualified scientific staff (DNA interpreting analysts with more than one year DNA case reporting experience and at least two trial testimonies). Checklists are used to structure the evaluation of the trainee's performance in each mock court. After the moot/mock court, constructive criticism of the trainee's testimony is given, and, if needed, specific suggestions for improvement are provided. A pass/fail determination for the serology moot/mock court is made by the scientific staff present at the moot/mock trial. For the DNA moot/mock court an average grade of 70% or greater must be achieved by the Criminalist in order to pass. Grades should be provided in writing to the analyst within two business days after the moot/mock court. An analyst, who does not achieve a passing grade, will be allowed to remediate the moot/mock court within two weeks, with the same case and jury panel. If the remediation is not successful the Criminalist, must complete and pass a second moot/mock court within two months. However, a new case and jury panel must be used.

If a Criminalist has not passed the DNA moot/mock court after two attempts, the Criminalist may be subject to demotion or termination. Successful completion of the moot/mock courts must be documented in the training record.

Analysts who train in specialized DNA techniques such as mitochondrial DNA testing and high-sensitivity DNA testing may be required to pass an additional moot/mock court covering the specific topic area.

F. Continuing and Supplemental Training

Analysts are trained in new procedures as they are added, and as their job duties change. Supplemental training may include a lecture covering the theoretical and practical aspects of the new procedure; a reading list selected from the scientific literature and full (three-step) or modified (two-step) practical training. The modified (two-step method) does not require the independent demonstration of the analytical procedure.
The modified (two step method) training is used when current online procedures have been updated or revised.

Once the analysts are comfortable with the procedure, they are given competency test samples, which must be successfully completed for each new procedure before the analyst can use the procedure in casework. Successful completion of supplemental training is documented by the direct supervisor or designee in the training record.

The specific requirements of continuing and supplemental training for each procedure are determined by the appropriate Technical Leader or designee. When a new procedure or technique is established in the Laboratory, a training module is added or updated in the Training Manual appendix.

G. Retraining

Retraining can be the result of requests from supervisors or analysts, or in response to a proficiency test or casework corrective action.

The retraining program initiated at the request of an analyst or supervisor will be determined by the Training coordinator and can involve additional observations, practices or competency tests depending on the needs of the analyst.

If it is determined by the Quality Assurance Manager and/or a Technical Leader that a deficiency in proficiency testing or casework is the result of analyst's lack of understanding of the methods, procedures, and/or protocols used by the laboratory, the analyst will be prohibited from performing the test in casework until he/she has been re-trained, and a new competency test has been successfully completed. In these cases, all re-training must be performed in accordance with the general and specific training guidelines specified in the Forensic Biology Training Manual.

H. Continuing Education

Continuing education is an educational activity that is offered by a recognized individual or organization that brings participants up-to-date in their relevant area of knowledge. Analysts are provided the opportunity to obtain continuing education through attendance at scientific meetings and seminars both onsite at the Department of Forensic Biology and offsite.

Each analyst's earned Continuing Education hours are documented and maintained by the Training Group.

Every Forensic Biology employee is required to attend an annual review of the *ASCLD/LAB Guiding Principles of Professional Responsibility for Crime Laboratories and Forensic Scientists.*

Documentation of content and attendance at appropriate continuing education activities is provided by sign-in sheets, certificates of attendance, program agenda/lecture title, travel authorization, resume/publication/other documentation of the credentials of the presenter(s), and other means, depending on the type of event.

Records are maintained by the Training Group for at least one ASCLD/LAB cycle of accreditation or 5 years, whichever is greater.

I. Review of Current Literature

The Forensic Biology Assistant Director assigned to Training or designee distributes relevant, scientific articles of interest to staff via e-mail on a regular basis, usually monthly. These articles are stored by the Training Group on the Forensic Biology server. Analysts are also encouraged to read other scientific articles of interest.

Analysts document their reading of the distributed articles and/or other scientific literature via a record distributed quarterly by the Training Group.

Records are maintained by the Training Group for at least one ASCLD/LAB cycle of accreditation or 5 years, whichever is greater.

A. Training Specific Guidelines

The training is divided into modules. The number of modules trained in depends on the job title of the trainee; fewer or additional modules may be given depending on the particular job assignment of the trainee.

	Criminalist I	**Criminalist II and above**
Right to know (hygiene officer)	X	X
Microscopy	X	X
Digital photography	X	X
Evidence exam	Selected Staff	X
Serology - blood presumptive	X	X
Serology - AP and sperm	X	X
Serology - amylase	X	✓ X
High Volume Exam	✓ X	Selected Staff
Small cases	No	X
Serology mock court	No	X
Sexual assault kits	X	X
Small items	✓	n/a
Exemplar processing	Selected Staff	Selected staff
P30 ELISA	X	X
M48 Extraction	X	X
Chelex Extraction	X	X
Touched Item Extraction	X	X
Organic Extraction	Selected Staff	Selected Staff
Quantitation-rtPCR	X	X
PCR amp	X	X

	Criminalist I	Criminalist II and above
CE (ABI 3130 set up)	X	X
STR Analysis	No	X
Dilutions & mixtures	No	X
Data Interpretation Exercise	No	X
DNA written exam	Selected modules	X
DNA oral exam	No	X
DNA mock court	No	X
Technical Review	No	Selected Staff
PC Technical Negative Case Review	No	Selected Staff
Administrative Review	Selected Staff	Selected Staff
Blood spatter	Selected staff	X

Specialty Team Training

Members of specific teams may be trained in techniques used only by that specialty team. The training will follow the standard model of observation, practice, and competency. In these cases, training samples may be provided by the Training team or the specialty team.

	Criminalist I	Criminalist II and above
mtDNA hair extraction	X	X
mtDNA duplex amplification	X	X
Gel Analysis and/or Agilent	X	X
Linear Array Analysis	X	X

	Criminalist I	Criminalist II and above
mtDNA cycle sequencing	X	X
ABI 3130 set-up	X	X
mtDNA data processing & interpretation	No	X
mtDNA mock court	No	X
mtDNA oral examination	No	X
High Volume Exam	X	n/a
Bone Extraction	Selected Staff	Selected Staff
Sample Control	X	X
HPLC	X	X
Post Amplification PE-Testing	X	X
Post Amplification SC-Testing	X	X
PE Data Analysis	No	X
SC Data Analysis	No	X

B. Required lectures

Most of the training modules have required lectures (see Section 4 – Modules). Each individual training module specifies the required lecture(s) associated with the module. Some required lectures, e.g., Ethics, are not associated with specific training modules. See the list of **Required Training Lectures** in the Training Modules section of this manual.

Lectures are given by staff members, generally prior to beginning each training module. Many of the lectures are also available as computer presentations found in the departmental directories, and can be reviewed as necessary. The trainee's attendance at the required lectures is documented in the training record and signed off by the lecturer.

C. Required reading

All of the training modules have required reading. Much of the information is found in the online reference binder/articles supplied to trainees. However, the analysts are also required to read the appropriate sections of manuals, chapters in books, etc. The required reading should be completed during the time allotted to the training module. Completion of the required reading is documented, by the direct supervisor, in the training record. .

D. Practice samples

For serology training (blood presumptive tests, semen presumptive tests, semen confirmatory tests, and amylase) practice samples can come from a variety of sources: the trainee, stains from previous external proficiency tests, or casework extracts previously tested for P30 and/or amylase.

The number of serology training samples is variable, depending on the training module. The number of tests performed is much greater, as specified in the practical exercises of each module.

Practice DNA training samples consist of coded swabs or specimens donated by laboratory personnel or from previous external proficiency samples. The DNA donor types and associated codes are maintained by the Training Team and are kept confidential. When a trainee generates a DNA result for a sample the trainee or supervisor provides the DNA type and code to the Training Team to check for correctness.

The number of DNA samples must include at least one of each of the following: blood stains, semen/non-semen mixed stains, saliva stains, and other samples. They should be supplied in sufficient quantity for the trainee to be able to do more than one analysis if necessary. The number of tests performed is much greater, as specified in the practical exercises of each module.

Practice DNA training samples will generally be provided by the Training Team; however, for specialized training (e.g., bone or hair extraction and typing), samples may be provided by specific specialty team. The trainee will generally use these same practice samples for all DNA procedures - extraction, quantitation, amplification and DNA typing. However, in some instances, e.g., when training commences on procedures beyond the extraction step, training samples can be provided as DNA extracts or amplified DNA.

During observation, the observer/trainer should evaluate the ability of the trainee for independent performance of the procedure. If the observer/trainer determines the trainee is not performing the technique independently and/or correctly, additional observation and training is required. Once the observer/trainer determines the trainee is capable of performing the technique correctly, the observation period of training is complete, and can be signed off. An independent practice is then performed and evaluated by the trainee's supervisor. If the supervisor determines the trainee is not independently performing the procedure correctly an additional practice and or training is required. Once the supervisor determines the trainee is able to independently perform the procedure correctly, the practice period of the training is complete. The supervisor documents the completion of the practice period in the training record.

E. Competency samples

For the DNA modules, trainees are provided with competency DNA samples that are coded in the same manner as the practice samples. When a trainee generates a DNA result for a sample, the trainees' supervisor provides the DNA type and code to the Training Team to check for correctness.

The minimum number of competency samples is variable, depending on the training module. The minimum number for each module is listed below.

Module	Sample type	Minimum number of Competency samples
Serology - blood presumptive	Blood/no blood	4
Serology - sperm identification	Sperm/no sperm	4
Serology - amylase identification	Amylase/no amylase	4
P30 ELISA	Semen/no semen	4
Chelex extraction	Contact swabs/cigarette butts/ saliva swabs Mixed semen stains	3 2
Touched Item Extraction	Saliva stains or body swabs	3
M48 extraction	Blood and or saliva stains	48

Module	Sample type	Minimum number of Competency samples
Quantitation	The extracted samples from above or others supplied by trainer	15
PCR amp/CE (ABI 3130)	Blood and/or saliva stains, mixed semen stains, touched items - the extracts from above	15
mtDNA organic hair extraction	Hair shaft (no root)	3*
Duplex Amplification/Linear Array	Extracts from the above mtDNA extractions, or other extracts	3 + controls
Cycle Sequencing/3130/Data Analysis	Amplified products from the above or other amplified products	3 + controls

*If the trainee is competent in either the organic extraction or bone extraction procedures, this will also satisfy the competency requirements for the mitochondrial DNA hair extraction procedure.

The trainee may use these same competency test samples for all DNA procedures - extraction, quantitation, amplification and DNA typing.

Trainees who start training after extraction steps (e.g., they have previously passed extraction competency) will be given at least three coded DNA extracts or three coded samples of PCR amp product as their competency test. The DNA extracts/PCR amp product can be of any type (blood/saliva/mixed semen stains).

Once the supervisor determines the trainee has performed and generated the correct results for the competency, the supervisor documents the completion in the training record.

F. Review procedures

The results from the trainee's practice samples and competency tests will be evaluated by his/her direct supervisor in terms of sensitivity, consistency, and contamination at each of the steps in the training. In addition, the supervisor must ensure that the trainee is analyzing the proper control samples, is correctly and completely filling out all documentation used to record sample analyses, and is familiar with the operation of the equipment necessary to perform the tests. It may be helpful to include the trainer in this review process.

Problems will be addressed at each rotation and additional practice instituted, if necessary. For example, the supervisor must check the trainee's work for contamination. Low-level contamination (the presence of alleles that do not meet laboratory reporting criteria, such as small peaks in STR analysis) may not affect the typing results. Such contamination may often be eliminated by simply changing a reagent. However, if the analyst consistently demonstrates low-level contamination, he/she must be observed more closely during subsequent practice runs to identify the reason for the problem.

The direct supervisor must document completion of all practical exercises and successful completion of the competency tests, if applicable, for all modules.

G. Completion of training

At the completion of each analytical training module, a notification must be made by the direct supervisor to the trainee and training team that the trainee has successfully passed the competency test. Once deemed competent, the analyst may perform that technique on casework samples. The notification will generally be done through/by initialing/signing the Forensic Biology Training Competency Record or by documenting directly on the competency test results/report.

Once an analyst has completed all the requirements to become a DNA Interpreting Analyst, the Technical Leader issues a written notification which acknowledges the successful completion of the requirements. This notification is filed in the training folder. As of that date, the analyst may interpret DNA results and sign DNA reports.

H. Criminalist III Training

As a supervisor, a Criminalist III has additional duties in addition to routine casework. To prepare for those duties, additional training consists of rotation supervisor test results review and case file review training.

An experienced Criminalist III or higher demonstrates how to perform a review of the analytical test results on various rotations, and technical and administrative reviews of serology and negative DNA case files. A new Criminalist III must then demonstrate their ability to perform reviews on these test results and case files. This is accomplished by having the Criminalist III's supervisor or designee perform a second review and sign the test results or case files. Successful completion of a review is documented in the training record or on the Criminalist III Review Record.

The number of second reviews necessary is dependent on the type of review. If the supervisor determines the new Criminalist III is not performing the reviews correctly, additional second reviews may be required. Once the minimum number of second reviews has been successfully met for a particular technique the new Criminalist III may perform reviews on their own.

Criminalist III's in specialty teams may be trained in reviews used only by that team.

	Minimum Number of Second Reviews
P30	20
Amylase	20
Quantitation-rtPCR	20
Amplification Sheets	20
STR Analysis	20
Negative DNA Case File Review	10
Administrative Review	10
Linkage Entry	5

A Criminalist III is required to have successfully completed all Criminalist II requirements for their team.

I. Criminalist IV Training

As a supervisor, a Criminalist IV has duties in addition to routine case work. To prepare for those duties, additional training consists of Forensic Biology evidence case sign in, scheduling case analysis and technical review of positive DNA cases.

An experienced Criminalist IV, Assistant Director or designee demonstrates how to sign in evidence which includes review of all NYPD paperwork, creating and reviewing of Forensic Biology Database records and scheduling analysis of evidence for different case types. A new Criminalist IV must then demonstrate their ability to perform these techniques. This is accomplished by having an experienced Criminalist IV, Assistant Director or designee perform a second review of all paperwork and scheduled analysis prior to the case acceptance into the laboratory. Successful completion of signed in cases is documented in the training record or on the Criminalist IV Review Record.

A new Criminalist IV must also demonstrate their ability to technically review cases with positive DNA results. This is accomplished by having the Criminalist IV's Assistant Director perform a second review of the case file and co-sign the technical review. Successful completion of a technical review is documented on the Criminalist IV Review Record.

If the supervisor determines the new Criminalist IV is not performing sign in or technical case reviews correctly additional second reviews may be required. Once the minimum number of signed in cases and second technical reviews has been successfully met the new Criminalist IV may now perform sign in and reviews on their own.

	Minimum Number of Second Reviews
Evidence Sign In	20
Positive DNA Case File Review	20

A Criminalist IV is required to have successfully completed all Criminalist III review training necessary for their team.

J. Assistant Director Training

As manager, an Assistant Director has duties in addition to team supervision. To prepare for these duties, additional training consists of enhanced technical review.

A new Assistant Director must demonstrate their ability to perform enhanced technical review of cases containing complex deconvolution of DNA mixtures, kinship or paternity cases, and cases with comparisons of known profiles to mixtures of DNA. This is accomplished by having an experienced Assistant Director, Deputy Director, or Director perform a second review of the case file and co-sign the technical review. Successful completion of an enhanced technical review is documented in the training record or on the Assistant Director Review Record.

Once the minimum numbers of enhanced technical reviews have been successfully met, the new Assistant Director may perform enhanced technical reviews on their own.

	Minimum Number of Second Reviews
Enhanced Technical Review	20

An Assistant Director is required to have successfully completed all Criminalist IV technical review training necessary for their team.

FORENSIC BIOLOGY TRAINING MANUAL

TRAINING MODULES		
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Required Training Lectures

Module 1	Basic Laboratory Techniques
Module 2A	Microscopy
Module 2B	Digital Photography
Module 3A	Serology – Blood Presumptive Tests
Module 3B	Serology – Acid Phosphatase and Sperm
Module 4A	Evidence Examination
Module 4B	Small Cases (Sexual Assault/Homicide)
Module 4C	Exemplar Processing
Module 4D	High Volume (PC) Exam
Module 4E	LCN Small Cases
Module 5A	Sexual Assault Kits
Module 5B	Small Items Exam (Kits)
Module 6	P30 ELISA
Module 7	Amylase
Module 8	Serology Mock Court
Module 9A	Chelex Extraction
Module 9B	MagAttract Extraction
Module 9C	Organic Extraction
Module 9D	High Sensitivity (Touched Item) Extraction
Module 10	DNA Quantitation
Module 11	PCR Amplification
Module 12A	ABI 3130*xl* Capillary Electrophoresis Set Up
Module 12B	Identifiler 28 and Y-STR Analysis
Module 12C	Identifiler 31 STR Analysis
Module 12D	Minifiler Analysis
Module 13	PCR Dilution and Mixture Studies
Module 14	PCR Data Interpretation Exercise
Module 15	Oral Examination
Module 16	DNA Mock Court
Module 17	Bloodstain Pattern Analysis

Additional Modules

Module 20A P30 and Amylase – Review
Module 20B P30 and Amylase Interpretation – Practical
Module 21 Quantitative Real Time PCR – Review
Module 22A STR Analysis – Practical
Module 22B STR Technical Review
Module 23A Technical Review of Negative DNA Cases
Module 23B Technical Review of Positive DNA Cases
Module 24 Administrative Review of Cases
Criminalist III Training Module
Criminalist IV Training Module
Assistant Director Training Module

Mitochondrial DNA Modules

Module 25 Mitochondrial DNA Hair Extraction
Module 26 Mitochondrial DNA Duplex Amplification
Module 27 Mitochondrial Agilent Training
Module 28 Mitochondrial DNA Linear Array Analysis
Module 29 Mitochondrial DNA Sequencing
Module 30 Mitochondrial DNA Data Interpretation (computer exercise)
Module 31 Mitochondrial DNA Mock Court

MODULES		
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Modules:

Required Training Lectures

Assistant Director Training Module

Criminalist IV Training Module

Criminalist III Training Module

M1 Basic Laboratory Techniques

M2A Microscopy

M2B Digital Photography

M3A Serology – Blood Presumptive Tests

M3B Serology- Acid Phosphatase and Sperm

M4A Evidence Examination

M4B Small Cases

M4C Exemplar Processing

M4D High Volume (PC) Exam

M4E LCN Small Cases

M5A Sexual Assault Kits

M5B Small Items (Sexual Assault Kits)

M6 P30 ELISA

M7 Serology – Amylase

M8 Serology Mock Court

M9A Chelex Extraction

M9B Mag Attract Extraction

M9C Organic Extraction

M9D High Yield (Touched Item) Extraction

M10 DNA Quantitation

REQUIRED TRAINNG LECTURES		
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LECTURE
Right-to-Know
General Forensic Science
Ethics
Serology
Sexual Assault Kits
Case Management
P30 / Amylase
Basics of the Legal System
DNA Extraction
QA/QC and Accreditation
DNA Quantitation
PCR Theory
3130 Capillary Electrophoresis
Basics of STR Typing
CODIS
Validation
Mitochondrial DNA Typing
STR Mixture Interpretation
Basics of Population Genetics
PCR Data Interpretation
Exemplar Processing
Low Copy Number DNA

ASSISTANT DIRECTOR TRAINING MODULE		
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Module: Assistant Director Training

Required lectures: None

Required reading

Tasks and standards for Criminalist IV

Tasks and standards for Criminalist III

Tasks and standards for Criminalist II

Tasks and standards for Criminalist I

Time and Leave manual (online)

"Supervisor's Guide to Reviewing Time Cards" (online)

Review the Management Systems Manual

Review the Administrative Manual

Review the Training Manual
-Training record requirements
- Modules for all Criminalists
-Training roles and responsibilities

Rotation and supervisor duties of Criminalist I, II's , III's and IV's

Review the Serology Manual.
-Requirements for interpretation of P30 and amylase

Review the Protocols for Forensic STR Analysis Manual
-Requirements for interpretation of STR results
-STR trouble-shooting
-Requirements for interpretation of RtPCR results
-RtPCR trouble-shooting

Review the Evidence and Case Management Manual
- Evidence examination guidelines
- Report guidelines
- Data analysis, documenting, archiving, reporting, case record review
- Case acceptance and evidence sign in procedures

Practical Exercises

As manager, an Assistant Director, have duties in addition to team supervision. To prepare for these duties, additional training consists of enhanced technical review.

An experienced Assistant Director, Deputy Director or Director must conduct a second technical review of the following items after the new Assistant Director has done so:

- First 20 enhanced DNA case technical reviews
- First 5 linkage entries (if not done under other Criminalist title)
- First 20 reviews (if not done under other Criminalist title or during enhanced review) for :
  - P30*
  - Amylase*
  - Real Time PCR*
  - Amp sheets
  - STR results

**For specialty groups training interpretations could be found on the network: (M:FBIOLOGY_MAIN\TRAINING\TRAINING INTERPRETATION AND REVIEW\CRIMINALIST III)*

Competency Test:

None

KSA's to be mastered:

1. Be able to supervise Criminalists I's, II's, III's and IV's including review of case records, reports, training, and time and leave issues.
2. Be able to perform technical review on all case types.

Other formal supervisory training (courses, lectures, workshops, etc.) will be offered as available.

Final Actions:

1. Discuss the module with your direct supervisor.
2. Supervisor or designee documents completion on all required second reviews.

CRIMINALIST III TRAINING MODULE		
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Module: Criminalist III training

Required lectures:

None

Required reading:

Tasks and standards for Criminalist III

Tasks and standards for Criminalist I

Time and Leave manual (online)

"Supervisor's Guide to Reviewing Time Cards" (online)

Review the Management Systems Manual

Review the Administrative Manual

Review the Training Manuals
- -Training record requirements
- - Modules for Criminalist I's
- -Training roles and responsibilities

Review the Serology Manual
- -Requirements for interpretation of P30 and Amylase

Review the Protocols for Forensic STR Analysis Manual.
- -Requirements for interpretation of STR results
- -STR trouble-shooting
- -Requirements for interpretation of RtPCR results
- -RtPCR trouble-shooting

Review the Evidence and Case Management Manual
- - Evidence examination guidelines
- - Report guidelines
- - Data analysis, documenting, archiving, reporting, case record review

Practical Exercises

As a supervisor, a Criminalist III has additional duties in addition to routine casework. To prepare for those duties, additional training consists of supervisory review.

The Criminalist IV supervisor or designee must conduct a second review of the following items after the Criminalist III has done so:

- First 20 case technical reviews.
- First 10 administrative reviews (if not done under other Criminalist title)
- First 5 linkage entries (if not done under other Criminalist title)
- First 20 reviews for :
  P30*
  Amylase*
  Real Time PCR*
  Amp sheets
  STR results (if not done under other Criminalist title)

**For specialty groups training interpretations could be found on the network: (M:FBIOLOGY_MAIN\TRAINING\TRAINING INTERPRETATION AND REVIEW\CRIMINALIST III)*

Competency Test:
None

KSA's to be mastered:

1. Be able to supervise Criminalist I's, including review of negative case records, reports, training, and time and leave issues.

2. Be able to perform technical review on specific case types.

3. Be able to perform administrative reviews.

4. Be able to supervise and review results and records for the following:
   P30/amylase (HSC)
   extraction
   quantitation
   amplification
   STR

Other formal supervisory training (courses, lectures, workshops, etc.) will be offered as available.

Final Actions:

1. Discuss the module with your direct supervisor.
2. Supervisor or designee documents completion on all required second reviews.

CRIMINALIST IV TRAINING MODULE		
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Module: Criminalist IV training

Required lectures: None

Required reading:

Tasks and standards for Criminalist IV

Tasks and standards for Criminalist III

Tasks and standards for Criminalist II

Tasks and standards for Criminalist I

Time and Leave manual (online)

"Supervisor's Guide to Reviewing Time Cards" (online)

Review the Management Systems Manual

Review the Administrative Manual

Review the Training Manual
-Training folder requirements,
-Modules for Criminalist I's, II's, and III
-Training roles and responsibilities

Review the Criminalist III's, II's and I's rotation duties

Review the Serology Manual
-Requirements for interpretation of P30 and amylase

Review the Protocols for Forensic STR Analysis Manual
-Requirements for interpretation of STR results
-STR trouble-shooting
-Requirements for interpretation of RtPCR results
-RtPCR trouble-shooting

Review the Evidence and Case Management Manual
-Evidence examination guidelines
-Report guidelines
-Data analysis, documenting, archiving, reporting, case record review
-Evidence Sign in Procedures

Practical Exercises

As a supervisor, a Criminalist IV has additional duties in addition to routine casework. To prepare for those duties, additional training consists of supervisory review.

An Assistant Director or designee must conduct a second technical review of the following items after the Criminalist IV has done so:

- First 20 positive DNA case technical reviews
- First 20 cases signed in as evidence
- First 10 administrative reviews (if not done under other Criminalist title)
- First 5 linkage entries (if not done under other Criminalist title)
- First 20 reviews (if not done under other Criminalist title) for :
  P30*
  Amylase*
  Real Time PCR*
  Amp sheets
  STR results

**For specialty groups training interpretations can be found on the network: (M:FBIOLOGY_MAIN\TRAINING\TRAINING INTERPRETATION AND REVIEW\CRIMINALIST III)*

Competency Test:

None

KSA's to be Mastered:

1. Be able to supervise Criminalist I's, II's and III's including review of case records, reports, training and time and leave issues.
2. Be able to perform technical review on all types of cases.
3. Be able to supervise evidence exam and evidence sign in.

Other formal supervisory training (courses, lectures, workshops, etc.) will be offered as available.

Final Actions:

1. Discuss module with your direct supervisor.
2. Supervisor or designee documents completion on all required second reviews.

FORENSIC BIOLOGY TRAINING MANUAL

MODULE 1: BASIC LABORATORY TECHNIQUES		
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Laboratory Safety, Clean Techniques & Basic Lab Equipment

Required lecture

Right to Know
Guidelines given on first day

Required Reading

1. Study the articles in the online reference folder on this topic.
2. Study the Evidence and Case Management Manual.

Practical exercises

1. Familiarize oneself with placement of safety equipment, such as eye washes, fire extinguishers, and safety showers.
2. Familiarize oneself with the location of all the personal protective equipment such as lab coats, gloves and eyewear used.
3. Familiarize oneself with the placement of all basic laboratory equipment used in the laboratory.
4. Perform correct pipetting technique using different µL volume pipettes.
5. Perform proper set up and clean up techniques for bench tops, tools and pipettes used in the laboratory.
6. Answer written questions pertaining to the module.

Competency test

None

KSA's to be mastered

1. Be able to locate and use safety and person protective equipment in the laboratory.
2. Know the placement of the basic laboratory equipment used.
3. Be able to properly clean tools and bench tops and explain the necessity for these techniques.
4. Be able to properly use different µL volume pipettes

Final Actions

1. Discuss the module with your direct supervisor, including review and results of questions for the module.
2. Have your supervisor document successful completion of the module. *The initials/signature of the supervisor indicates that all practical exercises have been completed and the correct results have been obtained on the competency test (if applicable).*

MODULE 10: DNA QUANTITATION		
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Required lecture

DNA quantitation

Required reading

1. Study the articles in the online reference folder on this topic.
2. Study the DNA quantitation methods and submission guidelines in the Protocols for Forensic STR Analysis Manual.

Practical exercises

When you run analytical procedures during training or receive samples for competency testing, document and create records as if you were working on a real case.

After observing the procedure and having demonstrated the procedure to the trainer, perform Quantitative Real Time PCR on the samples from the extraction practices.

Review the results with the supervisor once satisfactory results are obtained on the practice samples, perform DNA quantitation on the competency test samples. Review the results with your supervisor before continuing.

Competency test

The competency test samples provided for extraction are used for all subsequent DNA competency tests.

The quantitative real time PCR assay must have reaction efficiency, calibrator and no template control value that is within the allowable range. The CT values of the consecutive duplicate standards must be within 2 cycles (+ .5).

Submit aliquots of competency test samples for DNA amplification.

KSA's to be mastered

1. Be able to perform Quantitative Real Time PCR.
2. Understand the preparation, handling, and function of reagents used for DNA quantitation.
3. Understand the use of controls for the Quantitative Real Time PCR test.
4. Understand the sensitivity and limitations of the Quantitative Real Time PCR test.
5. Be able to explain the theory and procedure to someone who does not have a scientific background.
6. Be able to correctly interpret Quantitative Real Time PCR test results, make any necessary calculations, and submit proper amounts for amplification. Understand the relationship between the Quantitative Real Time PCR value of a sample, and the amount of DNA submitted for amplification.

Final actions

1. Discuss the module with your direct supervisor, including review of results and discussion of theory and practical aspects of module.
2. Have your supervisor evaluate the results of the competency test.
3. Have your supervisor sign document successful completion of the module. *The initials/signature of the supervisor indicates that all practical exercises have been completed and the correct results have been obtained on the competency test (if applicable).*

MODULE 11: PCR AMPLIFICATION		
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Required lectures

PCR theory
STR typing

Required reading

1. Study the articles in the online reference folder on this topic.
2. Study the amplification methods in the Protocols for Forensic STR Analysis the Manual.

Practical exercises

When you run analytical procedures during training or receive samples for competency testing, document and create records as if you were working on a real case.

After observing the procedure and having demonstrated the procedure to the trainer, do the following experiments.

PCR amplification

1. Aliquot correct amounts of DNA and amplify all practice samples using the current autosomal PCR system used in casework.
2. Aliquot correct amounts of DNA and amplify all practice samples for Y STR analysis.

Review the results with your supervisor; once correct PCR typing results are obtained on the practice samples, perform PCR amplification and typing on the competency test samples in the appropriate PCR systems.

Submit the PCR typing results for review to your supervisor. If your supervisor feels that additional work is necessary, it should be completed before continuing. Once all work is completed and passed, continue to the analytical training (if applicable).

Criminalist I's and II's can/will have the amplification sample/batch sheet created for them.
Criminalist III's and above must create their own sample/batch sheet.

Competency test

The competency test samples provided for Extraction are used for all subsequent DNA competency tests. The training group may also provide extracts with known quantification values as competency test samples in lieu of competency test samples provided for extraction.

The DNA typing results for positive controls and practice and competency samples must be correct. Amplification and extraction negatives must give clean results. Samples must yield complete profiles.

Those already deemed competent in PCR amplification on other PCR kits, such as Identifiler and/or MiniFiler, will need to observe one demonstration, perform one observed practice and a competency test in the new PCR system. The training group will provide extracts with known quantification values as competency test samples.

KSA's to be mastered

1. Be able to correctly interpret Quantification, make any necessary calculations, and submit proper amounts for amplification.
2. Understand the preparation, handling, and function of reagents used for PCR amplification and DNA typing.
3. Understand the use of controls introduced at this stage of DNA typing.
4. Be able to amplify samples in all DNA systems used in casework.
5. Understand the theory of PCR.
6. Be able to explain the theory and procedure to someone who does not have a scientific background.

Final actions

1. Discuss the module with your direct supervisor, including review of results and discussion of theory and practical aspects of module.
2. Have your supervisor evaluate the results of the competency test.
3. Have your supervisor document successful completion of the module. *The initials/signature of the supervisor indicates that all practical exercises have been completed and the correct results have been obtained on the competency test (if applicable).*

MODULE 12A: ABI 3130*xl* CAPILLARY ELEXTROPHORESIS SET UP		
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Required lectures

PCR theory
STR typing
Basics of capillary electrophoresis on the ABI 3130*xl*

Required reading

1. Study the articles in the online reference folder on this topic.
2. Study the capillary-based DNA methods in the Protocols for Forensic STR Analysis Manual.

Practical exercises

When you run analytical procedures during training or receive samples for competency testing, document and create records as if you were working on a real case.

After observing the procedure and having demonstrated the procedure to the trainer, do the following experiments.

1. Set up the ABI 3130*xl* instrument including buffer, POP and water changes.
2. Create a sample/batch sheet for the current 3130*xl* capillary-based PCR system (Identifiler and Y STR) and aliquot correct amounts of amplified practice samples and master mix onto 3130*xl* plate.
3. Load the plate onto instrument.

Review the results with your supervisor; once correct PCR typing results are obtained on the practice samples, perform set up and typing on the competency samples in all 3130*xl* capillary-based casework PCR systems.

Submit the PCR typing results for review to your supervisor. If your supervisor feels that additional work is necessary, it should be completed before continuing. Once all work is completed, continue to analytical training (if applicable).

Criminalist I's can/will have the 3130xl sample/batch sheet created for them and must aliquot samples for PCR analysis so that the typing results can be evaluated by their supervisor.

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Criminalist II's and above will create their own sample/batch sheet and perform their own PCR analysis.

Competency test

The competency test samples provided for extraction are used for all subsequent DNA competency tests.

The DNA typing results must be correct. Extraction and amplification negatives must give clean results. Samples must yield complete profiles.

KSA's to be mastered

1. Understand the preparation, handling, and function of reagents used for PCR amplification and DNA typing.
2. Understand the use of controls introduced at this stage of DNA typing.
3. Be able to amplify and type samples in all DNA systems used in casework.
4. Understand the theory of PCR, the basics of STR typing, and the basics of capillary electrophoresis.
5. Be able to explain the theory and procedure to someone who does not have a scientific background.

Final actions

1. Discuss the module with your direct supervisor, including review of results and discussion of theory and practical aspects of module. This may necessitate the direct supervisor observing the trainee demonstrate proper archiving of data.
2. Have your supervisor evaluate the results of the competency test.
3. Have your supervisor document successful completion of the module. *The initials/signature of the supervisor indicates that all practical exercises have been completed and the correct results have been obtained on the competency test (if applicable).*

MODULE 12B: IDENTIFILER 28 AND Y-STR ANALYSIS		
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Required lectures

PCR theory
STR typing
Basics of capillary electrophoresis on the ABI 3130*xl*

Required reading

1. Study the articles in the online reference folder on this topic.
2. Study the capillary-based DNA methods in the Protocols for Forensic STR Analysis Manual.

Practical exercises

When you run analytical procedures during training or receive samples for competency testing, document and create records as if you were working on a real case.

After observing the procedure and having demonstrated the procedure to the trainer, do the following experiments.

1. Analyze the data for all practice samples using current 3130*xl* capillary-based PCR system (Identifiler and Y STR).
2. Edit all practice samples using current accepted guidelines.

Review the results with your supervisor; once correct PCR typing and editing results are obtained on the practice samples, analyze and edit the competency test samples in all 3130*xl* capillary-based casework PCR systems.

Submit the PCR typing results for review to your supervisor. If your supervisor feels that additional work is necessary, it should be completed before continuing. Once all work is completed and passed, continue to the last part of analytical training.

Competency test

The competency test samples provided for extraction are used for all subsequent DNA competency tests.

The DNA typing results must be correct. Extraction and amplification negatives must give clean results. Samples must yield complete profiles. All alleles assigned including the allelic ladder, positive control, and samples must be correct. All artifact peaks must be properly edited and the reasons for the edits must be accurately identified.

Those already deemed competent in PCR amplification and ABI 3130*xl* Capillary Electrophoresis on other PCR kits, such as Minifiler, will need to observe one demonstration, perform one observed practice and a competency test in the new PCR system. The training group will provide extracts with known quantification values and/or PCR product as competency test samples.

KSA's to be mastered

1. Understand the preparation, handling, and function of reagents used for PCR amplification and DNA typing.
2. Understand the use of controls introduced at this stage of DNA typing.
3. Be able to amplify and type samples in all DNA systems used in casework.
4. Be able to correctly edit electropherograms, including the correct identification of artifacts.
5. Be able to properly use the instrument and associated computers, and archive data correctly.
6. Understand the theory of PCR, the basics of STR typing, and the basics of capillary electrophoresis.
7. Be able to explain the theory and procedure to someone who does not have a scientific background.

Final actions

1. Discuss the module with your direct supervisor, including review of results and discussion of theory and practical aspects of module. This may necessitate the direct supervisor observing the trainee demonstrate proper archiving of data.
2. Have your supervisor evaluate the results of the competency test.
3. Have your supervisor document successful completion of the module. *The initials/signature of the supervisor indicates that all practical exercises have been completed and the correct results have been obtained on the competency test (if applicable).*

MODULE 12C: IDENTIFILER 31 STR ANALYSIS		
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Required lectures

PCR theory
STR typing
Basics of capillary electrophoresis on the ABI 3130*xl*

Required reading:

1. Study the procedures described in the Protocols for Forensic STR Analysis Manual regarding amplification and analysis with Identifiler™ reagents for both 28 and 31 cycles.
2. Review the required readings in the online reference folder pertaining to the use application of Identifiler™ with both HT-DNA and LT-DNA samples.
3. Review the training lecture pertaining to the validation and application of Identifiler™ for both HT-DNA and LT-DNA samples at the Department of Forensic Biology

Practical Exercises:

1. Observe a trained analyst analyze at minimum 5 STR runs consisting of:
   a) 1 injection of Identifiler™ (ID) controls
   b) 2 normal ID31 injections
   c) 2 reruns associated with the 2 normal runs previously observed for category b

   The trainer will demonstrate all the procedures used for ID31 sample analysis including the scheduling of reruns.

2. Training sets are available in the M:\HighSens_Data\TRAINING folder in a subfolder named "ID31 Analysis Training Runs". Two sets of runs are available to choose from.

   Using the practice FSA files analyze an injection from each of the following runs under observation:
   a) ID31 controls
   b) ID31 samples initially run at the high injection parameter
   c) ID31 samples injected at normal injection parameters
   d) ID31 reruns originating from the injections from category 3

Using the practice FSA files analyze an injection from each of the following runs independently:

a) ID31 controls
b) ID31 samples initially run at the high injection parameter
c) ID31 samples injected at normal injection parameters
d) ID31 reruns originating from the injections from category 3

During the observation and analysis practice runs, record edits and document as if you were working on casework samples.

Ensure you understand the assignment of basepairs and alleles to peaks according to the LIZ-500 standard, and the Identifiler™ allelic ladder, respectively. Become familiar with the positions of the Identifiler™ loci. Recognize the peaks of the positive control amplified with Identifiler™. Distinguish allele peaks from artifacts.

Become familiar with the ID31 analysis and interpretation rules for the purpose of evaluating negative controls and generation of composite profiles during STR analysis rotations. Additionally, the analyst will be familiarized with the control review and profile documentation for each injection.

If desired, practice analysis of samples amplified with Identifiler™ further. Review the results of the practical exercises samples with your supervisor; once satisfactory results are obtained, perform analysis on the competency test runs. If your supervisor feels that additional work is necessary, it should be completed before continuing.

Competency:

Analyze and edit the provided competency FSA files. All alleles assigned including the allelic ladder, positive control, and samples must be correct. All artifact peaks must be properly edited and the reasons for the edits must be accurately identified.

Using the practice FSA files analyze an injection from each of the following runs independently:

1. ID31 controls
2. ID31 samples initially run at the high injection parameter
3. ID31 samples injected at normal injection parameters
4. ID31 reruns originating from the injections from category 3

KSA's to be mastered

1. Acquire the skill to analyze FSA files of samples amplified with Identifiler™ for ID31.
2. Understand the sizing of peaks using the LIZ-500 size standard.
3. Understand the assignment of alleles according to the Identifiler™ allelic ladder.
4. Be able to accurately identify artifacts and true peaks in an electropherogram of samples amplified with Identifiler™.
5. Be able to generate statistics from an Identifiler™ profile.

Final actions

1. Discuss the module with your direct supervisor, including review of results and discussion of theory and practical aspects of module.
2. Have your supervisor evaluate the results of the practical exercises.
3. Have your supervisor document successful completion of the module. *The initials/signature of the supervisor indicates that all practical exercises have been completed and the correct results have been obtained on the competency test (if applicable).*

MODULE 12D: MINIFILER ANALYSIS		
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Required lectures

PCR theory
STR typing
Basics of capillary electrophoresis on the ABI 3130*xl*

Required reading

1. Study the articles in the online reference folder on this topic.
2. Study the capillary-based DNA methods in the Protocols for Forensic STR Analysis Manual.

Practical exercises

When you run analytical procedures during training or receive samples for competency testing, document and create records as if you were working on a real case.

After observing the procedure and having demonstrated the procedure to the trainer, do the following experiments.

1. Analyze the data for all practice samples using the current MiniFiler analysis system.
2. Edit all practice samples using current accepted guidelines.

Review the results with your supervisor; once correct PCR typing and editing results are obtained on the practice samples, analyze and edit the competency test samples using the current MiniFiler analysis system.

Submit the PCR typing results for review to your supervisor. If your supervisor feels that additional work is necessary, it should be completed before continuing. Once all work is completed and passed, continue to the last part of analytical training.

Competency test

The competency test samples provided for extraction are used for all subsequent DNA competency tests.

The DNA typing results must be correct. Extraction and amplification negatives must give clean results. Samples must yield complete profiles. All alleles assigned including the allelic ladder, positive control, and samples must be correct. All artifact peaks must be properly edited and the reasons for the edits must be accurately identified.

Those already deemed competent in PCR amplification and ABI 3130*xl* Capillary Electrophoresis on other PCR kits, such as Identifiler, will need to observe one demonstration, perform one observed practice and a competency test in the MiniFiler PCR system. The training group will provide extracts with known quantification values and/or PCR product as competency test samples.

KSA's to be mastered

1. Understand the preparation, handling, and function of reagents used for PCR amplification and DNA typing.
2. Understand the use of controls introduced at this stage of DNA typing.
3. Be able to amplify and type samples in all DNA systems used in casework.
4. Be able to correctly edit electropherograms, including the correct identification of artifacts.
5. Be able to properly use the instrument and associated computers, and archive data correctly.
6. Understand the theory of PCR, the basics of STR typing, and the basics of capillary electrophoresis.
7. Be able to explain the theory and procedure to someone who does not have a scientific background.

Final actions

1. Discuss the module with your direct supervisor, including review of results and discussion of theory and practical aspects of module. This may necessitate the direct supervisor observing the trainee demonstrate proper archiving of data.
2. Have your supervisor evaluate the results of the competency test.
3. Have your supervisor document successful completion of the module. *The initials/signature of the supervisor indicates that all practical exercises have been completed and the correct results have been obtained on the competency test (if applicable).*

MODULE 13: PCR DILUTION AND MIXTURE STUDIES		
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Required lecture
OCME PCR validation studies
Basics of STR mixture interpretation

Required reading
1. Study the articles in the online reference folder on this topic.
2. Study the interpretation of complex STR results in the Protocols for Forensic STR Analysis.

Practical exercises
At this point, the trainee will be working independently, performing dilution and mixture studies, which will aid in interpretation of complex PCR typing results.

1. Using either single source practice or competency test extracts, prepare a dilution series of DNA containing 2000, 1000, 500, 250, 100, 50, 25 and 10 pg in the final amplification volume; amplify and type in the current autosomal PCR system used in casework; evaluate results.
2. Pick two single source practice or competency test samples that have different DNA types and prepare mixtures of the samples in ratios of 10:1, 8:1, 4:1, 2:1, 1:1, 1:2, 1:4, 1:8, 1:10; amplify and type in the current autosomal PCR system used in casework; evaluate results.
3. Prepare a mixture containing two males and a mixture containing a male and a female in ratios of 10:1, 8:1, 4:1, 2:1, 1:1, 1:2, 1:4, 1:8, and 1:10; amplify and type in Y STR's; evaluate results.
4. Prepare a written interpretation of the results, including in your interpretation a statement concerning limitations of the method to detect and resolve mixtures.

Competency test: None

KSA's to be mastered
1. Be able to identify mixtures and determine the relative proportion of the components.
2. Understand the limitations of each system to resolve mixtures of different proportions.
3. Understand the sensitivity of each system.

Final actions

1. Discuss the module with your direct supervisor, including review of results and discussion of theory and practical aspects of module.
2. Have your supervisor evaluate the conclusions developed in the written interpretation.
3. Have your supervisor document successful completion of the module. *The initials/signature of the supervisor indicates that all practical exercises have been completed and the correct results have been obtained on the competency test (if applicable).*

MODULE 14: PCR DATA INTERPRETATION EXERCISE		
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Required lecture

OCME PCR validation studies
Basics of STR mixture interpretation
Basics of population genetics and statistics

Required reading

Study the articles in the online reference folder on this topic.

Practical exercises

The trainer will provide the trainee with a series of data tables representing the range of results that are typically observed in PCR DNA typing cases. The trainee must independently evaluate the data tables and create a Forensic Biology report including his/her interpretation of the data. These interpretations will be discussed in a meeting with Criminalist IV's and/or an Assistant Director.

Competency test

None

KSA's to be mastered

1. Be able to create DNA reports, including appropriate statistics, using the standard report format and template statements of the Department of Forensic Biology.
2. Be able to evaluate initial DNA results and draw correct conclusions.
3. Be able to evaluate initial DNA results and determine what further testing might be needed.
4. Be able to determine the proper statistical information for each DNA scenario.

Final actions

1. After the meeting discuss the module with your direct supervisor, including review of results and discussion of theory and practical aspects of module. Review the reports that were created and the changes and suggestions made during the meeting.
2. Have your supervisor sign off on successful completion of the module.

MODULE 15: ORAL EXAMINATION		
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Required lecture

All the technical lectures plus the CODIS, QA/QC, Ethics and Accreditation lectures.

Required reading

All.

Practical exercise

None.

Competency test

New scientific staff, Criminalist II and above, must take and pass an oral examination covering several areas of DNA theory and analysis before using DNA procedures in casework; the scope of the questions is similar to those in the written examination. The direct supervisor and the test administrator who is an Assistant Director, Technical Leader, Training Manager or designee shall attend the oral examination. In order to pass, each question must be answered to the satisfaction of the test administrator. If remediation is needed, it may take the form of immediate follow-up questions, answering of the question(s) at a later date with the test administrator, or a repeat of the entire oral examination.

If a Criminalist has not passed the full oral examination after two attempts, then the Criminalist may be subject to demotion or termination.

KSA's to master

1. Be able to answer a wide variety of technical DNA questions.
2. Be able to answer a wide variety of questions related to QA/QC.

Final actions

Have your supervisor and/or test administrator document successful completion of the module.

MODULE 16: DNA MOCK COURT		
DATE EFFECTIVE 07-16-2012	APPROVED BY DNA TECHNICAL LEADERS	PAGE 1 OF 2

Required lecture

Basics of the legal system

Required reading

Study the articles in the online reference folder on this topic.

Practical exercises

To prepare for mock court, the trainee might review court transcripts, suggested questions, reading material concerning expert testimony, and observing laboratory personnel testify in court.

1. As available, attend court with Criminalists and observe testimony.
2. In consultation with your supervisor, select a DNA case for use in a mock court. Your supervisor will be the prosecutor, and other staff members will take the roles of the defense attorney, jury and judge.
3. Review the theoretical and practical aspects of the testing performed in the small case.
4. With your supervisor and the training group, go over the questions to be asked in the direct examination and the potential topics to be covered in cross examination.
5. Practice your answers with your supervisor, the training group and on your own, paying particular attention to make your responses loud, clear, and easily understandable to a lay person. Learn to speak slowly and enunciate carefully, directing your answers towards the jury. Learn to listen carefully to the questions, making sure the question is complete before answering; think before replying.

Competency test

Successfully complete your DNA mock court. The DNA mock court should be held no later than two months after the completion of training. The attending staff members will critique your performance; the "judge" will provide a written DNA Moot Court Testimony Evaluation Grade. An average grade of 70% or greater must be achieved by the Criminalist in order to pass. An analyst, who does not achieve a passing grade, will be allowed to remediate their first DNA mock court within two weeks, with the same case and jury panel. If the remediation is not successful the Criminalist, within two months, must complete and pass a second DNA mock court; however a new case and jury panel must be used.

If the Criminalist has not passed the DNA moot court after two attempts, then the Criminalist may be subject to demotion or termination.

KSA's to be mastered

Demonstrate poise, technical knowledge, ability to convey scientific concepts, and correct interpretation of laboratory results.

Final actions

Have your supervisor document successful completion of the module.

MODULE 17: BLOODSTAIN PATTERN ANALYSIS		
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Required lectures

History of bloodstain pattern analysis
Basics of bloodstain pattern analysis and blood droplet dynamics
Basic forensic photography

Required reading

1. Study the available literature in the laboratory.
2. Study the articles in the online reference folder on this topic.

Practical exercises

Participate in a bloodstain pattern workshop (internal or external).

Competency test

None

KSA's to be mastered

1. Be able to examine bloodstain patterns and offer an opinion as to their mode of deposition (commensurate with experience).
2. Know about the history, terminology, and basic principles of bloodstain pattern analysis and blood droplet dynamics.
3. Be able to explain the theory and procedures to someone who does not have a scientific background.

Final actions

1. Discuss the module with your direct supervisor, including review of results and discussion of theory and practical aspects of module.
2. Have your supervisor document successful completion of the module. *The initials/signature of the supervisor or certificate of completion (if provided) indicates that all practical exercises have been completed and the correct results have been obtained on the competency test (if applicable).*

MODULE 20A: P30 ELISA AND AMYLASE DIFUSSION REVIEW		
DATE EFFECTIVE 07-16-2012	APPROVED BY DNA TECHNICAL LEADERS	PAGE 1 OF 2

Required lecture

Serology
Identification of P30 using ELISA
Body fluid identification

Required reading

1. Study the articles in the online reference folder on this topic.
2. Study the P30 ELISA and tests for saliva in the Serology Manual.

Practical exercises

After observing the procedure and having demonstrated the procedure to the trainer, do the following on the provided practice files:

Review the provided p30 and amylase test results and determine which assay would pass or fail. Ensure all samples correspond to the sample sheet, the raw data is correct and all measurements and sample designations are correct. Note any discrepancies.

Review the results with your supervisor or designee; once the reviews are deemed satisfactory, perform reviews on the provided competencies.

Competency test

Correctly review the provided p30 and amylase test results.

Those able to achieve competency through the normal review of 20 casework p30 and amylase assays are not required to perform the module.

KSA's to be mastered

1. Be able to correctly interpret P30 ELISA and AMYLASE diffusion results for different sample types.
2. Understand the sensitivity and limitations of the p30 and amylase test.

3. Know about seminal plasma specific proteins. Concentrate on the prostate specific antigen, P30 (also called Prostate Specific Antigen or PSA), and how it is identified and quantified.
4. Study ELISA techniques used to quantify P30.
5. Understand the use of controls for the amylase test.
6. Understand the difference between AMY1 and AMY2 and in which body fluids each is found
7. Understand the theory of how to differentiate AMY1 and AMY2 using lectins.
8. Be able to explain the theory and procedures to someone who does not have a scientific background.

Final actions

1. Discuss the module with your direct supervisor, including review of results and discussion of theory and practical aspects of module.
2. Have your supervisor or designee evaluate the results of the competency test.
3. Have your supervisor document successful completion of the module. *The initials/signature of the supervisor indicates that all practical exercises have been completed and the correct results have been obtained on the competency test (if applicable).*

MODULE 20B: P30 ELISA AND AMYLASE DIFUSSION PRACTICAL

DATE EFFECTIVE	APPROVED BY	PAGE
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Required lecture

Serology
Identification of P30 using ELISA
Body fluid identification

Required reading

1. Study the articles in the online reference folder on this topic.
2. Study the P30 ELISA and tests for saliva in the Serology Manual.

Practical exercises

After observing the procedure and having demonstrated the procedure to the trainer, do the following on the provided practice files:

Interpret the provided p30 and amylase test results and determine:

1. If the assay passes or fails
2. If the samples are orifice or external
3. If the sample is positive or negative
4. What type of extraction the sample should be submitted to
5. If multiple samples are from the same case determine which if any should be sent to extraction and give the reasons

Review the results with your supervisor or designee; once satisfactory results are obtained on the practice samples, analyze the provided competencies.

Competency test

Correctly interpret and determine the extraction method for each of the samples from the provided p30 and amylase test results.

Analysts competent in the performance of the P30 ELISA and Amylase Diffusion assays are not required to perform this module.

KSA's to be mastered

1. Be able to correctly interpret P30 ELISA and AMYLASE diffusion results for different sample types.
2. Understand the sensitivity and limitations of the p30 and amylase tests.
3. Know about seminal plasma specific proteins. Concentrate on the prostate specific antigen, P30 (also called Prostate Specific Antigen or PSA), and how it is identified and quantified.
4. Study ELISA techniques used to quantify P30.
5. Understand the use of controls for the amylase test.
6. Understand the difference between AMY1 and AMY2 and in which body fluids each is found
7. Understand the theory of how to differentiate AMY1 and AMY2 using lectins.
8. Understand policies regarding controls and submission of samples.
9. Be able to explain the theory and procedures to someone who does not have a scientific background.

Final actions

1. Discuss the module with your direct supervisor, including review of results and discussion of theory and practical aspects of module.
2. Have your supervisor or designee evaluate the results of the competency test.
3. Have your supervisor document successful completion of the module. *The initials/signature of the supervisor indicates that all practical exercises have been completed and the correct results have been obtained on the competency test (if applicable).*

MODULE 21: QUANTITATIVE REAL-TIME PCR REVIEW		
DATE EFFECTIVE 07-16-2012	APPROVED BY DNA TECHNICAL LEADERS	PAGE 1 OF 2

Required lecture

DNA quantitation

Required reading

1. Study the articles in the online reference folder on this topic.
2. Study the DNA quantitation methods and submission guidelines in the Protocols for Forensic STR Analysis Manual.

Practical exercises

After observing the procedure and having demonstrated the procedure to the trainer, do the following on the provided practice files:

Review the provided Quantitative Real Time PCR assay results and determine:

1. If the assay passes or fails (list reasons for failure)
2. Which samples if any display inhibition
3. Which samples if any display background fluorescence
4. Which samples if any need to be requanted

Review the results with your supervisor or designee; once the reviews are deemed satisfactory, perform reviews on the competency Quantitative Real Time PCR assays.

Competency test

Correctly review the provided Quantitative Real Time PCR assays.

Those able to achieve competency through the normal review of 20 casework Quantitative Real Time PCR assays are not required to perform the module.

KSA's to be mastered

1. Understand the preparation, handling, and function of reagents used for DNA quantitation.
2. Understand the use of controls for the Quantitative Real Time PCR test.
3. Understand the sensitivity and limitations of the Quantitative Real Time PCR test.
4. Be able to explain the theory and procedure to someone who does not have a scientific background.

5. Be able to correctly interpret Quantitative Real Time PCR test results, make any necessary calculations, and determine proper amounts for amplification. Understand the relationship between the Quantitative Real Time PCR value of a sample, and the amount of DNA submitted for amplification.

Final actions

1. Discuss the module with your direct supervisor, including review of results and discussion of theory and practical aspects of module.
2. Have your supervisor or designee evaluate the results of the competency test.
3. Have your supervisor document successful completion of the module. *The initials/signature of the supervisor indicates that all practical exercises have been completed and the correct results have been obtained on the competency test (if applicable).*

MODULE 22A: STR ANALYSIS – PRACTICAL		
DATE EFFECTIVE 07-16-2012	APPROVED BY DNA TECHNICAL LEADERS	PAGE 1 OF 2

Required lectures

DNA extraction
DNA quantitation
PCR theory
STR typing
Basics of capillary electrophoresis on the ABI 3130

Required reading

1. Study the articles in the online reference folder on this topic.
2. Study the capillary-based DNA methods in the Protocols for Forensic STR Analysis Manual.

Practical exercises

After observing the procedure and having demonstrated the procedure to the trainer, do the following on the provided practice files:

1. Analyze the practice STR run files provided using the current required3130 capillary-based PCR system (Identifiler, MiniFiler and Y STR).
2. Edit the practice STR run files provided using current accepted guidelines.

Submit the results for review to your supervisor or designee. If your supervisor feels that additional analysis is necessary, it should be completed before continuing. Once correct analysis and editing results are deemed satisfactory for the practice analysis, analyze and edit the competency test samples in all required 3130 capillary-based casework PCR systems.

Competency test

Analyze and edit the provided competency STR run files. All alleles assigned including the allelic ladder, positive control, and samples must be correct. All artifact peaks must be properly edited and the reasons for the edits must be accurately identified. The files must be properly saved and archived.

Those already deemed competent in PCR amplification, ABI 3130 Capillary Electrophoresis set up and STR analysis on other PCR kits, such as Identifiler or MiniFiler, will need to observe one analysis demonstration, perform one observed analysis practice and perform an analysis competency test.

KSA's to be mastered

1. Understand the preparation, handling and function of reagents used for PCR amplification and DNA typing.
2. Understand the use of controls introduced at this stage of DNA typing.
3. Be able to correctly edit electropherograms, including the correct identification of artifacts.
4. Be able to properly use the instrument and associated computers, and archive data correctly.
5. Understand the theory of PCR, the basics of STR typing, and the basics of capillary electrophoresis.
6. Be able to explain the theory and procedures to someone who does not have a scientific background.

Final actions

1. Discuss the module with your direct supervisor, including review of results and discussion of theory and practical aspects of module. This may necessitate the direct supervisor observing the trainee demonstrate proper archiving of data.
2. Have your supervisor or designee evaluate the results of the competency test.
3. Have supervisor document successful completion of the module. *The initials/signature of the supervisor indicates that all practical exercises have been completed and the correct results have been obtained on the competency test (if applicable).*

MODULE 22B: STR TECHNICAL REVIEW		
DATE EFFECTIVE 07-16-2012	APPROVED BY DNA TECHNICAL LEADERS	PAGE 1 OF 2

Required lectures

DNA extraction
DNA quantitation
PCR Theory
STR typing
Basics of capillary electrophoresis on the ABI 3130

Required reading

1. Study the articles in the online reference folder on DNA extraction, DNA quantitation, DNA amplification, STR typing, and mixture interpretation.
2. Study the capillary-based DNA methods in the Protocols for Forensic STR Analysis Manual.

Practical exercises

Before beginning this module you must have been an interpreting analyst for a minimum of six months and have completed and passed competencies (if applicable) for DNA extraction (modules 9A-9D), DNA quantitation (module 10), PCR amplification (module 11), 3130xl capillary electrophoresis set up and STR analysis (module 12A-12B), PCR mixture dilution studies (module 13), PCR data interpretation exercise (module 14), the oral exam (module 15) and the DNA Moot Court (Module 16).

After observing the procedure and having demonstrated the procedure to the trainer, do the following on the provided practice files:

1. Technically review the practice STR run files provided using the current guidelines for all required 3130 capillary based PCR systems (Identifiler, MiniFiler and Y STR).
2. Determine if the all the edits and reruns have been properly identified and marked using current accepted guidelines.
3. Correctly save, create necessary records and archive the practice technically reviewed STR runs.

Submit the results for review to your supervisor or designee. If your supervisor feels that additional analysis is necessary, it should be completed before continuing. Once the reviews are deemed satisfactory perform technical reviews on the competency STR run files

Competency test

Technically review the provided competency STR run files. All alleles analyzed including the allelic ladder, positive control, and samples must be correct. All artifact peaks must have been properly edited and reasons for the edits and reruns must be accurately identified. The files must have be properly saved and archived.

Those already deemed competent in PCR amplification, ABI 3130 Capillary Electrophoresis set up, STR Analysis and STR Technical Review on other PCR kits, such as Identifiler or MiniFiler, will need to observe one technical review demonstration, perform one technical review practice and perform a technical review competency test.

KSA's to be mastered

1. Understand the preparation, handling, and function of reagents used for PCR amplification and DNA typing.
2. Understand the use of controls introduced at this stage of DNA typing.
3. Be able to correctly review the edits made to the STR electropherograms, including the correct identification of artifacts and rerun samples.
4. Be able to properly use the instrument and associated computers, and archive data correctly.
5. Understand the theory of PCR, the basics of STR typing, and the basics of capillary electrophoresis.
6. Be able to explain the theory and procedures to someone who does not have a scientific background.

Final actions

1. Discuss the module with your direct supervisor, including review of results and discussion of theory and practical aspects of module. This may necessitate the direct supervisor observing the trainee demonstrate proper archiving of data.
2. Have your supervisor or designee evaluate the results of the competency test.
3. Have supervisor document successful completion of the module. *The initials/signature of the supervisor indicates that all practical exercises have been completed and the correct results have been obtained on the competency test (if applicable).*

MODULE 23A: TECHNICAL REVIEW OF NEGATIVE DNA CASES		
DATE EFFECTIVE 07-16-2012	APPROVED BY DNA TECHNICAL LEADERS	PAGE 1 OF 2

Required lectures

Serology
p30\ amylase (for HSC)
Sexual Assault Kits (for HSC)
Extraction
Quantitation
QA/QC
Accreditation and certification
Case Management

Required reading

1. Study the articles in the online reference folder on serology, p30, amylase, evidence examination, quantitation, quality control, quality assurance, case management, accreditation and certification.
2. Study the note taking in the Evidence and Case Management Manual.
3. Study the flow charts in the Evidence and Case Management Manual.
4. Study the tests for blood and semen in the Serology Manual.

Practical exercises

Before beginning this module you must have completed and passed competencies (if applicable) in basic laboratory techniques (module 1), microscopy (module 2A) digital photography (module 2B), serology blood presumptive test (module 3A), serology acid phosphatase and sperm (module 3B), evidence exam (module 4A), small cases (module 4B), sexual assault kits (module 5), p30 (module 6), amylase (module 7), extraction (module 9A-9D) and quantitation (module 10).

Discuss how to perform a technical review with a trainer or supervisor.

Perform 20 technical reviews on negative DNA cases and reports. If any have technical or grammatical errors provide details on how to correct them.

Ensure all information and documentation in the case record is correct and complete. Make sure all necessary tests were performed on the case. Ensure that the results of all tests performed are contained within the case record. Check to ensure that the chain of custody and sample tracking documentation is done correctly. Ensure that the case report includes all the correct case information, dates and test results. Make sure all the vouchers are listed on the report and the report is signed. Document for the technical review and update Access (if applicable).

A supervisor or designee will second review these case records and determine if your reviews were performed correctly. If necessary you supervisor may require more cases to have second reviews.

Competency test

None

KSA's to be mastered

1. Be able to perform a technical review on case records and reports.
2. Be able to explain the review process to someone who does not have a scientific background.
3. Be able to update all the necessary databases.

Final actions

1. Discuss the module with your direct supervisor, including review of results and discussion of theory and practical aspects of module.
2. Have your supervisor document successful completion of the module. *The initials/signature of the supervisor indicates that all practical exercises have been completed and the correct results have been obtained on the competency test (if applicable).*

MODULE 23B: TECHNICAL REVIEW OF POSITIVE DNA CASES		
DATE EFFECTIVE 07-16-2012	APPROVED BY DNA TECHNICAL LEADERS	PAGE 1 OF 3

Required lectures

Serology
p30\ amylase (for HSC)
Sexual Assault Kits (for HSC)
DNA extraction
DNA quantitation
PCR Theory
3130 Capillary Electrophoresis
STR typing
CODIS
Population Statistics
STR Mixture Interpretation
PCR Data Interpretation
QA/QC
Accreditation and Certification
Case Management

Required reading

1. Study the articles in the online reference folder on serology, DNA extraction, DNA quantitation, DNA amplification, STR typing, mixture interpretation, population statistics, CODIS, quality control, quality assurance, case management, accreditation and certification.
2. Study the note taking of the Evidence and Case Management Manual.
3. Study the tests for blood and semen in the Serology Manual
4. Study the DNA extraction and quantitation methods in the Protocols for Forensic STR Analysis Manual.
5. Study the DNA amplification methods in the Protocols for Forensic STR Analysis Manual.
6. Study the Capillary-Based DNA methods in the Protocols for Forensic STR Analysis Manual.

Practical exercises

Before beginning this module you must have been given interpreting analyst status by completing and passing competencies (if applicable) for basic laboratory techniques (module 1), microscopy (module 2A) digital photography (module 2B), serology blood presumptive test (module 3A), serology acid phosphatase and sperm (module 3B), evidence exam (module 4A), small cases (module 4B), sexual assault kits (module 5), p30 (module 6), amylase (module 7), DNA extraction (modules 9A-9D), DNA quantitation (module 10), PCR amplification (module 11), 3130xl capillary electrophoresis set up and STR analysis (module 12A-12B), PCR mixture dilution studies (module 13), PCR data interpretation exercise (module 14), and the oral exam (module 15).

Discuss how to perform a technical review with a trainer or supervisor.

Perform 20 technical reviews on DNA cases. If any have technical or grammatical errors provide details on how to correct them.

Ensure all information and documentation in the case record is correct and complete. Make sure all necessary tests were performed on the case. Ensure that all deductions are correct and the results of all tests performed are contained within the case record. Check to ensure that the chain of custody and sample tracking documentation is done correctly. Ensure that the case record includes all the correct case information, dates and test results. Make sure all the vouchers are listed on the report and the report is signed. Ensure the CODIS sheet (if applicable) is filled out properly. Document for the technical review and update linkage and the Access databases (if applicable).

A supervisor or designee will second review these case files and determine if your review was performed correctly. If necessary you supervisor may require more cases to have second reviews.

Competency test

None

KSA's to be mastered

1. Be able to perform a technical review on DNA case files and reports.
2. Be able to explain the review process to someone who does not have a scientific background.
3. Be able to explain the CODIS eligibility rules.
4. Be able to update Linkage and all necessary databases.

Final actions

1. Discuss the module with your direct supervisor, including review of results and discussion of theory and practical aspects of module.
2. Have your supervisor document successful completion of the module. *The initials/signature of the supervisor indicates that all practical exercises have been completed and the correct results have been obtained on the competency test (if applicable).*

MODULE 24: ADMINISTRATIVE REVIEW OF CASES		
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Required lecture None

Required reading

Review the Evidence and Case Management Manual

Practical exercises

Discuss how to perform an administrative review with a trainer or supervisor.

After observing the procedure and having demonstrated the procedure to the trainer, do the following:

Perform 10 administrative reviews on either positive or negative cases. If any cases have errors provide details on how to correct them.

Ensure all pages on the right side of the file contain the FB number and analysts initials. Make sure all the pages on the left side of the file contain the FB number. Ensure all dates on the productivity sheet are correct. Make sure all the information in the top block of the report is correct and that the report is signed. Ensure there is a signature and date for the technical review. Document for the administrative review and fill out the Access database (if applicable).

A supervisor or designee will second review these case files and determine if your review was performed correctly. If necessary you supervisor may require more cases to have second reviews.

Competency test

None

KSA's to be mastered

Be able to perform a technical review on DNA case files and reports.

1. Be able to perform an administrative review on case files and reports.
2. Be able to explain the review process to someone who does not have a scientific background.
3. Be able to update the necessary databases.

Final actions

1. Discuss the module with your direct supervisor, including review of results and discussion of theory and practical aspects of module.

2. Have your supervisor document successful completion of the module. *The initials/signature of the supervisor indicates that all practical exercises have been completed and the correct results have been obtained on the competency test (if applicable).*

MODULE 25: MITOCHONDRIAL DNA HAIR EXTRACTION		
DATE EFFECTIVE 04-01-2014	APPROVED BY DNA TECHNICAL LEADERS	PAGE 1 OF 2

Required lectures

mtDNA lecture

Required reading

1. Study articles on this topic.
2. Study the mtDNA Hair extraction in the Protocols for Forensic Mitochondrial DNA Analysis Manual.

Practical exercises

The practice samples provided for extraction may be used for all subsequent mtDNA practice exercises.

When you run analytical procedures during training or receive samples for competency testing, document and create records as if you were working on a real case.

After observing the procedure, perform the following method:

1. Organic extraction of two hair samples, one of which can be your own hair.

A separate extraction negative should be extracted with each hair sample. Create a duplex amplification batch sheet.

Competency test

The competency test samples provided for extraction may be used for all subsequent mtDNA competency tests.

Each of three hair samples must be washed and extracted. A separate extraction negative should be extracted with each hair sample. Create a duplex amplification batch sheet. No quantitation needs to be performed, as the maximum amount of DNA will be submitted to amplification.

Note: Competency in either the organic extraction or bone extraction procedures will satisfy the competency requirements for the mitochondrial DNA hair extraction procedure.

KSA's to be mastered

1. Be able to properly document hair using the Mideo system, digital camera and LIMS.
2. Be able to perform washing, digestion, and organic extraction on hair shafts.
3. Understand the preparation, handling, and function of reagents used for mtDNA hair extraction.
4. Understand the use of controls introduced at this stage of DNA typing.
5. Be able to explain the theory and how these tests are run to someone who does not have a scientific background.

Final actions

1. Discuss the module with your direct supervisor, including review of results and discussion of theory and practical aspects of module.
2. Have your supervisor evaluate the results of the competency test.
3. Have your supervisor document successful completion of the module. *The initials/signature of the supervisor indicates that all practical exercises have been completed and the correct results have been obtained on the competency test (if applicable).*

MODULE 26: MITOCHONDRIAL DNA ROCHE AND HOMEBREW DUPLEX AMPLIFICATION		
DATE EFFECTIVE 07-16-2012	APPROVED BY DNA TECHNICAL LEADERS	PAGE 1 OF 2

Required lectures
mtDNA lecture

Required reading
1. Study articles on this topic.
2. Study the amplification methods in the Protocols for Forensic Mitochondrial DNA Analysis Manual.

Practical exercises
The practice samples provided for extraction may be used for all subsequent mtDNA practice exercises.

When you run analytical procedures during training or receive samples for competency testing, document and create records as if you were working on a real case.

After observing the procedure, perform the following methods, using appropriate samples: (generally, hair extracts for Roche and buccal extracts for Homebrew). Practical exercises can be performed using one system only, or both systems.

1. mtDNA Roche duplex amplification
2. mtDNA Homebrew duplex amplification

Create correct documents and records, aliquot correct amounts of DNA and amplify all practice samples along with an amplification negative control and the HL60 positive control. Create a product gel or Agilent batch sheet.

Competency test
The competency test samples provided for extraction may be used for all subsequent mtDNA competency tests.

Each competency sample and extraction negative must be amplified along with a positive control and amplification negative.

Competency can be performed using one amplification system only, or both systems.

KSA's to be mastered

1. Be able to correctly interpret DNA quantitation results, make any necessary calculations, and submit proper amounts for amplification in Roche and/or Homebrew amplifications.
2. Understand the preparation, handling, and function of reagents used for duplex amplification and mtDNA typing.
3. Understand the use of controls introduced at this stage of DNA typing.
4. Understand how the Roche and Homebrew duplex amplifications work.
5. Be able to explain the theory to someone who does not have a scientific background.

Final actions

1. Discuss the module with your direct supervisor, including review of results and discussion of theory and practical aspects of module.
2. Have your supervisor evaluate the results of the competency test.
3. Have your supervisor document successful completion of the module. *The initials/signature of the supervisor indicates that all practical exercises have been completed and the correct results have been obtained on the competency test (if applicable).*

MODULE 27: MITOCHONDRIAL DNA AGILENT ANALYSIS		
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Required lecture

mtDNA lecture

Required reading

1. Study articles on this topic.
2. Study the mtDNA Agilent methods in the mtDNA manual.

Practical exercises

The practice samples provided for extraction are used for all subsequent mtDNA practice exercises. Sample extracts may also be provided directly for analysts training in Agilent.

When you run analytical procedures during training or receive samples for competency testing, document and create records as if you were working on a real case.

After observing the procedure, perform the following method:

1. Quantitate the amplification product using the Agilent bioanalyzer.
2. Review all records created.
3. Using the quantitation values obtained for practice samples, calculate and fill out a cycle-sequencing batch sheet.

Review the results with the supervisor before continuing.

Competency test

The competency test samples provided for extraction are used for all subsequent mtDNA competency tests. Sample extracts may also be provided directly for analysts training in Agilent.

Agilent run must pass. Usable value for cycle-sequencing must be obtained for all samples (samples requiring requantitation, must be requantified).

KSA's to be mastered

1. Be able to perform Agilent quantitation.
2. Understand the preparation, handling, and function of reagents used for Agilent.
3. Understand the sensitivity and limitations of Agilent.
4. Be able to explain the theory and how this test is run to someone who does not have a scientific background.
5. Be able to correctly interpret Agilent results, make any necessary calculations, and submit proper amounts for cycle-sequencing. Understand the relationship between the Agilent value of a sample, and the amount of mtDNA submitted for cycle-sequencing.

Final actions

1. Discuss the module with your direct supervisor, including review of results and discussion of theory and practical aspects of module.
2. Have your supervisor evaluate the results of the competency test.
3. Have your supervisor document successful completion of the module. *The initials/signature of the supervisor indicates that all practical exercises have been completed and the correct results have been obtained on the competency test (if applicable).*

MODULE 28: MITOCHONDRIAL DNA LINEAR ARRAY ANALYSIS		
DATE EFFECTIVE 07-16-2012	APPROVED BY DNA TECHNICAL LEADERS	PAGE 1 OF 2

Required lecture

mtDNA lecture

Required reading

1. Study articles on this topic.
2. Study the mtDNA linear array methods in the Protocols for Forensic Mitochondrial DNA Analysis Manual.
3. Study the Roche Linear Array Mitochondrial DNA Course Materials & Training Manual.
4. Read the Linear Array mtDNA HVI/HVII Region-Sequence Typing Kit Package Insert

Practical exercises

The practice samples provided for extraction may be used for all subsequent mtDNA practice exercises.

When you run analytical procedures during training or receive samples for competency testing, document and create records as if you were working on a real case.

After observing the procedure, perform the following method:

1. Perform Linear Array analysis on practice samples.
2. Photograph the results.
3. Interpret the results for practice samples and create Linear Array Interpretation batch sheets.

Review the results with the supervisor before continuing.

Competency test

The competency test samples provided for extraction may be used for all subsequent mtDNA competency tests.

The linear array photo must be clear and focused with no more than 12 strips per photo. No bands should appear in any negative controls. The positive control and samples must give the correct Linear Array type.

KSA's to be mastered

1. Be able to perform a linear array.
2. Understand the preparation, handling, and function of reagents used for Linear Array analysis.
3. Understand the sensitivity and limitations of the Linear Array.
4. Be able to explain the theory and how this test is run to someone who does not have a scientific background.
5. Be able to correctly operate the digital camera and take a good quality photo.
6. Be able to correctly interpret linear array results, search the linear array database, and submit appropriate samples for mtDNA sequencing. Understand the relationship between the gel value of a sample, and the amount of mtDNA submitted for Linear Array.

Final actions

1. Discuss the module with your direct supervisor, including review of results and discussion of theory and practical aspects of module.
2. Have your supervisor evaluate the results of the competency test.
3. Have your supervisor document successful completion of the module. *The initials/signature of the supervisor indicates that all practical exercises have been completed and the correct results have been obtained on the competency test (if applicable).*

MODULE 29: MITOCHONDRIAL DNA SEQUENCING		
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Required lecture

mtDNA lecture

Required reading

1. Study articles on this topic.
2. Study the sequencing methods in the Protocols for Forensic Mitochondrial DNA Analysis Manual.

Practical exercises

The practice samples provided for extraction may be used for all subsequent mtDNA practice exercises.

When you run analytical procedures during training or receive samples for competency testing, document and create records as if you were working on a real case.

After observing the procedure, perform the following methods:

1. ExoSAP-IT Digestion
2. Cycle Sequencing
3. SDS treatment
4. Centrisep cleanup
5. Evaporation

Create a cycle sequencing batch sheet and aliquot correct amounts of ExoSap-IT. Aliquot the correct amounts of template DNA and water and cycle sequence with necessary primers. Perform SDS cleanup and Centrisep on all samples.

After evaporation and re-suspension of samples in formamide, load samples onto the ABI 3130.

Criminalist I trainees and above will perform their own 3130 runs.

Competency test

The competency test samples provided for extraction may be used for all subsequent mtDNA competency tests.

KSA's to be mastered

1. Be able to correctly create cycle sequencing batch sheets.
2. Understand the preparation, handling, and function of reagents used for ExoSAP-IT, mtDNA cycle sequencing, SDS cleanup, and Centrisep cleanup.
3. Be able to select correct primers to meet mtDNA cycle sequencing requirements.
4. Understand the theory of sequencing and the different types of chemistries available.
5. Be able to explain the theory to someone who does not have a scientific background.

Final actions

1. Discuss the module with your direct supervisor, including review of results and discussion of theory and practical aspects of module.
2. Have your supervisor evaluate the results of the competency test.
3. Have your supervisor document successful completion of the module. *The initials/signature of the supervisor indicates that all practical exercises have been completed and the correct results have been obtained on the competency test (if applicable).*

MODULE 2A: MICROSCOPY		
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Required lecture

Basic microscopy

Required reading

1. Study the articles in the online reference folder on this topic.

Practical exercises

After observing fundamental microscopic technique, do the following:

1. Practice setting up critical illumination with different slides and magnifications.

The practical exercise may be completed/performed during or in conjunction with other training modules.

Competency test

None.

KSA's to be mastered

1. Be able to use and set up critical illumination on any of the compound microscopes in the laboratory.
2. Know the basic microscopic terms, principles, and techniques.
3. Be able to explain the theory to someone who does not have a scientific background.

Final actions

1. Discuss the module with your direct supervisor, including review of results and discussion of theory and practical aspects of module. This may necessitate the direct supervisor observing the trainee demonstrate proper use of the microscope.
2. Have your supervisor document successful completion of the module. *The initials/signature of the supervisor indicates that all practical exercises have been completed and the correct results have been obtained on the competency test (if applicable).*

MODULE 2B: DIGITAL PHOTOGRAPHY		
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Required lecture

Basic forensic photography

Required reading

1. Study the articles in the online reference folder on this topic.
2. Read the sections of the Evidence and Case Management Manual relating to photo documentation.

Practical exercises

After observing fundamental digital camera handling techniques, do the following:

1. Practice handling and using the camera, transferring digital images to the computer and LIMS, adjusting the image size, and printing photographs in various formats (one to a page, two or more to a page).

The practical exercise may be completed/performed during or in conjunction with other training modules.

Competency test

None.

KSA's to be mastered

1. Be able to use any of the digital cameras in the laboratory.
2. Be able to control illumination.
3. Be able to produce decent quality photographs of physical evidence.
4. Be able to explain the theory to someone who does not have a scientific background.

Final actions

1. Discuss the module with your direct supervisor, including review of results and discussion of theory and practical aspects of module.
2. Have your supervisor document successful completion of the module. *The initials/signature of the supervisor indicates that all practical exercises have been completed and the correct results have been obtained on the competency test (if applicable).*

MODULE 30: MITOCHONDRIAL DNA DATA INTERPRETATION (COMPUTER EXERCISE)		
DATE EFFECTIVE 07-16-2012	APPROVED BY DNA TECHNICAL LEADERS	PAGE 1 OF 2

Required lecture

mtDNA lecture

Required reading

1. Sequencing Analysis User Guide
2. Sequencher User Guide
3. Sequencher Tutorial Guide
4. Study the articles on this topic
5. Study the section describing the use of Sequencher in the Protocols for Forensic Mitochondrial DNA Analysis Manual.

Practical exercises

Criminalist II trainees and above will analyze their own previously run sequencing reactions.

In addition, the trainer will provide the trainee a CD with sequence data for ten sample sets. For each sample set, the trainee should determine if the controls are of good quality, if sequence data meets current guidelines, assemble the sequence data into contigs using the Sequencher software program, and make any appropriate edits on the Sequence Analysis Editing Sheet. The trainee must also assemble the appropriate documention for each contig built and be able to electronically archive the sequence data on the mtDNA server. Finally, a report including statistics should be compiled for the ten sample sets.

Competency test

The competency test samples provided for extraction may be used for the sequencing analysis and data interpretation competency tests.

KSA's to be mastered

1. Be able to assemble and edit mtDNA sequencing electropherograms.
2. Be able to evaluate initial mtDNA results and determine what further testing might be needed.
3. Be able to determine the proper statistical information for each mtDNA type.

Final actions

1. Discuss the module with your direct supervisor, including review of results and discussion of theory and practical aspects of module.
2. Have your supervisor sign off on successful completion of module. *The initials/signature of the supervisor indicates that all practical exercises have been completed and the correct results have been obtained on the competency test (if applicable).*

MODULE 31: MITOCHONDRIAL DNA MOCK COURT		
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Required lecture

none

Required reading

Transcripts available in-house from past trials involving mtDNA analysis.

Practical exercises

To prepare for mock court, the trainee should review (i) court transcripts, (ii) suggested questions, (iii) reading material concerning expert testimony, and when possible should observe laboratory personnel testify in court.

1. As available, attend court with Criminalists and observe testimony.
2. In consultation with your supervisor, select one of your mtDNA cases for use in a mock court. Your supervisor will be the prosecutor, and other staff members will take the roles of the defense attorney and judge.
3. Review the theoretical and practical aspects of the testing performed in the small case.
4. With your supervisor, go over the questions to be asked in the direct examination and the potential topics to be covered in cross examination.
5. Practice your answers with your supervisor and on your own, paying particular attention to make your responses loud, clear, and easily understandable to a lay person. Learn to speak slowly and enunciate carefully, directing your answers towards the jury. Learn to listen carefully to the questions, making sure the question is complete before answering; think before replying.

Competency test

Successfully complete your DNA mock court. The attending staff members will critique your performance; the "judge" will provide a written Court Testimony Evaluation Grade.

KSA's to be mastered

Demonstrate poise, technical knowledge, ability to convey scientific concepts, and correct interpretation of laboratory results.

Final actions

Have your supervisor document successful completion of the module.

MODULE 3A: SEROLOGY – BLOOD PRESUMPTIVE TESTS

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Required lecture
Serology

Required reading
1. Study the articles in the online reference folder on this topic.
2. Study the tests for blood in the Serology Manual.

Practical exercises
When you run analytical procedures during training or receive samples for competency testing, take notes and fill out worksheets as if you were working on a real case. After observing each procedure and having demonstrated each procedure to the trainer, do the following experiments.

1. Sensitivity. Check this for the KM presumptive test by testing serial dilutions of blood up to 1/1,000,000.
2. Specificity. Check this for KM reagent by testing various substances such as sweat, urine, plant extracts (onion), rust, various species samples, etc.

Competency test
Blood Presumptive competency test

KSA's to be mastered
1. Be able to perform the blood presumptive tests.
2. Understand the composition of blood, both its cellular components and protein makeup (including hemoglobin).
3. Understand the mechanisms of the presumptive tests for blood employed in the laboratory: Kastle-Meyer (KM), leucomalachite green (LMG), and luminol.
4. Understand which substances cross-react with which presumptive test and why.
5. Understand the sensitivity and limitations of the KM test.
6. Understand the reasons and use of controls for this procedure.
7. Be able to explain the theory and procedure to someone who does not have a scientific background.

Final actions
1. Discuss the module with your direct supervisor, including review of results and discussion of theory and practical aspects of module.
2. Have your supervisor document successful completion of the module. *The initials/signature of the supervisor indicates that all practical exercises have been completed and the correct results have been obtained on the competency test (if applicable).*

MODULE 3B: SEROLOGY – ACID PHOSPHATASE AND SPERM		
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Required lecture

Serology

Required reading

1. Study the articles in the online reference folder on this topic.
2. Study the tests for semen in the Serology Procedures Manual.

Practical exercises

When you run analytical procedures during training or receive samples for competency testing, take notes and fill out worksheets as if you were working on a real case. After observing each procedure and having demonstrated each procedure to the trainer, do the following experiments.

1. Sensitivity. Using the acid phosphatase test, test various dilutions of semen extracts up to 1/1,000,000.
2. Specificity. Check for specificity of the acid phosphatase test against other substances such as vaginal fluid, urine, saliva, etc.
3. Prepare slides of semen-stained swabs and semen-free swabs. Use two methods of preparing the slides: extracting the stains and pelleting cellular debris by centrifugation and "mashing" the stains/swabs onto a slide. Stain these slides using the Christmas Tree stain procedure.

Competency test

Sperm identification competency test using the Christmas Tree Stain Procedure. You must correctly stain and determine the presence or absence of sperm on each slide.

KSA's to be mastered

1. Be able to perform the acid phosphatase presumptive test and the Christmas Tree stain.
2. Understand the sensitivity and limitations of the AP test.
3. Understand the use of controls for the AP tests.
4. Understand the components of seminal fluid, including human sperm morphology. Get a general feeling about the how sperm morphology differs in various animals.
5. Understand the mechanism of the acid phosphatase presumptive test.
6. Understand what substances interfere with the test or might give a false positive test.
7. Understand why sperm exhibit differential staining.
8. Understand the persistence of the components of semen in the oral, anal, and vaginal tracts and why the length of time differs.
9. Be able to explain the theory and procedures to someone who does not have a scientific background.

Final actions

1. Discuss the module with your direct supervisor, including review of results and discussion of theory and practical aspects of module.
2. Have your supervisor evaluate the results of the competency test.
3. Have your supervisor document successful completion of the module. *The initial/signature of the supervisor indicates that all practical exercises have been completed and the correct results have been obtained on the competency test (if applicable).*

MODULE 4A: EVIDENCE EXAMINATION		
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Required lectures
Safety and right to know
Serology
Case Management

Required reading
1. Study the articles in the online reference folder on these topics.
2. Study the note taking section of the Evidence and Case Management Manual.
3. Study the tests for blood and semen in the Serology Manual.

Practical exercises

Before beginning this module you must have completed and passed competencies (if applicable) for basic laboratory techniques (module 1), microscopy (module 2A) digital photography (module 2B), serology blood presumptive test (module 3A), and serology acid phosphatase and sperm (module 3B).

1. During the first week of training, observe several Criminalists examining evidence.
2. During the second week of training practice evidence examination using mock cases, provided by the Training Team, while being observed by Criminalist trainers.

Competency Test

Successfully examine mock cases.

KSA's required to be mastered

1. Understand target dates, how cases are assigned, and how records are filled out for case tracking purposes.
2. Understand the importance of chain of custody records for evidence sign-out, return to the Evidence Unit, and the documentation of retained items.
3. Understand the need to thoroughly examine and analyze evidence items based on the scheduled analysis, including the use of evidence packaging records, clothing description records, notes, diagrams, and photography as needed.
4. Understand policies regarding controls, retention of samples, and submission of samples.

Final actions

1. Discuss the module with your direct supervisor, including review of results and discussion of theory and practical aspects of module.
2. Have your supervisor document successful completion of the module. *The initials/signature of the supervisor indicates that all practical exercises have been completed and the correct results have been obtained on the competency test (if applicable).*

MODULE 4B: SMALL CASES		
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Required lecture
Safety and right to know
Serology
Case management

Required reading
1. Study the articles in the online reference folder on this topic.
2. Study the note taking section of the Evidence and Case Management Manual.
3. Study the tests for blood and semen in the Serology Manual.

Practical exercises
1. Obtain simple sexual assault or homicide cases to work on, in consultation with the evidence exam rotation supervisor, evidence sign-in supervisor, or your supervisor.
2. Review any records for the case.
3. Examine the items in each case, documenting as needed using available records, notes, photography, and/or diagrams.
4. Perform any presumptive and/or confirmatory tests as needed.
5. Write draft reports, return evidence as needed (after consultation with your supervisor), and submit cases to your supervisor for review and signature.

Competency test
None.

KSA's to be mastered
1. Understand target dates, how cases are assigned, and how records are filled out for case tracking purposes.
2. Be able to document chain of custody for evidence sign-out, return to the Evidence Unit, and for documentation of retained items.
3. Be able to thoroughly examine and analyze evidence items based on the scheduled analysis including use of evidence packaging records, clothing description records, notes, diagrams, and photography as needed.
4. Be able to write an accurate and complete draft report on a simple case.

Final actions

1. Discuss the module with your direct supervisor, including review of results and discussion of theory and practical aspects of module.
2. Have your supervisor evaluate the case notes, body fluid identification, and the report.
3. Have your supervisor document successful completion of the module. *The initials/signature of the supervisor indicates that all practical exercises have been completed and the correct results have been obtained on the competency test (if applicable).*

MODULE 4C: EXEMPLAR PROCESSING		
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Required lecture

Safety and right to know
Case Management

Required reading

1. Study the articles in the online reference folder on this topic.
2. Study the note taking section of the Evidence and Case Management Manual.
3. Study blood processing in the Serology Manual

Practical exercises

1. Obtain PM, true and/or pseudo exemplar to work on, in consultation with the evidence exam rotation supervisor, evidence sign-in supervisor, or your supervisor.
2. Review the paperwork in the casefile.
3. Examine the items in each case, documenting as needed using the available records, notes, photography, and/or diagrams.
4. Write draft reports, return evidence as needed (after consultation with your supervisor), and submit cases to your supervisor for review and signature.

Competency test

None.

KSA's to be mastered

1. Understand target dates, how cases are assigned, and how records are filled out for case tracking purposes.
2. Be able to thoroughly examine and analyze exemplar items based on the scheduled analysis, including submission for DNA extraction.
3. Be able to document chain of custody for evidence sign-out, return to the Evidence Unit, and for documentation of retained items.

Final actions

1. Discuss the module with your direct supervisor, including review of records and discussion of theory and practical aspects of module.
2. Have your supervisor document successful completion of the module. *The initials/signature of the supervisor indicates that all practical exercises have been completed and the correct results have been obtained on the competency test (if applicable).*

MODULE 4D: HIGH VOLUME (PC) EXAM		
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Required lecture
Case management

Required reading
1. Study the articles in the online reference folder on this topic.
2. Study the note taking section of the Evidence and Case Management Manual

Practical exercises
1. Obtain small training evidence cases or items, swabs, tools, gloves, cigarette butts etc…, to work on in consultation with the Training Team, PC team exam supervisor or your supervisor.
2. Review the paperwork in the item.
3. Examine the items in each case, documenting as needed using the available records, notes, photography, and/or diagrams.
4. Perform any presumptive and/or confirmatory tests as needed.
5. Write draft reports, return evidence as needed (after consultation with your supervisor), and submit cases to your supervisor for review and signature.

Competency test
None.

KSA's to be mastered
1. Understand target dates, how cases are assigned, and how records are to be filled out for case tracking purposes.
2. Be able to document chain of custody for evidence sign-out, return to the Evidence Unit, and for documentation of retained items.
3. Be able to thoroughly examine and analyze evidence items based on the scheduled analysis including use of evidence packaging records, clothing description records, notes and diagrams, and photography as needed.
4. Be able to write an accurate and complete draft report on a simple case.

Final actions
1. Discuss the module with your direct supervisor, including review of results and discussion of theory and practical aspects of module.
2. Have your supervisor evaluate the case notes, body fluid identification, and the report.
3. Have your supervisor document successful completion of the module. *The initials/signature of the supervisor indicates that all practical exercises have been completed and the correct results have been obtained on the competency test (if applicable).*

MODULE 4E: LCN SMALL CASES		
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Required lecture
Safety and right to know
Case management

Required reading
1. Study the articles in the online reference folder on this topic.
2. Study the note taking sections of the Evidence and Case Management Manual.

Practical exercises
1. Obtain LCN cases to work on, in consultation with the evidence examination supervisor, evidence sign-in supervisor, or your supervisor.
2. Review any records for the case.
3. Examine the items in each case, documenting as needed using the available records, notes, photography, and/or diagrams.
4. Perform any presumptive and/or confirmatory tests as needed.
5. Write draft reports, return evidence as needed (after consultation with your supervisor), and submit cases to your supervisor for review and signature.

Competency test
None.

KSA's to be mastered
1. Understand target dates, how cases are assigned, and paperwork to be filled out for case tracking purposes.
2. Be able to document chain of custody records for evidence sign-out, return to the Evidence Unit, and for documentation of retained items.
3. Be able to thoroughly examine and analyze evidence items based on the scheduled analysis including use of evidence packaging records, clothing description records, notes, diagrams, and photography as needed.
4. Be able to write an accurate and complete draft report on a simple case.

Final actions
1. Discuss the module with your direct supervisor, including review of results and discussion of theory and practical aspects of module.
2. Have your supervisor evaluate the case notes, body fluid identification, and the report.
3. Have your supervisor document successful completion of the module. *The initials/signature of the supervisor indicates that all practical exercises have been completed and the correct results have been obtained on the competency test (if applicable).*

MODULE 5A: SEXUAL ASSAULT KITS		
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Required lecture

Standardized sexual assault evidence collection kits
Serology

Required reading

1. Study the articles in the online reference folder on this topic.
2. Study the sexual assault kit processing and flow chart in the Evidence and Case Management Manual.
3. Study the Christmas Tree staining and amylase presumptive tests in the Serology Manual.
4. Study body fluid identification in the Serology Manual.

Practical exercises

Before beginning this module you must have completed and passed competencies (if applicable) for basic laboratory techniques (module 1), microscopy (module 2A) digital photography (module 2B), serology blood presumptive test (module 3A), and serology acid Phosphatase and sperm (module 3B).

1. Observe a Criminalist processing and closing at least five sexual assault kits, including at least one containing underwear or other small clothing item.
2. Demonstrate the processing of at least five sexual assault kits for the trainer, including preparation of stained slides and examination of underwear or other small clothing item.
3. Demonstrate the closing of at least 3 sexual assaults kits for the trainer, including sample submission for extraction and exemplar retaining.

During training, and for a period of six months after the completion of training, new Criminalists must have sperm searches double-read by a competent Criminalist.

Competency test

none

KSA's to be mastered

1. Understand target dates, how cases are assigned, and documentation used for case tracking purposes.
2. Be able to thoroughly examine and analyze a sexual assault kit based on the scheduled analysis.

3. Be able to document chain of custody records for evidence sign-out, return to the Evidence Unit, and for documentation of retained items.
4. Understand the tasks to be done prior to transferring a semen-positive case to another Criminalist.
5. Understand the purpose of each sexual kit component.
6. Understand the mechanism of the Christmas Tree stain.

7. Be able to explain the theory and tests performed to someone who does not have a scientific background.

Final actions

1. Discuss the module with your direct supervisor, including review of results and discussion of theory and practical aspects of module.
2. Have your supervisor evaluate the case records and the report.
3. Have your supervisor document successful completion of the module. *The initials/signature of the supervisor indicates that all practical exercises have been completed and the correct results have been obtained on the competency test (if applicable).*

MODULE 5B: SMALL ITEMS EXAM (SEXUAL ASSAULT KITS)		
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Required lecture

Safety and right to know
Case management
Serology
Kits

Required reading

1. Study the articles in the online reference folder on this topic.
2. Study the note taking section of the Evidence and Case Management Manual.
3. Study the tests for blood and semen in the Serology Manual.

Practical exercises

1. Obtain at least three small training evidence items, e.g., condom, bra, pantyhose, etc, to work, in consultation with the Training Team, evidence exam rotation supervisor, or your supervisor.
2. Review the records, if any, for the item.
3. Examine the items, documenting as needed with available records, notes, photography, and/or diagrams.
4. Perform any presumptive and/or confirmatory tests as needed.

Competency test

Successfully examine and document up to three small mock evidence items.

KSA's to be mastered

1. Understand target dates, how cases are assigned, and how records are filled out for case tracking purposes.
2. Be able to document chain of custody for evidence sign-out, return to the Evidence Unit, and for documentation of retained items.
3. Be able to thoroughly examine and analyze evidence items based on the scheduled analysis including use of evidence packaging records, clothing description records, notes, diagrams, and photography as needed.

Final actions

1. Discuss the module with your direct supervisor, including review of results and discussion of theory and practical aspects of module.
2. Have your supervisor evaluate the records and testing performed.
3. Have your supervisor sign off on successful completion of module.
   The initials/signature of the supervisor indicates that all practical exercises have been completed and the correct results have been obtained on the competency test (if applicable).

MODULE 6: P30 ELISA		
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Required lecture

Identification of P30 using ELISA

Required reading

1. Study the articles in the online reference folder on this topic.
2. Study the P30 ELISA test in the Serology Manual section

Practical exercises

When you run analytical procedures during training or receive samples for competency testing, document and create records as if you were working on a real case.

After observing the procedure and having demonstrated the procedure to the trainer, do the following experiments.

1. Sensitivity. Using the P30 ELISA test, test various dilutions of semen extracts up to 1/10,000,000.
2. Specificity. Check the specificity of anti-P30 (polyclonal antibody) by using other substances such as vaginal fluid, urine, and saliva using ELISA.

Competency test

Obtain a semen identification competency test. You must correctly determine the presence or absence of P30 in each sample.

KSA's to be mastered

1. Be able to perform the P30 ELISA test.
2. Be able to correctly interpret P30 ELISA results.
3. Understand the sensitivity and limitations of the P30 ELISA test.
4. Understand the use of controls for the P30 ELISA Test.
5. Know about seminal plasma specific proteins. Concentrate on the prostate specific antigen, P30 (also called Prostate Specific Antigen or PSA), and how it is identified and quantified.

6. Understand the relationship, if any, between the amount of acid phosphatase, P30, spermatozoa, and the amount of semen present.
7. Be able to explain the theory and how these tests to someone who does not have a scientific background.

Final actions

1. Discuss the module with your direct supervisor, including review of results and discussion of theory and practical aspects of module.
2. Have your supervisor evaluate the results of the competency test.
3. Have your supervisor document successful completion of the module. *The initials/signature of the supervisor indicates that all practical exercises have been completed and the correct results have been obtained on the competency test (if applicable).*

MODULE 7: SEROLOGY – AMYLASE		
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Required lecture

Body fluid identification

Required reading

1. Study the articles in the online reference folder on this topic.
2. Study the tests for saliva in the Serology Manual.

Practical exercises

When you run analytical procedures during training or receive samples for competency testing, document and create records as if you were working on a real case.

After observing each procedure and having demonstrated each procedure to the trainer, do the following experiments.

1. Sensitivity. Using the amylase diffusion procedure, test various dilutions of saliva extracts up to 1/10,000.
2. Specificity. Check the specificity of the amylase test by running the amylase diffusion assay on extracts of other substances such as semen, semen-stained vaginal swabs, semen-free vaginal swabs, and urine.

Competency tests

Amylase identification competency test. The presence or absence of amylase in each sample must be correctly determined.

KSA's to be mastered

1. Be able to perform the amylase test.
2. Be able to properly interpret the test for different sample types.
3. Understand the sensitivity and limitations of the amylase test.
4. Understand the use of controls for the amylase test.
5. Understand the difference between AMY1 and AMY2 and in which body fluids each is found
6. Understand the theory of how to differentiate AMY1 and AMY2 using lectins.
7. Be able to explain the theory and procedure to someone who does not have a scientific background.

Final actions

1. Discuss the module with your direct supervisor, including review of results and discussion of theory and practical aspects of module.
2. Have your supervisor evaluate the results of the competency test.
3. Have your supervisor document successful completion of the module. *The initials/signature of the supervisor indicates that all practical exercises have been completed and the correct results have been obtained on the competency test (if applicable).*

MODULE 8: SEROLOGY MOCK COURT		
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Required lectures
Basics of the legal system
QA/QC and Accreditation
Serology

Required reading
Study the articles in the online reference folder on this topic.

Practical exercises
To prepare for mock court, the trainee might review court transcripts, suggested questions, reading material concerning expert testimony, and observing laboratory personnel testify in court.

1. As available, attend court with Criminalists and observe testimony.
2. In consultation with your supervisor, select one of your small cases for use in a mock court. Your supervisor will be the prosecutor, and other staff members will take the roles of the defense attorney, judge and jury.
3. Review the theoretical and practical aspects of the testing performed in the small case.
4. With your supervisor, go over the questions to be asked in the direct examination and the potential topics to be covered in cross examination.
5. Practice your answers with your supervisor and/or designee and on your own, paying particular attention to making your responses loud, clear, and easily understandable to a lay person. Learn to speak slowly and enunciate carefully, directing your answers towards the jury. Learn to listen carefully to the questions, making sure the question is complete before answering; think before replying.

Competency test
Successfully complete your serology mock court. The attending staff members will critique your performance; the "judge" will provide a Serology Court Testimony Evaluation record.

KSA's to be mastered
Demonstrate poise, technical knowledge, ability to convey scientific concepts, and correct interpretation of laboratory results.

Final actions
Have your supervisor document successful completion of the module.

MODULE 9A: CHELEX EXTRACTION		
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Required lecture

DNA extraction

Required reading

1. Study the articles in the online reference folder on this topic.
2. Study the DNA extraction methods in the Protocols for Forensic STR Analysis Manual.

Practical exercises

When you run analytical procedures during training or receive samples for competency testing, document and create records as if you were working on a real case.

After observing the procedure and having demonstrated the procedure to the trainer, do the following experiments.

1. Chelex differential extraction of semen positive samples.
2. Chelex extraction of hairs, other evidence, blood or exemplars.

As each extraction is finished, submit aliquots for DNA quantitation. Review the results with your supervisor; once satisfactory results are obtained on the practice samples, perform extractions on the competency test samples. Submit aliquots of competency test samples for DNA quantitation.

Competency test

Each sample must yield a typable amount of DNA, as determined by the current quantitation method used. Each extraction set must have a clean extraction negative, as determined by the current quantitation method used and PCR analysis. Each sample must give a correct full DNA profile in the PCR system(s) tested.

KSA's to be mastered

1. Be able to perform Chelex extraction on all sample types.
2. Understand the preparation, handling, and function of reagents used for DNA extraction.
3. Be able to properly aliquot samples for Quantitation.
4. Understand the use of controls introduced at this stage of DNA typing.
5. Be able to explain the theory and procedures to someone who does not have a scientific background.

Final actions

1. Discuss the module with your direct supervisor, including review of results and discussion of theory and practical aspects of module.
2. Have your supervisor evaluate the results of the competency test.
3. Have your supervisor document successful completion of the module. *The initials/signature of the supervisor indicates that all practical exercises have been completed and the correct results have been obtained on the competency test (if applicable).*

MODULE 9B: MAG ATTRACT EXTRACTION		
DATE EFFECTIVE 07-16-2012	APPROVED BY DNA TECHNICAL LEADERS	PAGE 1 OF 2

Required lecture

DNA extraction

Required reading

1. Study the articles in the online reference folder on this topic.
2. Study the DNA extraction methods in the Protocols for Forensic STR Analysis Manual.

Practical exercises

When you run analytical procedures during training or receive samples for competency testing, document and create records as if you were working on a real case.

After observing the procedure and having demonstrated the procedure to the trainer, do the following experiments.

1. Perform an M48 extraction.

As each extraction is finished, submit aliquots for DNA quantitation. Review the results with the supervisor; once satisfactory results are obtained on the practice samples, perform extractions on the competency test samples. Submit aliquots of competency test samples for DNA quantitation.

Competency test

1. Perform an M48 extraction.
2. Perform an M48 reduced volume extraction.

Each appropriate sample must yield a typable amount of DNA, as determined by the current quantitation method used. Each extraction set must have a clean extraction negative, as determined by the current quantitation method used and PCR analysis. Each sample must give the correct type in the PCR systems tested. No more than half of the sample blanks (when/if used) can contain more than 0.01pg/µL.

KSA's to be mastered

1. Be able to perform M48 and M48 reduced volume extractions on all sample types.
2. Understand the preparation, handling, and function of reagents used for DNA extraction.
3. Be able to properly aliquot samples for Quantitation.
4. Understand the use of controls introduced at this stage of DNA typing.
5. Be able to explain the theory and procedures to someone who does not have a scientific background.

Final actions

1. Discuss the module with your direct supervisor, including review of results and discussion of theory and practical aspects of module.
2. Have your supervisor evaluate the results of the competency test.
3. Have your supervisor document successful completion of the module. *The initials/signature of the supervisor indicates that all practical exercises have been completed and the correct results have been obtained on the competency test (if applicable).*

MODULE 9C: ORGANIC EXTRACTION		
DATE EFFECTIVE 07-16-2012	APPROVED BY DNA TECHNICAL LEADERS	PAGE 1 OF 2

Required lecture

DNA extraction

Required reading

1. Study the articles in the online reference folder on this topic.
2. Study the DNA extraction methods in the Protocols for Forensic STR Analysis Manual.

Practical exercises

When you run analytical procedures during training or receive samples for competency testing, document and create records as if you were working on a real case.

After observing the procedure and having demonstrated the procedure to the trainer, do the following experiments.

1. Perform an organic extraction on saliva or known blood samples.

As each extraction is finished, submit aliquots for DNA quantitation. Review the results with the supervisor; once satisfactory results are obtained on the practice samples, perform extractions on the competency test samples. Submit aliquots of competency test samples for DNA quantitation.

Competency test

Each sample must yield a typable amount of DNA, as determined by the current quantitation method used. Each extraction set must have a clean extraction negative, as determined by the current quantitation method used and PCR analysis. Each sample must give the correct type in the PCR systems tested.

KSA's to be mastered

1. Be able to perform an organic extraction.
2. Understand the preparation, handling, and function of reagents used for DNA extraction.
3. Be able to properly aliquot samples for Quantitation.
4. Understand the use of controls introduced at this stage of DNA typing.
5. Be able to explain the theory and procedure to someone who does not have a scientific background.

Final actions

1. Discuss the module with your direct supervisor, including review of results and discussion of theory and practical aspects of module.
2. Have your supervisor evaluate the results of the competency test.
3. Have your supervisor document successful completion of the module. *The initials/signature of the supervisor indicates that all practical exercises have been completed and the correct results have been obtained on the competency test (if applicable).*

MODULE 9D: HIGH YIELD (TOUCHED ITEM) EXTRACTION		
DATE EFFECTIVE 07-16-2012	APPROVED BY DNA TECHNICAL LEADERS	PAGE 1 OF 2

Required lecture

DNA extraction

Required reading

1. Study the articles in the online reference folder on this topic.
2. Study the DNA extraction methods in the Protocols for Forensic STR Analysis Manual.

Practical exercises

When you run analytical procedures during training or receive samples for competency testing, document and create records as if you were working on a real case.

After observing the procedure and having demonstrated the procedure to the trainer, perform a touched item extraction on provided samples.

As each extraction is finished, submit aliquots for DNA quantitation. Review the results with the supervisor; once satisfactory results are obtained on the practice samples, perform extractions on the competency test samples. Submit aliquots of competency test samples for DNA quantitation.

Competency test

Each sample must yield a typable amount of DNA, as determined by the current quantitation method used. Each extraction set must have a clean extraction negative, as determined by the current quantitation method used and PCR analysis. Each sample must give the correct type in the PCR systems tested.

KSA's to be mastered

1. Be able to perform a touched item extraction.
2. Understand the preparation, handling, and function of reagents used for DNA extraction.
3. Be able to properly aliquot samples for Quantitation.
4. Understand the use of controls introduced at this stage of DNA typing.
5. Be able to explain the theory and procedure to someone who does not have a scientific background.

Final actions

1. Discuss the module with your direct supervisor, including review of results and discussion of theory and practical aspects of module.
2. Have your supervisor evaluate the results of the competency test.
3. Have your supervisor document successful completion of the module. *The initials/signature of the supervisor indicates that all practical exercises have been completed and the correct results have been obtained on the competency test (if applicable).*

APPENDIX		
DATE EFFECTIVE 07-16-2012	APPROVED BY DNA TECHNICAL LEADERS	PAGE 1 OF 1

Suggested Tracking Sheets

Forensic Biology Training Lecture Tracking Sheet

Forensic Biology Training Demonstration Tracking Sheet

Forensic Biology Training Observed Practice Tracking Sheet

Forensic Biology Training Independent Practice Tracking Sheet

Forensic Biology Competency Tracking Sheet

Forensic Biology Mitochondrial DNA Training Tracking Sheet

Forensic Biology Training Review Tracking Sheets

Serology Moot Court Evaluation Form – Judge

Serology Moot Court Evaluation Form – Juror

DNA Moot Court Evaluation Form – Judge

DNA Moot Court Evaluation Form – Juror

Written Examination

PCR Data Interpretation Exercises (Module 14)

DEPARTMENT OF FORENSIC BIOLOGY
Required Training Lectures Tracking Sheet

Analyst:_____

lecture	date given	lecturer
Right-to-Know		
Serology		
Sexual Assault Kits		
Case Management		
P30 / Amylase		
Basics of the Legal System		
DNA Extraction		
QA/QC and Accreditation		
DNA Quantitation		
PCR Theory		
3130 Capillary Electrophoresis		
Basics of STR Typing		
CODIS		
Validation		
Mitochondrial DNA Typing		
STR Mixture Interpretation		
Basics of Population Genetics		
PCR Data Interpretation		
Exemplar Processing		
Low Copy Number DNA		
Ethics		

DEPARTMENT OF FORENSIC BIOLOGY
Other Training Lectures Tracking Sheet

Analyst:_____

lecture	date given	lecturer
ABC Certification		
Missing Persons		
Molecular Genetics		
Property Crimes		
WTC/Disaster Preparedness		
Blood Spatter		

Forensic Biology Training Demonstration Tracking Sheet

Module	Demonstration Done By	Date
1- Basic Lab Technique		
High Copy		
Low Copy		
2A- Microscopy	N/A – done during serology sperm search	N/A
2B- Digital Photography	N/A –done during evidence exam	N/A
3A- Serology Blood		
3B- Serology Sperm		
AP		
Sperm Search		
4A- Evidence Exam		
Case/ Item 1		
Case/Item 2		
Case/Item 3		
Case/Item 4		
4B- Small Cases	N/A	N/A
4C- Exemplar Processing		
PM Sample 1		
PM Sample 2		
Swab		
Pseudo		
4D- High Volume (PC) Exam		
Case/ Item 1		
Case/Item 2		
Case/Item 3		
Case/Item 4		
4E-LCN Exam		
Swabbing 1		
Swabbing 2		
Swab Cutting		

Forensic Biology Training Demonstration Tracking Sheet

Module	Demonstration Done By	Date
5A-Sexual Assault Kits		
1-Kit Processing		
2-Kit Processing		
3-Kit Processing		
4-Kit Processing		
5-Kit Processing		
Sexual Assault Kits cont'd		
1- Kit Closing		
2- Kit Closing		
3- Kit Closing		
4- Kit Closing		
5- Kit Closing		
5B- Small Items (Kits)		
Case/ Item 1		
Case/Item 2		
Case/Item 3		
Case/Item 4		
Case/Item 5		
6- P30		
Coating		
Blocking		
Assay		
7- Amylase		
8- Serology Mock Court	Done with Supervisor	N/A
9A- Chelex Extraction		
Differential		
Other		
9B- M48 Extraction		
Exemplars		
Reduced Volume		

Forensic Biology Training Demonstration Tracking Sheet

Module	Demonstration Done By	Date
9C- Organic Extraction		
9D- High Sensitivity (Touched Item) Extraction		
10- Quantitation		
11- PCR Amplification		
Identifiler 28		
Identifiler 31		
PowerPlex Y		
Minifiler		
12A - Capillary Electrophoresis		
3130xl Set Up		
Identifiler 28		
Identifiler 31		
Power Plex Y		
Minifiler		
12B- 3130xl Capillary Electrophoresis		
Data Analysis		
Identifiler 28		
Power Plex Y		
Minifiler		
12C- 3130xl Capillary Electrophoresis		
Data Analysis		
Identifiler 31		
13- Mixture Dilution Study	N/A	N/A
14- PCR Data Interpretation	N/A	N/A
15- Oral Exam	N/A	N/A
16- DNA Moot Court		
Direct	done by training group	N/A
Cross	done by training group	N/A
17- Bloodstain Pattern Analysis	N/A- done as a 40 hour workshop	N/A

Forensic Biology Additional Training Demonstration Tracking Sheet

Training	Demonstration Done By	Date

Forensic Biology Training Observed Practice Tracking Sheet

Module	Supervisor Review	Date
1- Basic Lab Technique	N/A	N/A
High Copy	N/A	N/A
Low Copy	N/A	N/A
2A- Microscopy	N/A – done during serology sperm search	N/A
2B- Digital Photography	N/A –done during evidence exam	N/A
3A- Serology Blood		
3B- Serology Sperm		
AP		
Sperm Search		
4A- Evidence Exam		
Mock Case 1 (Blood)		
Mock Case 2 (Semen)		
Mock Case 3 (Swabbing/Scraping)		
Mock Case 4 (Blood/Semen/Scraping)		
4B- Small Cases	N/A	N/A
4C- Exemplar Processing		
PM Sample 1 (Blood)		
PM Sample 2 (Bone)		
Swab	N/A –done during evidence exam mock cases	N/A
Pseudo	N/A –done during evidence exam mock cases	N/A
4D- High Volume (PC) Exam		
Mock Case 1 (Blood)		
Mock Case 2 (Swabbing)		
Mock Case 3 (Scraping)		
Mock Case 4 (Blood/Swabbing/Scraping)		
4E-LCN Exam		
Mock Case Swabbing 1		
Mock Case Swabbing 2		
Mock Case Swab Cutting		

Forensic Biology Training Observed Practice Tracking Sheet

Module	Supervisor Review	Date
5A-Sexual Assault Kits* (min of 3)		
1-Kit Processing		
2-Kit Processing		
3-Kit Processing		
4-Kit Processing		
5-Kit Processing		
Sexual Assault Kits cont'd (min of 3)		
1- Kit Closing		
2- Kit Closing		
3- Kit Closing		
4- Kit Closing		
5- Kit Closing		
5B- Small Items (min. of 3)		
Item 1		
Item 2		
Item 3		
Item 4		
6- P30		
Coating		
Blocking		
Assay		
7- Amylase		
8- Serology Mock Court	Done With Supervisor	N/A
9A- Chelex Extraction		
Differential		
Other		
9B- M48 Extraction		
Exemplars		
Reduced Volume		
9C- Organic Extraction		
9D- High Sensitivity (Touch Item) Extraction		

*The direct supervisor must do a review of the file after processing, prior to closing and must do technical review of serology portion of the case.

Forensic Biology Training Observed Practice Tracking Sheet

Module	Supervisor Review	Date
10- Quantitation		
11- PCR Amplification		
Identifiler 28		
Identifiler 31		
PowerPlex Y		
MiniFiler		
12A - 3130xl Capillary Electrophoresis		
Set Up		
Identifiler 28		
Identifiler 31		
Power Plex Y		
MiniFiler		
12B- 3130xl Capillary Electrophoresis		
Data Analysis		
Identifiler 28		
Power Plex Y		
MiniFiler		
12C- 3130xl Capillary Electrophoresis		
Data Analysis		
Identifiler 31		
13- Mixture Dilution Study	N/A	N/A
14- PCR Data Interpretation	N/A	N/A
15- Oral Exam	N/A	N/A
16- DNA Moot Court		
Direct	N/A –done by training group	N/A
Cross	N/A –done by training group	N/A
17- Bloodstain Pattern Analysis	N/A- done as a 40 hour workshop	N/A

Forensic Biology Additional Training Observed Practice Tracking Sheet

Training	Supervisor Review	Date

Forensic Biology Training Independent Practice Tracking Sheet

Module	Supervisor Review	Date
1- Basic Lab Technique	N/A	N/A
High Copy	N/A	N/A
Low Copy	N/A	N/A
2A- Microscopy	N/A – done during serology sperm search	N/A
2B- Digital Photography	N/A –done during evidence exam	N/A
3A- Serology Blood		
3B- Serology Sperm		
AP		
Sperm Search		
4A- Evidence Exam	N/A-done as small cases	N/A
4B- Small Cases (HSC)		
Case 1		
Case 2		
Case 3		
Case 4		
4C- Exemplar Processing		
PM Sample Case 1		
PM Sample Case 2		
Case 3 (Swab)		
Case 4 (Pseudo)		
4D- High Volume (PC) Exam		
Case 1		
Case 2		
Case 3		
Case 4		
4E-LCN Exam		
Case 1 (Swabbing)		
Case 2 (Swabbing)		
Case 3 (Swab Cutting)		

Forensic Biology Training Independent Practice Tracking Sheet

Module	Supervisor Review	Date
5A-Sexual Assault Kits*		
1-Kit Processing		
2-Kit Processing		
3-Kit Processing		
4-Kit Processing		
5-Kit Processing		
Sexual Assault Kits cont'd		
1- Kit Closing		
2- Kit Closing		
3- Kit Closing		
4- Kit Closing		
5- Kit Closing		
5B- Small Items (Kits)		
Item 1		
Item 2		
Item 3		
Item 4		
6- P30		
Coating	N/A	N/A
Blocking	N/A	N/A
Assay		
7- Amylase		
8- Serology Mock Court	N/A	N/A
9A- Chelex Extraction		
Differential		
Other		
9B- M48 Extraction		
Exemplars		
Reduced Volume		

*The direct supervisor must do a review of the file after processing, prior to closing and must do technical review of serology portion of the case.

Forensic Biology Training Independent Practice Tracking Sheet

Module	Supervisor Review	Date
9C- Organic Extraction		
9D- High Sensitivity (Touched Item) Extraction		
10- Quantitation		
11- PCR Amplification		
Identifiler 28		
Identifiler 31		
PowerPlex Y		
Minifiler		
12A - 3130xl Capillary Electrophoresis		
Set Up		
Identifiler 28		
Identifiler 31		
Power Plex Y		
Minifiler		
12B- 3130xl Capillary Electrophoresis		
Data Analysis		
Identifiler 28		
Power Plex Y		
Minifiler		
12C- 3130xl Capillary Electrophoresis		
Data Analysis		
Identifiler 31		
13- Mixture Dilution Study	N/A	N/A
14- PCR Data Interpretation	N/A	N/A
15- Oral Exam	N/A	N/A
16- DNA Moot Court		
Direct	done by training group	N/A
Cross	done by training group	N/A
17- Bloodstain Pattern Analysis	N/A- done as a 40 hour workshop	N/A

Forensic Biology Additional Training Independent Practice Tracking Sheet

Training	Supervisor Review	Date

Forensic Biology Competency Tracking Sheet

Name of Trainee--

Module Attempted	Supervisor Signature	Date	Comments
1-Basic Lab Technique			
2A -Microscopy			done as part of sperm search
2B-Digital Photography			done as part of evidence exam
3A-Serology Blood			
3B-Serology Sperm			
4A-Evidence Exam			
4B-Small Cases			
4C-Exemplar Processing			
PM			
Swabs			
Pseudo			
4D-High Volume (PC) Exam			
4E- LCN Exam			
5A-Sexual Assault Kits			
5B-Small Items (Kits)			
6-P30 ELISA			
7-Amylase			
8- Serology Mock Court		--------	

Forensic Biology Competency Tracking Sheet

Name of Trainee--

Module Attempted	Supervisor Signature	Date	Comments
9A- Chelex Extraction			
Differential			
Other			
9B- M48 Extraction			
9C- Organic Extraction			
9D- High Sensitivity Extraction			
10- Quantitation			
11A- PCR Amplification			
Identifiler 28			
Identifiler 31			
Minifiler			
PowerPlexY			
12A-Capillary Electrophoresis			
3130xl Set Up			
Identifiler 28			
Identifiler 31			
Minifiler			
PowerPlex Y			
12B- Data Analysis			
Identifiler 28			
Minifiler			
PowerPlex Y			
12C- Data Analysis			
Identifiler 31			
13- Mixture Dilution Study			
Identifiler 28			
PowerPlex Y			

Forensic Biology Competency Tracking Sheet

Name of Trainee--

Module Attempted	Supervisor Signature	Date	Comments
14- PCR Data Interpretation			
15- Oral Exam			
16- DNA Moot Court		-----	
17-Bloodstain Pattern Analysis	N/A- done as 40 hour workshop	-----	
All Written Questions			

All Required Module Reading	
Trainee Signature	Date:
Supervisor Signature	Date:

Reviews	Supervisor Signature	Date All Completed
P30		
Amylase		
Rotorgene		
STR		
Negative DNA Case		
Positve DNA Case		
Enhanced Case		
Case Sign In		
Administrative Review		

Forensic Biology Competency Tracking Sheet

Name of Trainee-- _____

Exercise	Supervisor Signature	Date All Completed
Linkage Entry		
CODIS Searcher		
Partial Match		
FST		

FORENSIC BIOLOGY TRAINING CHECKLIST
Modules

Analyst: _____

#	Module	Date	Initials of trainer(s)	Date completed	Initials of direct supervisor
25	mtDNA HAIR EXTRACTION DEMO				
25	OBSERVED PRACTICE COMPLETE				
25	INDEPENDENT PRACTICE COMPLETE				
25	COMPETENCY TEST CORRECT				
26	mtDNA ROCHE AND HOMEBREW DUPLEX AMPLIFICATION DEMO				
26	OBSERVED PRACTICE COMPLETE				
26	INDEPENDENT PRACTICE COMPLETE				
26	COMPETENCY TEST CORRECT				
27a	mtDNA AGILENT DEMO				
27a	OBSERVED PRACTICE COMPLETE				
27a	INDEPENDENT PRACTICE COMPLETE				
27a	COMPETENCY TEST CORRECT				
28	mtDNA LINEAR ARRAY ANALYSIS DEMO				
28	OBSERVED PRACTICE COMPLETE				
28	INDEPENDENT PRACTICE COMPLETE				
28	COMPETENCY TEST CORRECT				

FORENSIC BIOLOGY TRAINING CHECKLIST
Modules

Analyst: _____

29	mtDNA SEQUENCING DEMO				
29	OBSERVED PRACTICE COMPLETE				
29	INDEPENDENT PRACTICE COMPLETE				
29	COMPETENCY TEST CORRECT				
30	MtDNA DATA INTERPRETATION (computer exercise)				
31	mtDNA MOCK COURT				
	mtDNA WRITTEN QUESTIONS				
	mtDNA ORAL EXAMINATION				
	REMEDIATION				

P30 REVIEW TRACKING

Task	Plate ID	2nd Reviewer	Date 2nd Reviewed
P30 Review 1			
P30 Review 2			
P30 Review 3			
P30 Review 4			
P30 Review 5			
P30 Review 6			
P30 Review 7			
P30 Review 8			
P30 Review 9			
P30 Review 10			
P30 Review 11			
P30 Review 12			
P30 Review 13			
P30 Review 14			
P30 Review 15			
P30 Review 16			
P30 Review 17			
P30 Review 18			
P30 Review 19			
P30 Review 20			

AMYLASE REVIEW TRACKING

Task	Plate ID	2nd Reviewer	Date 2nd Reviewed
Amylase Review 1			
Amylase Review 2			
Amylase Review 3			
Amylase Review 4			
Amylase Review 5			
Amylase Review 6			
Amylase Review 7			
Amylase Review 8			
Amylase Review 9			
Amylase Review 10			
Amylase Review 11			
Amylase Review 12			
Amylase Review 13			
Amylase Review 14			
Amylase Review 15			
Amylase Review 16			
Amylase Review 17			
Amylase Review 18			
Amylase Review 19			
Amylase Review 20			

ROTORGENE REVIEW TRACKING

Task	Run ID	2nd Reviewer	Date 2nd Reviewed
RG Review 1			
RG Review 2			
RG Review 3			
RG Review 4			
RG Review 5			
RG Review 6			
RG Review 7			
RG Review 8			
RG Review 9			
RG Review 10			
RG Review 11			
RG Review 12			
RG Review 13			
RG Review 14			
RG Review 15			
RG Review 16			
RG Review 17			
RG Review 18			
RG Review 19			
RG Review 20			

AMP SHEET REVIEW TRACKING

Task	AMP ID	2nd Reviewer	Date 2nd Reviewed
AMP Sheet Review 1			
AMP Sheet Review 2			
AMP Sheet Review 3			
AMP Sheet Review 4			
AMP Sheet Review 5			
AMP Sheet Review 6			
AMP Sheet Review 7			
AMP Sheet Review 8			
AMP Sheet Review 9			
AMP Sheet Review 10			
AMP Sheet Review 11			
AMP Sheet Review 12			
AMP Sheet Review 13			
AMP Sheet Review 14			
AMP Sheet Review 15			
AMP Sheet Review 16			
AMP Sheet Review 17			
AMP Sheet Review 18			
AMP Sheet Review 19			
AMP Sheet Review 20			

STR REVIEW TRACKING

Task	Run Name	2nd Reviewer	Date 2nd Reviewed
STR Review 1			
STR Review 2			
STR Review 3			
STR Review 4			
STR Review 5			
STR Review 6			
STR Review 7			
STR Review 8			
STR Review 9			
STR Review 10			
STR Review 11			
STR Review 12			
STR Review 13			
STR Review 14			
STR Review 15			
STR Review 16			
STR Review 17			
STR Review 18			
STR Review 19			
STR Review 20			

NEGATIVE DNA CASE REVIEW TRACKING

Task	Case Number	2nd Reviewer	Date 2nd Reviewed
NEG DNA Case Review 1			
NEG DNA Case Review 2			
NEG DNA Case Review 3			
NEG DNA Case Review 4			
NEG DNA Case Review 5			
NEG DNA Case Review 6			
NEG DNA Case Review 7			
NEG DNA Case Review 8			
NEG DNA Case Review 9			
NEG DNA Case Review 10			
NEG DNA Case Review 11			
NEG DNA Case Review 12			
NEG DNA Case Review 13			
NEG DNA Case Review 14			
NEG DNA Case Review 15			
NEG DNA Case Review 16			
NEG DNA Case Review 17			
NEG DNA Case Review 18			
NEG DNA Case Review 19			
NEG DNA Case Review 20			

DNA CASE REVIEW TRACKING

Task	Case Number	2nd Reviewer	Date 2nd Reviewed
DNA Case Review 1			
DNA Case Review 2			
DNA Case Review 3			
DNA Case Review 4			
DNA Case Review 5			
DNA Case Review 6			
DNA Case Review 7			
DNA Case Review 8			
DNA Case Review 9			
DNA Case Review 10			

ENHANCED CASE REVIEW TRACKING

Task	Case Number	2nd Reviewer	Date 2nd Reviewed
Enhanced Case Review 1			
Enhanced Case Review 2			
Enhanced Case Review 3			
Enhanced Case Review 4			
Enhanced Case Review 5			
Enhanced Case Review 6			
Enhanced Case Review 7			
Enhanced Case Review 8			
Enhanced Case Review 9			
Enhanced Case Review 10			
Enhanced Case Review 11			
Enhanced Case Review 12			
Enhanced Case Review 13			
Enhanced Case Review 14			
Enhanced Case Review 15			
Enhanced Case Review 16			
Enhanced Case Review 17			
Enhanced Case Review 18			
Enhanced Case Review 19			
Enhanced Case Review 20			

CASE SIGN IN REVIEW TRACKING

Task	Case Number	2nd Reviewer	Date 2nd Reviewed
Case 1			
Case 2			
Case 3			
Case 4			
Case 5			
Case 6			
Case 7			
Case 8			
Case 9			
Case 10			
Case 11			
Case 12			
Case 13			
Case 14			
Case 15			
Case 16			
Case 17			
Case 18			
Case 19			
Case 20			

ADMINISTRATIVE REVIEW TRACKING

Task	Case #	2nd Reviewer	Date 2nd Reviewed
ADMIN Review 1			
ADMIN Review 2			
ADMIN Review 3			
ADMIN Review 4			
ADMIN Review 5			
ADMIN Review 6			
ADMIN Review 7			
ADMIN Review 8			
ADMIN Review 9			
ADMIN Review 10			
ADMIN Review 11			
ADMIN Review 12			
ADMIN Review 13			
ADMIN Review 14			
ADMIN Review 15			

A minimum of 10 cases must have second reviews.

LINKAGE ENTRY REVIEW TRACKING

Task	Case #	2nd Reviewer	Date 2nd Reviewed
Linkage Entry 1			
Linkage Entry 2			
Linkage Entry 3			
Linkage Entry 4			
Linkage Entry 5			
Linkage Entry 6			
Linkage Entry 7			
Linkage Entry 8			
Linkage Entry 9			
Linkage Entry 10			

A minimum of 5 entries must have second reviews

P30 REVIEW TRACKING

Task	Plate ID	2nd Reviewer	Date 2nd Reviewed
P30 Review 1			
P30 Review 2			
P30 Review 3			
P30 Review 4			
P30 Review 5			
P30 Review 6			
P30 Review 7			
P30 Review 8			
P30 Review 9			
P30 Review 10			
P30 Review 11			
P30 Review 12			
P30 Review 13			
P30 Review 14			
P30 Review 15			
P30 Review 16			
P30 Review 17			
P30 Review 18			
P30 Review 19			
P30 Review 20			

AMYLASE REVIEW TRACKING

Task	Plate ID	2nd Reviewer	Date 2nd Reviewed
Amylase Review 1			
Amylase Review 2			
Amylase Review 3			
Amylase Review 4			
Amylase Review 5			
Amylase Review 6			
Amylase Review 7			
Amylase Review 8			
Amylase Review 9			
Amylase Review 10			
Amylase Review 11			
Amylase Review 12			
Amylase Review 13			
Amylase Review 14			
Amylase Review 15			
Amylase Review 16			
Amylase Review 17			
Amylase Review 18			
Amylase Review 19			
Amylase Review 20			

ROTORGENE REVIEW TRACKING

Task	Run ID	2nd Reviewer	Date 2nd Reviewed
RG Review 1			
RG Review 2			
RG Review 3			
RG Review 4			
RG Review 5			
RG Review 6			
RG Review 7			
RG Review 8			
RG Review 9			
RG Review 10			
RG Review 11			
RG Review 12			
RG Review 13			
RG Review 14			
RG Review 15			
RG Review 16			
RG Review 17			
RG Review 18			
RG Review 19			
RG Review 20			

AMP SHEET REVIEW TRACKING

Task	AMP ID	2nd Reviewer	Date 2nd Reviewed
AMP Sheet Review 1			
AMP Sheet Review 2			
AMP Sheet Review 3			
AMP Sheet Review 4			
AMP Sheet Review 5			
AMP Sheet Review 6			
AMP Sheet Review 7			
AMP Sheet Review 8			
AMP Sheet Review 9			
AMP Sheet Review 10			
AMP Sheet Review 11			
AMP Sheet Review 12			
AMP Sheet Review 13			
AMP Sheet Review 14			
AMP Sheet Review 15			
AMP Sheet Review 16			
AMP Sheet Review 17			
AMP Sheet Review 18			
AMP Sheet Review 19			
AMP Sheet Review 20			

STR REVIEW TRACKING

Task	Run Name	2nd Reviewer	Date 2nd Reviewed
STR Review 1			
STR Review 2			
STR Review 3			
STR Review 4			
STR Review 5			
STR Review 6			
STR Review 7			
STR Review 8			
STR Review 9			
STR Review 10			
STR Review 11			
STR Review 12			
STR Review 13			
STR Review 14			
STR Review 15			
STR Review 16			
STR Review 17			
STR Review 18			
STR Review 19			
STR Review 20			

NEGATIVE DNA CASE REVIEW TRACKING

Task	Case Number	2nd Reviewer	Date 2nd Reviewed
NEG DNA Case Review 1			
NEG DNA Case Review 2			
NEG DNA Case Review 3			
NEG DNA Case Review 4			
NEG DNA Case Review 5			
NEG DNA Case Review 6			
NEG DNA Case Review 7			
NEG DNA Case Review 8			
NEG DNA Case Review 9			
NEG DNA Case Review 10			
NEG DNA Case Review 11			
NEG DNA Case Review 12			
NEG DNA Case Review 13			
NEG DNA Case Review 14			
NEG DNA Case Review 15			
NEG DNA Case Review 16			
NEG DNA Case Review 17			
NEG DNA Case Review 18			
NEG DNA Case Review 19			
NEG DNA Case Review 20			

POSITIVE DNA CASE REVIEW TRACKING

Task	Case Number	2nd Reviewer	Date 2nd Reviewed
Positive DNA Case Review 1			
Positive DNA Case Review 2			
Positive DNA Case Review 3			
Positive DNA Case Review 4			
Positive DNA Case Review 5			
Positive DNA Case Review 6			
Positive DNA Case Review 7			
Positive DNA Case Review 8			
Positive DNA Case Review 9			
Positive DNA Case Review 10			
Positive DNA Case Review 11			
Positive DNA Case Review 12			
Positive DNA Case Review 13			
Positive DNA Case Review 14			
Positive DNA Case Review 15			
Positive DNA Case Review 16			
Positive DNA Case Review 17			
Positive DNA Case Review 18			
Positive DNA Case Review 19			
Positive DNA Case Review 20			

ENHANCED CASE REVIEW TRACKING

Task	Case Number	2nd Reviewer	Date 2nd Reviewed
Enhanced Case Review 1			
Enhanced Case Review 2			
Enhanced Case Review 3			
Enhanced Case Review 4			
Enhanced Case Review 5			
Enhanced Case Review 6			
Enhanced Case Review 7			
Enhanced Case Review 8			
Enhanced Case Review 9			
Enhanced Case Review 10			
Enhanced Case Review 11			
Enhanced Case Review 12			
Enhanced Case Review 13			
Enhanced Case Review 14			
Enhanced Case Review 15			
Enhanced Case Review 16			
Enhanced Case Review 17			
Enhanced Case Review 18			
Enhanced Case Review 19			
Enhanced Case Review 20			

CASE SIGN IN REVIEW TRACKING

Task	Case Number	2nd Reviewer	Date 2nd Reviewed
Case 1			
Case 2			
Case 3			
Case 4			
Case 5			
Case 6			
Case 7			
Case 8			
Case 9			
Case 10			
Case 11			
Case 12			
Case 13			
Case 14			
Case 15			
Case 16			
Case 17			
Case 18			
Case 19			
Case 20			

ADMINISTRATIVE REVIEW TRACKING

Task	Case #	2nd Reviewer	Date 2nd Reviewed
ADMIN Review 1			
ADMIN Review 2			
ADMIN Review 3			
ADMIN Review 4			
ADMIN Review 5			
ADMIN Review 6			
ADMIN Review 7			
ADMIN Review 8			
ADMIN Review 9			
ADMIN Review 10			
ADMIN Review 11			
ADMIN Review 12			
ADMIN Review 13			
ADMIN Review 14			
ADMIN Review 15			

A minimum of 10 cases must have second reviews.

LINKAGE ENTRY REVIEW TRACKING

Task	Case #	2nd Reviewer	Date 2nd Reviewed
Linkage Entry 1			
Linkage Entry 2			
Linkage Entry 3			
Linkage Entry 4			
Linkage Entry 5			
Linkage Entry 6			
Linkage Entry 7			
Linkage Entry 8			
Linkage Entry 9			
Linkage Entry 10			

A minimum of 5 entries must have second reviews.

Serology Mock Court Testimony Summary Form – JUDGE			
Analyst:		Case Number:	
Prepared by (Print):		Date:	
Prepared by (Signature):			

INSTRUCTIONS: Use this form to summarize the juror evaluations along with your own observations of the above analyst's testimony. Cover each of the categories evaluated and include any of the general comments you feel appropriate. This form must be completed within 2 business days of completion of the moot court exercise.

Average Rating for General Presentation	Average Rating for Technical Presentation	Average Rating for Effectiveness of Presentation	Average Overall Rating

Circle one: **PASS** **FAIL**

GENERAL PRESENTATION

TECHNICAL PRESENTATION

EFFECTIVENESS OF PRESENTATION

Signature of Analyst: _____

Serology Moot Court Testimony Evaluation Form-Juror			
Analyst:		Case Number:	
Evaluator (Print):		Date:	
Evaluator (Signature):			

Please rate the Criminalist in the following categories based upon the moot court testimony. The rating system is as follows: (1) poor/never, (2) good/on a few occasions, (3) very good/sometimes, (4) excellent/always, and (n/a) not applicable.

GENERAL PRESENTATION	_____ (points earned) / _____ (points evaluated)				
	1	2	3	4	n/a
Posture	☐	☐	☐	☐	☐
Dress	☐	☐	☐	☐	☐
Direct Examination					
Speech	☐	☐	☐	☐	☐
Eye Contact	☐	☐	☐	☐	☐
Voice Level	☐	☐	☐	☐	☐
Did the use of body language detract from the testimony itself?	☐	☐	☐	☐	☐
Cross Examination					
Speech	☐	☐	☐	☐	☐
Eye Contact	☐	☐	☐	☐	☐
Voice Level	☐	☐	☐	☐	☐
Did the use of body language detract from the testimony itself?	☐	☐	☐	☐	☐
Was there a noticeable change in the witness's demeanor between the two section of testimony?	☐	☐	☐	☐	☐

TECHNICAL PRESENTATION *(Add details in comments section)*	_____ (points earned) / _____ (points evaluated)				
How well did the witness explain each of the following areas?					
Our quality control system	☐	☐	☐	☐	☐
Maintenance of chain of Custody	☐	☐	☐	☐	☐
How evidence is examined	☐	☐	☐	☐	☐
How rotation system works	☐	☐	☐	☐	☐
Serology testing	☐	☐	☐	☐	☐
Process and steps of P30					
Process and steps of Amylase	☐	☐	☐	☐	☐
Process and steps of KM	☐	☐	☐	☐	☐
Process and steps of AP					
Confirmation of human blood	☐	☐	☐	☐	☐
Confirmation of semen					
Explanation of contamination	☐	☐	☐	☐	☐
RG Assay	☐	☐	☐	☐	☐

EFFECTIVENESS OF PRESENTATION *(Add details in comments section)*	_____ (points earned) / _____ (points evaluated)				
	1	2	3	4	n/a
Direct Examination	☐	☐	☐	☐	☐
Was the witness credible?	☐	☐	☐	☐	☐
Did the witness adequately deflect attempts to impugn the lab and its practices?	☐	☐	☐	☐	☐
Did the witness exhibit a tendency to ramble and give too much information rather than answering the question succinctly?	☐	☐	☐	☐	☐
Did the witness listen to the questions and answer them appropriately? (For instance, did the witness not answer a question with "yes" or "no" when they should have?)	☐	☐	☐	☐	☐
Were the witness's answers to questions in language the jury can understand?	☐	☐	☐	☐	☐
Cross Examination					
Was the witness credible?	☐	☐	☐	☐	☐
Did the witness adequately deflect attempts to impune the lab and its practices?	☐	☐	☐	☐	☐
Did the witness exhibit a tendency to ramble and give too much information rather than answering the question succinctly?	☐	☐	☐	☐	☐
Did the witness listen to the questions and answer them appropriately? (For instance, did the witness not answer a question with "yes" or "no" when they should have?)	☐	☐	☐	☐	☐
Were the witness's answers to questions in language the jury can understand?	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐

Overall Rating _____(total points earned)/_____(total points evaluated) =		Pass	Fail

Percentage Scale: 100-90 (excellent); 80-89 (very good); 70-79 (good); 60-69 (fair); 50-59 (poor); less than 50 (failure)

COMMENTS	
General Comments from above questions:	
The witness gave an excellent explanation of:	
The witness gave an inadequate explanation of:	
What other questions would make this sheet better for training?	

DNA Mock Court Testimony Evaluation Form - JUROR			
Analyst:		Case Number:	
Evaluator (Print):		Date:	
Evaluator (Signature):			

Please rate the Criminalist in the following categories based upon the moot court testimony. The rating system is as follows: (1) poor/never, (2) needs improvement/on a few occasions, (3) average/sometimes, (4) very good/most of the time, (5) excellent/always, and (n/a) not applicable.

GENERAL PRESENTATION	[_____ (points earned) / _____ (total points evaluated)] x 20% = _____					
	1	2	3	4	5	n/a
Posture	☐	☐	☐	☐	☐	☐
Comments:						
Dress	☐	☐	☐	☐	☐	☐
Comments:						
Direct Examination						
Speech	☐	☐	☐	☐	☐	☐
Comments:						
Eye Contact	☐	☐	☐	☐	☐	☐
Comments:						
Voice Level	☐	☐	☐	☐	☐	☐
Comments:						
Body Language	☐	☐	☐	☐	☐	☐
Comments:						
Cross Examination						
Speech	☐	☐	☐	☐	☐	☐
Comments:						
Eye Contact	☐	☐	☐	☐	☐	☐
Comments:						
Voice Level	☐	☐	☐	☐	☐	☐
Comments:						
Body Language	☐	☐	☐	☐	☐	☐
Comments:						
Did the witness maintain a similar demeanor during direct- and cross-examination?	☐	☐	☐	☐	☐	☐
Comments:						

TECHNICAL PRESENTATION *(Add details in comments section)*	[_____ (points earned) / _____ (total points evaluated)] x 40% = _____					
	1	2	3	4	5	n/a
How well did the witness explain each of the following areas?						
Our quality control system	☐	☐	☐	☐	☐	☐
Comments:						
Maintenance of chain of Custody	☐	☐	☐	☐	☐	☐
Comments:						
How evidence is examined	☐	☐	☐	☐	☐	☐
Comments:						
How rotation system works	☐	☐	☐	☐	☐	☐
Comments:						
Serology testing	☐	☐	☐	☐	☐	☐
Comments:						
Explanation of DNA analysis						
Process and steps	☐	☐	☐	☐	☐	☐
Comments:						
Terminology	☐	☐	☐	☐	☐	☐
Comments:						
How to interpret a mixture	☐	☐	☐	☐	☐	☐
Comments:						
Explanation of contamination	☐	☐	☐	☐	☐	☐
Comments:						
Depiction and presentation of tabular results	☐	☐	☐	☐	☐	☐
Comments:						
Generation and interpretation of statistical results	☐	☐	☐	☐	☐	☐
Comments:						
CODIS system	☐	☐	☐	☐	☐	☐
Comments:						

EFFECTIVENESS OF PRESENTATION *(Add details in comments section)* [_____ (points earned) / _____ (total points evaluated)] x 40% = _____						
	1	2	3	4	5	n/a
Direct Examination						
Was the witness credible?	☐	☐	☐	☐	☐	☐
Comments:						
Did the witness answer the questions clearly and succinctly, refraining from rambling and offering too much information?	☐	☐	☐	☐	☐	☐
Comments:						
Did the witness listen to the questions and answer them appropriately? (For instance, did the witness not answer a question with "yes" or "no" when they should have?)	☐	☐	☐	☐	☐	☐
Comments:						
Were the witness's answers to questions in language the jury can understand?	☐	☐	☐	☐	☐	☐
Comments:						
Cross Examination						
Was the witness credible?	☐	☐	☐	☐	☐	☐
Comments:						
Did the witness adequately deflect attempts to impugn the lab and its practices?	☐	☐	☐	☐	☐	☐
Comments:						
Did the witness answer the questions clearly and succinctly, refraining from rambling and offering too much information?	☐	☐	☐	☐	☐	☐
Comments:						
Did the witness listen to the questions and answer them appropriately? (For instance, did the witness not answer a question with "yes" or "no" when they should have?)	☐	☐	☐	☐	☐	☐
Comments:						
Were the witness's answers to questions in language the jury can understand?	☐	☐	☐	☐	☐	☐
Comments:						
Requirements: Analyst must earn >70% of total points. **Circle one:** COMPLETED TESTIMONY UNABLE TO COMPLETE TESTIMONY						
COMMENTS						

General Comments:
The witness gave an excellent explanation of:
The witness gave an inadequate explanation of:
What other questions would make this sheet better for training?

TO BE COMPLETED BY JUDGE: **Overall Rating** (total of percentages above)	

DNA Mock Court Testimony Summary Form – JUDGE			
Analyst:		Case Number:	
Prepared by (Print):		Date:	
Prepared by (Signature):			

INSTRUCTIONS: Use this form to summarize the juror evaluations of the above analyst's testimony. First, average the numerical scores from all submitted forms and enter the average overall rating into the space provided, indicating whether the analyst met the requirements for passing this module. Second, using the same evaluations from the jurors along with your own observations, comment on the moot court performance of the analyst. Cover each of the categories evaluated and include any of the general comments you feel appropriate. This form must be completed within 2 business days of completion of the moot court exercise.

Average Rating for General Presentation	Average Rating for Technical Presentation	Average Rating for Effectiveness of Presentation	Average Overall Rating

Requirements: Analyst must achieve >70% of total points for average overall rating. **Circle one:** **PASS** **FAIL**

GENERAL PRESENTATION

TECHNICAL PRESENTATION

EFFECTIVENESS OF PRESENTATION

Signature of Analyst: _____

DNA Mock Court Testimony Summary Form – JUDGE WORKSHEET (THIS PAGE NOT FOR DISSMENATION TO ANALYST)				
LIST OF SCORES (Enter the ratings submitted by each evaluator for each category. Right click on the text field in the field for "Average Score" in each category and select "update Field". The average of all values in the column will appear.)				
	General Presentation	**Technical Presentation**	**Effectiveness of Presentation**	**Overall Rating**
AD				
Judge				
Juror 1				
Juror 2				
Juror 3				
Juror 4				
Juror 5				
Juror 6				
Average Scores:	**0.0**	**0.0**	**0.0**	**0.0**

This set of questions can found in M:\FBIOLOGY_MAIN\TRAINING\Written Questions. Use "save as" to save your version **to your own directory** (My Documents) - not the public Forensic Biology directories.

Type in the answers for the questions pertaining only to the modules you were trained on and review with your direct supervisor. If you are performing the oral examination, you will need to provide a copy of your written exam to the oral exam administrator prior to your exam.

General Biology and Chemistry

1. What is the basic structure of a macromolecule?

2. What are the four classes of macromolecules?

3. For each class of macromolecules, give an example of one that is relevant to a process that we use in the laboratory.

4. What are the four nitrogenous bases found in DNA?

5. How are they bonded together, which are paired, how many bonds?

6. What is a protein?

7. What is an enzyme?

8. What is an immune response?

9. What is the difference between a primary and secondary immune response? Innate and adaptive?

10. What is an antigen?

11. What is an antibody?

12. How are antibodies made – polyclonal vs. monoclonal?

13. Describe or draw the basic structure of a eukaryotic cell.

14. Name the locations DNA can be found in the cell?

15. For nuclear DNA, what is the relationship between the amounts of DNA in a sperm cell compared to an epithelial cell?

16. How much DNA (weight) is in a single epithelial cell (show your calculations)?

17. How many sperm are necessary to yield --1 ng of DNA, 500 pg of DNA (show your calculations)?

18. What is pH?

19. What is the central dogma of molecular biology? Define each of its components.

Module 1: Laboratory Safety, Clean Techniques & Basic Lab Equipment

1. What types of personal protective equipment do we use in the laboratory?

2. What are the two main purposes of personal protective equipment in our laboratory?

3. Name two locations of eye washes.

4. Name two chemicals that are kept in the flammable cabinets.

5. What is done to prepare a surface or lab tools for use?

6. What are the purposes of each of the steps of this decontamination?

7. Why is it important that areas be separated into pre-amp and post-amp?

8. What are three ways of contaminating a sample?

9. Which items should be discarded in the sharps container?

10. Calculate the amount of extract and amount of TE^{-4} /DI H_2O you need for to get an aliquot of 1 ng/20 µL for each of the given quantitation results.

   a. 2.5 ng/20 µL
   b. 5 ng/20 µL (1/10 dilution)
   c. 52.3 pg/µL
   d. 236.1 pg/µL (1/100 dilution)

12. You need to make a 1:8 ratio of DNA of two DNA types A and B (A:B). Your total aliquot should be 2ng/26 µL. For each of the following sets, calculate how much of each extract you should use and how much TE^{-4}:

   a. Extract A: 2.5 ng/20 µL, Extract B: 252.3 pg/µL
   b. Extract A: 86 pg/µL, Extract B: 533.0 pg/µL (1/100 dilution)

13. What is the MSDS?

14. What information can be found in the MSDS?

15. Where is the MSDS located in the laboratory?

16. What two safety items should every analyst know the location of?

17. When should a cut resistant glove be worn?

Module 2: Digital photography, MIDEO, and Microscopy

1. What is the purpose of a photograph of a piece of evidence? (Module 2B)

2. When should an item of evidence be photographed? Why?

3. At what angle should an item of evidence be photographed?

4. What should be included within the frame of the photograph when taking a picture of evidence? What should not be included? (Module 2B)

5. What types of information should be recorded on a photograph of a piece of evidence? (Module 2B)

6. What type of sample would you look at using a biological microscope? (Module 2A)

7. What type of sample would you look at using a stereoscope and why? (Module 2A)

8. What is critical illumination?

Module 3A: Serology – Blood presumptive

1. What are the components of blood?

2. What is the Kastle-Meyer test?

3. How does it work? (what are the chemical reactions that occur?)

4. What component of blood does it work with?

5. What substances can give a false positive with K-M?

6. What substances can give a false negative with K-M?

7. What are other tests that can be used for testing for the presence of blood?

8. Describe in general terms what you do when you see a possible bloodstain on a piece of evidence?

9. What information should be provided in your case file about presumptively positive bloodstains?

Module 3B: Serology – AP and sperm

1. What are the components of semen?

2. What is the AP test?

3. How does it work? (what are the chemical reactions that occur?)

4. What component of semen does it work with?

5. What are two ways of screening for semen stains on a piece of evidence?

6. What type of information should be provided in your notes about a presumptively positive semen stain?

7. What are other substances that will give a false positive with AP?

8. Describe the procedure of doing a sperm search.

9. What are the different parts of a sperm cell?

10. Approximately how big is a sperm cell in relation to other types of cells?

11. When performing a sperm search, what are the criteria for a positive result?

12. How many sperm need to be seen in order to for a slide/sample to be considered positive?

13. In what types of cases would a negative sperm search still give a positive semen result?

Module 4A, 4B and 4D: Evidence Exam

1. After collection what happens to the evidence prior to coming to Forensic Biology?

2. What is the purpose of the NYPD Liaison Unit?

3. How does evidence get into the laboratory?

4. What is DEMP? When should it be checked? Who checks it?

5. Describe what you do when you first get a case file.

6. Describe what you do when you first get a package of evidence.

7. What types of criteria are used in determining whether a piece of evidence is suitable and/or appropriate for examination?

8. What general types of information should be recorded in your notes about a piece of evidence?

9. What is a discrepancy form? When should and why should it be filled out?

10. If a presumptive positive stain is found, what are the next steps that are taken?

11. Describe a piece of evidence that would be probative in a homicide or assault case.

12. Describe a piece of evidence that would be probative in a sexual assault case.

13. Describe how you would choose stains for testing on a large item of clothing where there are many stains when:

There is a single injured person

There is more than one injured person

There are multiple assailants in a sexual assault case

14. What should be done with trace evidence collected from an item?

15. How should evidence be sealed in order to return it to the EU?

Module 4C: Exemplar Processing

1. What is the procedure for the transfer of an exemplar/suspect file that is linked to an FB case?

2. What is the procedure for the transfer of an exemplar/suspect file that is not linked to an FB case?

3. What is the procedure for processing an exemplar from a sexual assault kit?

4. What personal protective equipment should be used when processing PM bloods?

5. Describe the procedure for examining and submitting samples for a bottle that was submitted as a pseudo-exemplar for a suspect.

6. If no buccal specimen in included in the kit what items can be submitted as a victim exemplar?

7. Is amylase testing necessary on a pseudo exemplar? Why/why not?

8. Are pseudo exemplars labeled differently than true exemplars? How? Why?

Module 5A: Sexual Assault Kits

1. Name five things typically included in a sexual assault kit.

2. What items in a kit are typically sent to P30 testing?

3. What items in a kit are typically sent to amylase testing?

4. What types of documentation are required for items other than swabs?

5. What items in a kit are not examined? Why?

6. When would the fingernail scrapings be examined?

7. If a stain is reddish brown is seen what two presumptive tests must be performed on the stain? Why?

8. When would you perform a sperm search on a swab with negative p30 results? Why?

9. When should an AP negative stain/swab be sent to p30?

10. What items are sent to DNA extraction for amylase positive samples (P30 negative)?

11. What size cuttings from swabs are made for P30 and amylase testing? From underwear?

12. What size cuttings from swabs are made for DNA extraction? From underwear?

13. Up to how long can non-motile sperm persist in vaginal, anal, and oral cavities?

14. What is a suspect kit and what is the purpose of examining it?

15. Why is additional clothing (clothing not included in the kit) processed after the sexual assault kit?

Module 6: P30 ELISA

1. What is a monoclonal antibody that is used in the P30 assay?

2. What is p30?

3. Where is p30 found in the body?

4. What is an ELISA?

5. Draw a diagram of how the p30 ELISA works and label its components.

6. Explain how to determine positive and negative results for the p30 assay – orifice vs. external.

7. Explain the basics of spectrophotometry in relation to how it works for p30 detection.

8. What is the chemical reaction involved in color emittance in the p30 ELISA?

9. Is p30 a presumptive or confirmatory test?

10. What does a positive p30 results confirm the presence of?

Module 7: Amylase

1. What is amylase?

2. What is its function?

3. How many types of amylase are there?

4. Where can amylase be found other than in saliva?

5. What type of amylase do we test for in the laboratory?

6. How does the amylase test work?

7. Explain how to determine positive and negative results for the amylase assay – orifice vs. external.

8. What are five examples of swabs that would be considered:

    External

    Orifice

9. How do we screen for amylase stains on a piece of evidence?

10. Is amylase a presumptive or confirmatory test? Why?

Module 9: Extraction

1. Describe the DNA that is obtained by using a Chelex extraction method.

2. What is Chelex 100 and what is its role in the extraction procedure?

3. When a bloodstain is extracted, why is it important to remove as much of the supernatant from the initial soak as possible?

4. What properties of sperm cells allow a differential extraction procedure to be effective?

5. List the reagents that are used in a differential extraction.

6. Describe the function of each of the following reagents in a differential extraction:

   a. PBS
   b. proteinase K
   c. DTT

7. In a differential extraction, what is the purpose of the swab/substrate remains fraction?

8. After a differential extraction of a sample on which a sperm search was performed and many sperm were seen, quantitation results reveal that none of the sperm cell fractions have DNA in them; all the epithelial cell fractions and swab remains fractions do. How can this be explained?

9. The only evidence remaining on a 1985 sexual assault case is a vaginal slide. You examine the slide and see only four sperm heads and a low amount of epithelial cells. What do you do next?

10. A decomposed body is found that remains unidentified. The Medical Examiner asks what sorts of samples should be collected for possible DNA testing. What do you tell her? List sample types in order of preference.

11. Describe the DNA that is obtained from an M48 extraction.

12. How is pH concentration used in the M48 extraction process?

13. What is a chaotropic agent?

14. How is chaotropic salt concentration used in the M48 extraction process?

15. What are the advantages of using Fish Sperm DNA or Poly A RNA in the extraction procedure?

16. Describe the DNA that is obtained by using an organic extraction method.

17. What types of samples are extracted using an organic extraction?

18. Describe what is in each layer seen during PCI separation/extraction.

19. Why are Chelex and M48 extractions used more frequently than organic extractions?

20. What is a Microcon? How does a Microcon work?

21. What are the advantages of using Fish Sperm DNA or Poly A RNA in the Microcon procedure?

22. Why are Extraction Negatives Microcon'd?

23. What volume should extraction negatives be Microcon'd to? Why?

24. Why should the DNA sample not be stored in the Microcon tube?

25. In what type(s) of extraction do you have flexibility in elution volume?

26. What volumes of extract are submitted for quantitation?

27. Which component of the following samples contains the nuclear DNA?

Blood
Semen
Saliva

28. At what step in the following extractions is the DNA released from the cell?

Organic
M48
Chelex blood
Chelex differential

Module 10: Quantitation

1. What are four methods of DNA quantitation other than real-time PCR?

2. Name one advantage and disadvantage of each of the methods listed above.

3. What DNA sequence is used for real-time PCR, and why is this sequence useful and appropriate for quantitation purposes?

4. What is a Ct value?

5. How is the quantity of DNA measured in real-time PCR?

6. How is the quality of DNA measured in real-time PCR?

7. List the controls used in a real-time PCR quantitation run and the criteria for a run to "pass."

8. Between what range must the reaction efficiency be to pass? Would a reaction efficiency of .0799 pass? Why?

9. Describe the function of each of the following reagents in real-time PCR quantitation:

   a. SYBR green
   b. Calibrator
   c. DMSO

10. Why should all reagents except DMSO and water be stored in a Nalgene cooler on the bench top prior to use/sample preparation?

11. What should be done if the no template control is > 0.1 pg/µL for HCN? LCN?

12. Under what circumstances would you re-quant an extraction negative?

13. What is the difference between background and low background fluorescence? How is the difference noted on the Rotorgene Data Collection Sheet?

14. Why are samples quanted at neat and a dilution?

15. Why are bloodstains and exemplars only quanted at a dilution?

16. Which value, if any, should be chosen for amplification? Why?

N = <1000 pg/uL
1/100 = within +/- 2.5x

N = >1000 pg/uL
1/100 = <1000 pg/uL

N = >1000 pg/uL
Dilution >1000 pg/uL

N = < 20 pg/uL, NO inhibition or background fluorescence
Dilution within +/- 2.5 fold

N = **,
Dilution**

N = * or Δ
1/100 =<0.1 pg/uL

1/10 dilution only = **

Module 11: PCR Amplification

1. What are the 3 steps in the PCR reaction?

2. Describe each component of the PCR reaction mix and its function.

3. Who invented PCR? Where was it invented and for what reason?

4. What does 5'→3' direction mean? Draw a chemical structure if necessary.

5. What is meant by "primer dimer"?

6. How many cycles on the thermal cycler are standard for Identifiler?

7. How many cycles on the thermal cycler are standard for PowerPlex Y?

8. What is the approximate length of the primers used in the Identifiler kit?

9. State 5 factors that influence primer specificity and stringency.

10. What is the relationship between the concentration of Mg^{+2} and the concentration of dNTPS in the optimization PCR?

11. What does a "non-specific amplification product" mean?

12. What does a "non-template nucleotide addition" mean?

13. If you were designing primers for PCR amplification how would you design the reverse primer to reduce the amount of non-template nucleotide additions? Why?

14. What are the differences between and singleplex and a multiplex?

15. Taq DNA polymerase offers the obvious advantage of being thermostable. How does the property of thermostability help the PCR reaction? Compare PCR using Taq polymerase with PCR using the Klenow fragment of E. coli DNA polymerase I.

16. What are reasons for having a minimum amount of DNA to add to an amplification and what are possible outcomes of using less?

17. Nucleotide misincorporation occurs approximately once in every 1 million base pairs in PCR. Under what conditions would this adversely affect the fidelity of the PCR process?

18. What are examples of samples that might have PCR inhibitors?

19. What is meant by "stutter"? Give an explanation for the cause of stutter one repeat unit longer and one repeat shorter than the desired product?

20. Excluding the inactivation of polymerase and the exhaustion of primers or dNTPs, give three other reasons why the amplification plateau occurs in PCR?

21. What is a stochastic effect? Explain the following stochastic effects:
    a. Allelic Dropout
    b. Preferential Amplification

22. What are the target concentrations of DNA for amplifications in the following system?
    Identifiler 28 (ID28)
    Identifiler 31 (ID31)
    PowerPlex Y (PPY)

23. When can/should the p30 value be used to amplify samples in PPY? Identifiler?

24. At what values should amylase positive vaginal swabs be submitted for PPY amplification?

25. When should a sample be amped low in Identifiler? PPY?

26. What is the purpose of the positive control in amplification?

Module 12: PCR Amplification and ABI 3130 Capillary Electrophoresis

1. Why are most of the STR's used for forensic DNA typing tetrameric as opposed to dimeric? Are there STR's used in the laboratory that are not tetrameric? If so, which ones?

2. Are the STR loci currently used in our lab human specific?

3. What is a non-consensus or microvariant allele, give three examples for different loci and explain the allele nomenclature.

4. List the different classifications used to describe the complexity of the STR core repeat sequences. Give an example for each type.

5. Using fluorescent STR allele detection technology, how many reaction primers are labeled and which labeling colors do you know?

6. When reporting an STR type, what is the difference between a genotype and a phenotype? What do we report? What do we use for our statistics?

7. How can a single source PowerPlex Y profile display heterozygosity at locus DYS385?

Instrument set-up:

8. Describe each of the reagents put into an STR plate setup, and their function.

9. How does electrophoresis work?

10. What other types of molecules can be separated via electrophoresis other than DNA?

11. Describe how an electrokinetic injection works.

12. Why do the capillaries need to stay emersed in liquid before, during and after electrophoresis?

13. Why does the buffer on the instrument need to be changed daily?

14. What is HIDI? What is the purpose if using HIDI?

15. What is the purpose of denature/chill step?

16. Explain the function of the spectral file. What are indications for a problem with the spectral file? When is the spectral applied to the raw data?

17. What are the normal run parameters on the 3130xl instrument for Identifiler 28, Identifiler 31, PPY? What are the re-run high parameters ID28, ID31 and PPY?

18. What should be monitored after a run is started?

Data analysis and editing:

19. What is the purpose of an allelic ladder?

20. What is the purpose of the size standard?

21. Why is the 250bp size standard not labeled in the LIZ size standard?

22. Describe how the GeneMapper software analyzes the STR raw data and assigns allele calls to a sample.

23. What can cause a sample not to analyze properly?

24. What is the purpose of the positive control?

25. What should be done if the positive control fails?

26. What should you do if you notice an extraction negative that has peaks in it?

27. What is a spike? What can cause it?

28. What type of peak heights can be expected in a rerun high sample vs. a normal?

29. You are troubleshooting a CE run. What are possible explanations for the following observations?

a. No PCR product present in all lanes, but orange size standards visible
b. Most samples look OK, but one sample has neither orange standard nor alleles
c. Peaks of smaller fragments are sharp but later peaks get progressively lower and wider
d. All peaks are present in all colors
e. There are lots of spikes in almost every lane

30. List the different scenarios where STR results might be mistaken for a DNA mixture.

31. What is the difference between matrix over-subtraction and an N-band? Sketch what each looks like.

Forensic DNA History

1. What methods were used previous to DNA to attempt to link evidentiary biological fluids to an individual?

2. What are Southern, Northern, Western blots?

3. What was the first statistically important method of DNA typing?

4. What was the first PCR-based method used for forensic purposes?

5. Compare advantages and disadvantages of RFLP and STR typing.

6. During what year did each of the following occur at the OCME:

OCME serology lab starts
Name changes to Department of Forensic Biology
DQalpha goes on line
RFLP goes on line
STRs (Quad, Cofiler and Identifiler 28 systems) goes on line
FBio joins the CODIS network
MtDNA goes on line
Low Copy Number DNA testing goes on line
OCME Forensic Biology Building Opens
PowerPlex Y goes online
FBio becomes ISO Accredited

7. What is the significance of YM1 for Forensic Biology?

Quality Assurance/Quality Control:

1. What is Quality Assurance?

2. What is Quality Control?

3. How often is the Department of Forensic Biology required to undergo an audit/inspection?

4. Who performs the audit/inspection?

5. What is the significance of an accredited lab?

6. Why must the Department of Forensic Biology be accredited?

7. List all of the QC tests that are used to monitor:

a. Evidence examination
b. P30 ELISA
c. Serology
d. Chelex extraction
e. M48 extraction
f. Rt-PCR quantitation
g. PCR
h. STR analysis

8. What is the significance of the inventory sheets and when should it be filled out?

9. Give the definitions for each of the following terms and/or acronyms and explain briefly how it relates to our laboratory:

a. ABC
b. ASCLD and ASCLD/LAB
c. CODIS, NDIS, SDIS, and LDIS
d. criminalist and criminologist
e. DAB
f. examining and interpreting analysts
g. Forensic scientist
h. NIJ
i. NIST
j. NRC
k. NYCLAC and BIOTWG
l. Proficiency tests
m. Competency tests
n. QC and QA
o. TWGDAM and SWGDAM
p. QAS

10. What is a validation? Why are they needed? What needs to be done before a validated procedure/instrument goes online?

11. What is the difference, if any, between a standard and a control?

Case Management

1. What types of review does a case-file go through before a report is issued?

2. What paperwork can be found on the left side of the file? Right side?

3. Give reason why a re-cut of evidence would occur.

4. When should a re-cut of an exemplar occur?

5. When should a draft report be started, and for what purpose?

6. What types of information should you review when you get back the following types of paperwork:

Transfer kit paperwork

Extraction/Quantitation

Amplification/STR

7. What is the concordance policy? What is a concordance used for? Give examples of when a sample should be duplicated and when it does not need to be duplicated.

8. What is the purpose of the productivity form?

9. When should a case contact be filled out? When should it be added to the file?

10. What is a chain of custody? When should it be filled out?

11. What is a tracking sheet? When should it be filled out?

12. During review of your case you discover that your sample was misspelled on the STR paperwork. What needs to be done in order to correct the mistake?

13. During review of your case you discover that your sample was amplified with the wrong concentration. What needs to be done in order to correct the mistake?

CODIS

1. Define the following and how they relate to our laboratory:
    a. CODIS
    b. LDAS/Linkage
    c. LDIS
    d. SDIS
    e. NDIS

2. What is needed in order for a profile to be added to the following databases?
    a. LDAS/Linkage
    b. LDIS
    c. SDIS
    d. NDIS

3. What types of profiles are found in the following databases?
    a. LDAS/Linkage
    b. LDIS
    c. SDIS
    d. NDIS

4. What types of sample profiles should be checked against LDIS/LINKAGE? What types of sample profiles should be checked against LAB-TYPES?

5. Who is responsible for checking profiles against LDIS/Linkage?

6. Who is responsible for entering profiles into Linkage? LDIS? SDIS?

7. Who should be contacted first when a local match in LDIS is recognized?

8. What is the difference between a forensic match, an offender match and a conviction match?

9. What is a partial match? How is it found? When should stats be calculated?

10. Describe the difference between a high stringency, moderate stringency and low stringency match. Give examples of each (only locus needed for example).

11. What is the 4 x 4 rule?

12. When should an INC be used on the CODIS sheet?

13. When should a + be used on the CODIS sheet?

14. Which specimen category would you chose on the CODIS sheet with the following profiles?

a. Single Source Profile
b. Deduced Single Source Profile
c. Partially Deduced Mixture
d. Single Source Matching another profile in CODIS
e. Single Source Matching a suspect profile
f. Suspect Profile

15. Describe various ways a DNA profile from unidentified remains can be identified in CODIS.

16. You have completed an assault case that generated a Male Donor A profile that was uploaded to CODIS. You later receive a comparison sample from the victim. After typing the victim you realize he matches Male Donor A. What should you do?

17. What needs to be done in order to expunge a profile from CODIS?

18. How are Off Ladder Alleles entered on the CODIS sheet?

19. What is a cold hit? Warm hit?

20. When should a DNA hit be done? What are the categories of DNA hits? When should they be used?

Mitochondrial DNA

1. Human mtDNA consists of approximately how many base pairs?

2. In what form does mtDNA exist in cells?

3. Do the distribution of bases differ between the heavy and light strands of mtDNA? If so, explain?

4. The control region of mtDNA is also known as the displacement loop (D-loop). Why is this area referred to as the displacement loop? How large is this region?

5. What two regions of the mtDNA D-loop are used in forensic analysis? Why and how large are they in length?

6. What is the Anderson Sequence? How was it constructed and what is its use?

7. Describe the mechanism of sequencing using the Sanger method. Specifically, what are the differences between manual sequencing to automated sequencing? Include the major advantages of automated sequencing.

9. There are two major types of automated sequencing kits. One utilizes dRhodamine fluorescently labeled ddNTP's and the other utilizes BigDye chemistry. What are the advantages to each system?

10. What is the structural difference of a 2'dNTP as compared to a 2'3'ddNTP. Which NTP is utilized in sequencing and why?

11. Signal dropout is common after the C stretch of HV1 when the polymorphic T is absent from within it. What is the most likely cause?

12. How can the remaining sequence be deciphered past this C stretch?

Population genetics and statistics

1. Assuming no laboratory error, is DNA testing always accurate? Always precise? Always conclusive?

2. How is population frequency calculated for autosomal STRs, Y chromosome STRs, mitochondrial DNA? How is each inherited and why are they calculated differently?

3. What is the second NRC report, who wrote it, and what do chapters 4 and 5 cover?

4. What is the ceiling principle and is it still used?

5. How are homozygote and heterozygote frequencies calculated under Hardy Weinberg equilibrium?

6. What is human population substructure?

7. What is theta and how is it used in calculations?

8. What degree of relatedness is assumed and what value is used?

9. Is the homozygote or heterozygote frequency corrected for substructure and why are homozygotes corrected or not corrected?

10. Given a best estimate of frequency, in what range does the true frequency lie? How was this determined? Why is a best estimate given and not a true value?

11. If only one allele of a locus can be reported, how is the locus frequency calculated?

12. Do the corrected Hardy Weinberg formulas apply if the evidence and the subject is from the same subgroup (isolated "New England fishing" village)? What is used?

13. If a man, whose DNA type matches the sperm in a rape, says, I did not commit the rape but my younger brother did it, what is the best way to determine the probability that they share the same genotype (approaching 100% probability)? What is the best thing to do if they are identical twins?

14. If the brother in the above non-twin scenario cannot be found, what can be done?

15. Is the same formula with minor variation used to calculate relatedness for all relatives? Why or why not?

16. How do subtypes of alleles, fractional core repeats (i.e. 8.3), or sequence polymorphisms affect the calculation of DNA profile frequency? How are they handled in the calculations and what happens when the population database is constructed? What is

the frequency that one of these events occurs and does this invalidate non-sequencing STR DNA typing?

17. How many different Identifiler DNA profiles are there (show your calculations)?

18. Assume the following mixture has two contributors. How many different combinations of contributors are possible (show your calculations)?

D3	**D16**	**THO1**	**TPOX**
14, 15	8, 9, 10, 12	9.3	10, 11, 13

19. Assume the VWA allele 14 is found in 10% of the population and allele 15 is found in 4% of the population. According to Hardy-Weinberg, how frequently are the 14, 14 and 14, 15 genotypes found? Repeat the calculations using the method recommended by the NRC.

20. What is the random match probability?

21. What is source attribution? What statistic must be achieved in order to say someone is the source? Why?

22. Explain the likelihood ratio in technical and laymen's terms.

23. What is the FST? What statistical calculation does it use? When should FST be done in a case?

24. What database is used to calculate a PPY statistic? How was the database created?

25. What database is used to calculate an autosomal STR profile? How was the database created?

25. How are missing alleles accounted for in the statistical calculations for autosomal STR's? PPY?

PCR data interpretation exercises for Module 14

These are interpretation exercises to be worked through as part of training. By practicing interpretation now, and discussing among us our reasoning, you will have an easier time when a tough interpretation comes up in a case.

For each scenario, write a report. Use the standard DNA template report and import the tables by copying and pasting. Include:

- A summary section (first page of report) with statistics if appropriate
- A table of results
- An explanation to follow the table (usually more info than the summary)

Write this up on the computer as if you were reporting the results; do this **independently**, without consulting anyone. Some are complicated and require thought! This is not something you can do at the last minute. Use "save as" to save your version **to your own directory** (h:\users\yourname) - not the public Forensic Biology directories.

In each case, sperm was found on the vaginal swab.

COFILER SCENARIO 1:

ITEM	D3	D16	AMEL	THO1	TPOX	CSF1PO	D7
(v) Blood	17, 19	10, 12	X	6, 8	11	10	8, 12
(s) Blood	16, 18	9	X, Y	7, 9	11	12	10, 12
Vaginal Swab							
Epithelial Cell Fraction	17, 19	10, 12	X	6, 8	11	10	8, 12
Sperm Cell Fraction	16, 18	9	X, Y	7, 9	11	12	10, 12

COFILER SCENARIO 2:

ITEM	D3	D16	AMEL	THO1	TPOX	CSF1PO	D7
(v) Blood	17, 19	10, 12	X	6, 8	11	10	8, 12
(s) 1 Blood	18	9	X, Y	7, 9	11	10	10, 11
(s) 2 Blood	16	9	X, Y	7, 9	12	9, 10	10
Vaginal Swab							
Epithelial Cell Fraction	17, 19	10, 12	X	6, 8	11	10	8, 12
Sperm Cell Fraction	16, 18	9	X, Y	7, 9	11,12	9, 10	10, 11

COFILER SCENARIO 3:

ITEM	D3	D16	AMEL	THO1	TPOX	CSF1PO	D7
(v) Blood	17, 19	10, 12	X	6, 8	11	10	8, 12
(s) 1 Blood	18	9	X, Y	7, 9	11	12	10, 11
(s) 2 Blood	16	9	X, Y	7, 9	12	9, 10	10
Vaginal Swab							
Epithelial Cell Fraction	17, 19	10, 12	X	6, 8	11	10	8, 12
Sperm Cell Fraction	17, 19	10, 12	INC	6, 8	11	10	8, 12

COFILER SCENARIO 4:

ITEM	D3	D16	AMEL	THO1	TPOX	CSF1PO	D7
(v) Blood	17, 19	10, 12	X	6, 8	11	10	8, 12
(s) Blood	16, 18	9	X, Y	7, 9	11	12	10, 12
Vaginal Swab							
Epithelial Cell Fraction	17, 19	10, 12	X	6, 8	11	10	8, 12
Sperm Cell Fraction	16, 17, 18, 19	9, 10, 12	X, Y	6, 7, 8, 9	11	10, 12	8, 10, 12

COFILER SCENARIO 5:

ITEM	D3	D16	AMEL	THO1	TPOX	CSF1PO	D7
(v) Blood	17, 19	10, 12	X	6, 8	11	10	8, 12
(s) 1 Blood	18	9	X, Y	7, 9	11, 12	12	10, 11
(s) 2 Blood	17	8	X, Y	7, 9	12	12	10
Vaginal Swab							
Epithelial Cell Fraction	17, 19	10, 12	X	6, 8	11	10	8, 12
Sperm Cell Fraction	18	9	X, Y	7, 9	11, 12	12	10, 11

COFILER SCENARIO 6:

ITEM	D3	D16	AMEL	THO1	TPOX	CSF1PO	D7
(v) Blood	17, 19	10, 12	X	6, 8	11	10	8, 12
(s) 1 Blood	18	9	X, Y	7, 9	11	12	10, 11
(s) 2 Blood	16	9	X, Y	7, 9	12	9, 10	10
Vaginal Swab							
Epithelial Cell Fraction	17, 19	10, 12	X	6, 8	11	10	8, 12
Sperm Cell Fraction	15, 18	9, 10, 11	X, Y	7, 9, 10	8, 9, 11	9, 12	8, 10, 11

Forensic Biology Training Independent Practice Tracking Sheet

Module	Supervisor Review	Date
1- Basic Lab Technique	N/A	N/A
High Copy	N/A	N/A
Low Copy	N/A	N/A
2A- Microscopy	N/A – done during serology sperm search	N/A
2B- Digital Photography	N/A –done during evidence exam	N/A
3A- Serology Blood		
3B- Serology Sperm		
AP		
Sperm Search		
4A- Evidence Exam	N/A-done as small cases	N/A
4B- Small Cases (HSC)		
Case 1		
Case 2		
Case 3		
Case 4		
4C- Exemplar Processing		
PM Sample Case 1		
PM Sample Case 2		
Case 3 (Swab)		
Case 4 (Pseudo)		
4D- High Volume (PC) Exam		
Case 1		
Case 2		
Case 3		
Case 4		
4E-LCN Exam		
Case 1 (Swabbing)		
Case 2 (Swabbing)		
Case 3 (Swab Cutting)		

Forensic Biology Training Independent Practice Tracking Sheet

Module	Supervisor Review	Date
5A-Sexual Assault Kits*		
1-Kit Processing		
2-Kit Processing		
3-Kit Processing		
4-Kit Processing		
5-Kit Processing		
Sexual Assault Kits cont'd		
1- Kit Closing		
2- Kit Closing		
3- Kit Closing		
4- Kit Closing		
5- Kit Closing		
5B- Small Items (Kits)		
Item 1		
Item 2		
Item 3		
Item 4		
6- P30		
Coating	N/A	N/A
Blocking	N/A	N/A
Assay		
7- Amylase		
8- Serology Mock Court	N/A	N/A
9A- Chelex Extraction		
Differential		
Other		
9B- M48 Extraction		
Exemplars		
Reduced Volume		

*The direct supervisor must do a review of the file after processing, prior to closing and must do technical review of serology portion of the case.

Forensic Biology Training Independent Practice Tracking Sheet

Module	Supervisor Review	Date
9C- Organic Extraction		
9D- High Sensitivity (Touched Item) Extraction		
10- Quantitation		
11- PCR Amplification		
Identifiler 28		
Identifiler 31		
PowerPlex Y		
Minifiler		
12A - 3130xl Capillary Electrophoresis		
Set Up		
Identifiler 28		
Identifiler 31		
Power Plex Y		
Minifiler		
12B- 3130xl Capillary Electrophoresis		
Data Analysis		
Identifiler 28		
Power Plex Y		
Minifiler		
12C- 3130xl Capillary Electrophoresis		
Data Analysis		
Identifiler 31		
13- Mixture Dilution Study	N/A	N/A
14- PCR Data Interpretation	N/A	N/A
15- Oral Exam	N/A	N/A
16- DNA Moot Court		
Direct	done by training group	N/A
Cross	done by training group	N/A
17- Bloodstain Pattern Analysis	N/A- done as a 40 hour workshop	N/A

Forensic Biology Refresher Tracking Sheet

Training	Supervisor Review	Date