

DNA Academy Sample Set Training Goals

All trainees are required to analyze a minimum of 7 sets of data (Sample Sets 1 through 6 plus the Competency Test / Sample Set 7)

- Throughout the Academy, the trainees will extract items from a sample set, and will then be required to quantify, amplify, type, and evaluate their data using GeneMapper® ID prior to extracting items from any other sample set. This process serves two purposes – (1) it allows the instructors to readily identify, address, and correct issues (such as the introduction of contamination or the inability of a trainee to recover sufficient amounts of DNA during the extraction process) and (2) it enables the trainee to receive immediate feedback regarding their analytical skills, affording the individual the ability to become increasingly proficient and confident. NERFI has found this holistic approach to be the most expedient, valuable, and trainee-friendly method for instruction of DNA testing methodologies.
- For the first three sample sets, each trainee's DNA typing results will be subjected to a preliminary review by an instructor to evaluate the trainee's ability / technique before they can proceed to the next sample set. If appropriate, the trainee will be required to repeat all (or part) of the sample set. Trainees experiencing difficulty in mastering the extraction techniques may be assigned additional training samples or sample sets at the lead instructor's discretion.
- The last four sample sets are self-paced, meaning the trainee may proceed to their next sample set once the analysis of the previous set has been completed.
- Trainees will be encouraged to discuss any potential problems or concerns with the instructors. This process, along with continued instructor oversight, enables each trainee to receive instructions to repeat a procedure in a timely manner, should the need arise.
- The trainees are also assigned fifteen (15) simulated data sets (Sim Sets) to process during the DNA Academy. The trainees must manage their time effectively to be able to meet submission deadlines for each sample and sim set.
- The purpose of the simulated data sets is to provide the trainee with the skills to analyze, interpret, and report increasingly more challenging and larger data sets. The first simulated data set scenario involves a simple home invasion/burglary scene. Later simulated data set fact patterns describe complex rape and homicide scenarios. In addition, samples in some of the later simulated data sets are specifically provided to expose the trainee to data that is difficult to analyze and interpret. Overloaded samples, low template DNA samples, and mixtures are included in these sets. The simulated data sets serve to reinforce data analysis, interpretation, statistical application, report writing, CODIS applicability, and critical thinking skills targeted during the analysis of sample sets.

SAMPLE SET 1: This sample set consists of four bloodstains of diminishing concentration. The purpose of Sample Set 1 is to test for the trainee's ability to successfully extract DNA from blood samples and to get the trainee acclimated to the entire DNA analytical process. No case scenario is provided with this set. The trainee's "report" consists solely of a table of the trainee's typing results.

SAMPLE SET 2: This sample set consists of four simulated vaginal swabs prepared using different female donors and increasingly more dilute semen from a single male donor. This sample set tests the trainee's ability to obtain sufficient separation of the sperm and epithelial cell fractions for each item in the sample set. In addition, use of the different female donors builds in a check for possible sample switches. This set does not have a case scenario and the "report" is a table of the trainee's typing results, allowing the trainee to focus on learning the specifics of the DNA analytical processes.

SAMPLE SET 3: This sample set consists of a blank/unstained swab and three simulated vaginal swabs prepared using different female donors and increasing more dilute semen from a single male donor. As with the previous sample set, this sample set tests the trainee's ability to obtain sufficient separation of the sperm and epithelial cell fractions for each item in the sample set. It also provides the trainee with the opportunity to refine their differential extraction technique and allows for monitoring of sample switches and carryover/the introduction of contamination during the extraction process. As part of this sample set, the trainees are provided with a case scenario (fact pattern) that corresponds to the samples received for analysis. Using the case fact pattern and the results of their testing, the trainee must draft a standard laboratory report. The lack of reference samples for this sample set precludes the need for conclusions to be drawn as the trainee learns the basics of the report writing process. As with all reports, the trainee must follow the CODIS decision tree to determine if any profiles are suitable for submission to NDIS, given the typing results and the case fact pattern.

SAMPLE SET 4: This sample set consists of five "challenging" samples from various donors. Examples of challenging samples are gum, envelope flaps, hairs with roots, fingernail clippings, and garments (for wearer). This sample set tests the trainee's ability to work with small, fragile, and sometimes difficult to handle/swab materials, as well as their ability to recover lower amounts of DNA. Further, these samples provide the trainee with the opportunity to see stochastic effects in their typing results first hand and provides them with experience in the interpretation of this type of data. The sample set scenario, along with the lack of reference samples, allows the trainee to further focus on the basics of the report writing process.

SAMPLE SET 5: This sample set consists of two reference samples and three simulated bloodstain cuttings from a shirt. One of the bloodstains is from a single source, one is a mixture, and one is a diffuse bloodstain from a single source. By this point, the trainee should have mastered the DNA analytical procedures. Accordingly, the focus for this sample set is on the ability of the trainee to correctly interpret and report their DNA typing results, the application of statistics to the DNA typing results, and the ability of the

trainee to correctly follow the CODIS decision tree. The case scenario and the samples used are designed to ensure the trainee is applying critical reasoning skills.

SAMPLE SET 6: This sample set consists of reference samples (including hair as an alternate known from a missing person), a smoked cigarette butt, and a simulated swab of a multiple donor bloodstain from a crime scene. As with the previous sample set, the purpose of this set is to reinforce the ability of the trainee to correctly interpret and report their results, apply statistics to their findings, and correctly follow the CODIS decision tree. This case scenario and the samples used are also designed to ensure the trainee is applying critical thinking skills.

SAMPLE SET 7 – COMPREHENSIVE TEST: This sample set consists of reference samples, a simulated vaginal swab and bloodstain cutting from a shirt. Each trainee is required to conduct their analysis of the samples in this competency test independently. This final sample set serves as a test to demonstrate the trainee's ability to successfully follow the DNA analytical procedures, interpret and report their results, determine if statistics are applicable, and follow the CODIS decision tree.