PERFORMANCE BASED STANDARDS FOR FORENSIC SCIENCE PRACTITIONERS

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Introduction

These "Performance Based Standards for Forensic Science Practitioners" have been developed by the ENFSI QCC Competence Assurance Project (CAP) Group for use by all ENFSI forensic science practitioners. These standards have been derived from work carried out in the forensic science sector in the United Kingdom by practitioners working with the Science, Technology and Mathematics Council (now SEMTA, a UK Sector Skills Council part of whose remit is forensic science). These standards should be applicable in all Criminal Justice Systems.

The standards are presented in a generic format. They cover the 'forensic' process from the actions of the first officer attending the scene, through scene examination, examination in the laboratory, interpretation and reporting to presenting evidence in court. They are not prescriptive. They recognise that there may be more than one acceptable way of carrying out a task.

The standards are written in terms of outcomes. They give the desired outcome of carrying out a task. In other words they describe **WHAT** a competent practitioner should be able to achieve but they do not describe **HOW** that outcome is achieved. In addition they indicate the knowledge and understanding that a forensic practitioner needs to achieve competent performance.

In their generic form they are applicable to all forensic disciplines, whether that is crime scene investigation, forensic pathology, DNA, criminalistics etc. For use in a specific area of forensic practice they will need some "translation" to the language and environment of the particular specialism. For example, although contamination will be understood by all forensic

practitioners, the actual type of contamination may well be different from one specialism to another.

The standards are applicable to all roles in the forensic process, whether it is scene investigator, reporting scientist, reporting analyst etc. Not all of the activities and standards will be applicable to all roles. The role of the crime scene investigator will focus around activities B to D and might include parts of activity I, whereas the role of reporting scientist will focus around activities E to I (unless the role also involves scene investigation). The role of the reporting analyst may focus around activities E, F, G and I.

The activities and standards describe, generically, the totality of what has to be achieved and detail the knowledge and understanding that is needed to do this. They can be considered to be a generic checklist which has many uses. Apart from being used to assess competent performance in forensic practice, the checklist should be used to inform the design and application of all forensic science education and training (whether delivered in forensic science institutions or in an academic environment). Qualification design and certification programmes should also use these activities and standards as the basis for their development.

ACTIVITY AND STANDARDS SUMMARY:

Activity A: Undertake initial actions at the scene of incident

Standard A1: Undertake initial preservation and control actions at the scene

Activity B: Develop a scene investigation strategy

Standard B1: Determine the requirements of the investigation
Standard B2: Make assessment of the scene and determine requirements

Activity C: Undertake scene investigation

Standard C1: Establish and preserve control of the scene
Standard C2: Prepare to examine the scene
Standard C3: Examine the scene
Standard C4: Collect potential evidence material
Standard C5: Pack items and samples

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Standard D1: Analyse the likely sequence of events
Standard D2: Decide on which items and samples are to be examined further
Standard D3: Transfer the items to the designated locations
Standard D4: Store items and samples

Activity E: Develop a laboratory examination strategy

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Standard F1: Determine the integrity of items and samples
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Standard G1: Monitor and maintain integrity of items and samples
Standard G2: Identify and recover potential evidence
Standard G3: Determine case examinations to be undertaken
Standard G4: Carry out examinations
Standard G5: Produce laboratory notes and records

Activity H : Interpret findings

Standard H1: Collate results of examinations
Standard H2: Interpret examination findings

Activity I: Report findings

Standard I1: Produce report
Standard I2: Participate in consultation before trial.
Standard I3: Present oral evidence to courts and inquiries

Activity A: Undertake initial actions at the scene of incident

Activity Summary

This activity is relevant to the first officer, or individual, attending the scene and is concerned with taking control of the scene so that it is protected for those individuals who will carry out a detailed investigation of the scene.

The activity covers:

- Taking initial control of the scene of the incident
- Taking the necessary actions to preserve the scene of the incident

Making a judgement at the scene of the incident as to whether or not a crime has been committed is of crucial importance in this activity.

Where it is decided that a crime may have been committed, preserving the scene so as not to compromise further investigation is essential to this activity.

The activity consists of one standard:

- A1 Undertake initial preservation and control actions at the scene

Activity A: Undertake initial actions at the scene of incident

Performance Criteria

Standard A1: Undertake initial preservation and control actions at the scene

You must ensure that you:

a. Check for survivors and undertake rescuing actions

b. Check for threatening health risks dangers

c. Make a preliminary judgement as to whether or not a crime has been committed

d. Apprehend any suspects at the scene

e. Document all persons that are at the scene of the incident and take contact details

f. Set cordons to prevent evidence being compromised and to restrict scene access to relevant personnel

g. Define scene access for officials

h. Contact the relevant person for a decision on reinforcements and on who shall perform the investigation of the scene

i. Carry out relevant procedures which are required within a short time frame (for example gunshot residues sampling)

j. Make arrangements for the taking of necessary tests and the collection of relevant items of clothing etc if a person involved in the incident has been taken to hospital

k. Protect the scene while waiting for reinforcements

Activity A: Undertake initial actions at the scene of incident

Knowledge and understanding required for the activity

You need to know and understand:

1. Legal and organisational requirements
2. How to provide first aid and the procedure for summoning medical assistance
3. How to carry out a risk assessment at a scene
4. What constitutes a crime
5. How a scene can be compromised by contamination
6. How to determine the area to be protected
7. Who relevant personnel are and who needs access to the scene
8. How to assess the need for specialist expertise and procedures, for example gunshot residue sampling from an individual's hand
9. How to ensure that the scene is protected adequately

Activity B: Develop a scene investigation strategy

Activity Summary

This activity is relevant to any individual whose role is to carry out a detailed scene examination.

The activity covers:

- Understanding the requirements of the investigation and the investigators
- Assessing the scene and determining the steps necessary to meet the requirements of the investigation

Communicating with investigators, to find out exactly what their requirements are, is of crucial importance in this activity.

The scene examination strategy developed to meet the needs of the investigation must take account of principles and practices involved in the investigative process.

The activity consists of two standards:

- Standard B1: Determine the requirements of the investigation
- Standard B2: Make assessment of the scene and determine requirements

Activity B: Develop a scene investigation strategy

Performance Criteria

Standard B1: Determine the requirements of the investigation

You must ensure that you:

a Ascertain the circumstances of the incident and the scene of the investigation from the investigator and other sources and ensure that they are accurately recorded

b Determine and document the types of examinations to be carried out in accordance with the reported circumstances

c Give due consideration to the possibility of linked scenes to ensure that relevant avenues of investigation are followed up

d Determine the logistics of the operation and resolve known problems with due regard to effectiveness, efficiency and economy

e Consider the safety of all personnel at the scene and give advice to ensure relevant safety precautions are carried out

f Identify resources and equipment needed for the investigation and make suitable arrangements to get them to the scene

Standard B2: Make assessment of the scene and determine requirements

You must ensure that you:

a. Record people that have been at the scene before the cordons have been set up, record their routes of entry and exit and actions undertaken and arrange a common approach path to the scene of the incident

b. Consider the health and safety of yourself, investigating staff and others and ensure that actions are carried out to ensure safety and preserve health and welfare

c. Review initial assessments in the light of scene observations and identify and consult sources of further information

d. Identify resources and equipment needed for the investigation and make suitable arrangements to get them to the scene

e. Record relevant data pertaining to the intended investigation, accurately, at the time of the examination

Activity B: Develop a scene investigation strategy

Knowledge and understanding required for the activity

You need to know and understand:

1. The importance of adhering to a recognised code of conduct and making impartial judgements
2. The reasons for and importance of establishing the circumstances of the case
3. The operational and scientific factors that need to be considered when performing different types of examination
4. The importance of assessing the effect of examinations of potential evidence on other evidence types
5. The considerations that need to be taken into account when considering the logistics of the operation and co-ordination with other scene personnel.
6. How to avoid or resolve problems concerning contamination and preservation of the evidence
7. How to resolve issues concerning welfare, time constraints, prevailing weather conditions, security, economy and safety.
8. The principles and methods involved in the investigative process, the roles of the scientists and related personnel and the communication systems which need to be utilised
9. The legal and organisational requirements
10. What type of equipment is needed
11. How to assess and determine examination requirements
12. The scientific disciplines and specialised services that are available
13. The techniques and resources that are available
14. Relevant health and safety issues
15. The preservation techniques that are available
16. The use of information on incident patterns and trends

17. The need to review initial assessments

18. The potential evidence types and the limits of your own ability

19. The types of protective equipment available

Activity C: Undertake scene investigation

Activity Summary

This activity is concerned with the examination of the scene of incident and the location, identification and recovery of potential evidence from the scene for further examination.

The activity covers:

- Establishing control and preservation of the scene so that the scene and any potential evidence at the scene are not compromised.
- The physical preparation of equipment to be used in the examination and the identification of the area for examination in order to maintain the integrity of the items and samples collected.
- Carrying out a physical examination of the scene of incident and locating and recovering potential evidence
- Packing and storing items and samples recovered from the scene

The methods used to locate and recover potential evidence will depend upon the particular items and samples involved and the evidence types.

Established principles and practices must be adopted throughout this activitiy.

Safe working practices are crucial in this activity so as to maintain the health and safety of oneself and others. The preservation, integrity and continuity of items, samples and potential evidence are of crucial importance and must be maintained at all times.

This activity is relevant to any individual whose role is to carry out a detailed scene examination.

This activity consists of five standards:

- Standard C1: Establish and preserve control of the scene
- Standard C2: Prepare to examine the scene
- Standard C3: Examine the scene
- Standard C4: Collect potential evidence
- Standard C5: Pack items and samples

Activity C: Undertake scene investigation

Performance Criteria

Standard C1 : Establish and preserve control of the scene

You must ensure that you:

a. Communicate and establish with relevant personnel responsibilities for the scene investigation

b. Establish or confirm and adjust where necessary the scene boundary and approach path

c. Set and maintain cordons to restrict scene access to relevant personnel and that they are manned according to examination requirements

d. Restrict personnel entering and leaving the cordoned area to ensure that unauthorised access does not occur.

e. and others entering the scene area use personal protective equipment in accordance with health and safety, scene and organisational requirements

f. Anticipate and deal with conflict arising at the scene and that relevant personnel are informed

g. Control the scene so that potential evidence is not damaged, degraded, contaminated or lost

h. Preserve potential evidential material in accordance with scene requirements

Standard C2: Prepare to examine the scene of the incident

You must ensure that you:

a. Document and record the integrity of the scene before any alterations are made to it

b. Accurately record details and circumstances of the incident and the scene of the investigation gathered from available sources

c. Make effective working relationships with relevant personnel in order to manage the scientific investigation of the scene

d. Give advice to relevant personnel regarding the control and preservation of the scene where this is necessary

e. Assess, determine and agree on the types and sequence of examinations necessary with the investigating officer or representative in accordance with the circumstances of the incident

f. Identify the area of the scene and its boundaries and protect them to preserve the scene

g. Agree on the route of access to the scene taking account of potential contamination and loss of evidence

h. Advise other personnel on the requirements for collecting data and that your own notes are recorded accurately and comprehensively at the time of the examination.

i. Prepare equipment required for the examination and confirm that it is working effectively

Standard C3: Examine the scene

You must ensure that you:

a. Ascertain that the examination in its entirety is carried out in accordance with legal and organisational requirements

b. Carry out examinations in a sequence which will ensure detection and optimum recovery of all types of potential evidence

c. Detect the existence of, and identify the location of, evidential material and record it accurately and comprehensively at the time of the examination.

d. Select and use recovery methods to optimise recovery

e. Identify the need for additional areas of expertise

f. Carry out the examination in a manner that ensures the safety of all personnel at the scene

g. Record all relevant information accurately, comprehensively and at the time of the examination

Standard C4 : Collect potential evidential material

You must ensure that you:

a. Use equipment safely according to collection requirements of the potential evidential material

b. Prioritise and collect, in a sequential manner, potential evidential material in co-operation with other relevant personnel to help prove or disprove matters under investigation

c. Safely carry out relevant tests to detect and screen potential evidential material as part of the sequential examination within your responsibility and the considered judgement of your own limitations

d. Identify the need for additional expertise, facilities and equipment and that relevant personnel are briefed

e. Preserve recovered items without damage, degradation, contamination and loss

f. Establish and maintain, the continuity, security and integrity of items

g. Collect potential evidential material in a manner that ensures the health and safety of yourself and others

h. Recover and keep controls and reference samples in a manner that minimises damage, contamination, degradation and loss

i. Record the relevant information pertaining to the examination accurately and at the time of the examination

Standard C5 : Pack items and samples

You must ensure that you:

a. Handle and pack items in a way that preserves the potential evidence, maintains continuity, prevents contamination and cross-contamination and conforms to health and safety requirements

b. Accurately identify item packing requirements

c. Seal, label and record items in accordance with legal, safety and organisational requirements

d. Maintain the continuity and integrity of items

e. Use safe working practices to ensure the health and safety of all personnel and the prevention of possible contamination in the handling of items

Activity C: Undertake scene investigation

Knowledge and understanding required for the activity

You need to know and understand:

1. The importance and methods of recording information
2. Evidence collection techniques
3. Evidence preservation techniques
4. The various communication methods and requirements
5. The causes and effects of contamination and means of prevention
6. Potential conflict of interests
7. The people and organisations to consult and inform
8. An agreed code of ethics and the need for impartial judgements
9. Relevant health and safety considerations
10. Scientific and other specialised disciplines and techniques and resources available both in house and at other sources
11. Legal and organisational requirements
12. The information needed to plan the examination
13. How to record the information
14. The reasons for and the importance of establishing the case details
15. The principles and methods involved in the investigative process, the roles of the scientists and related personnel
16. The importance of assessing the effect of examinations of potential evidence on other evidence types
17. The operational and scientific factors which need to be considered
18. The importance of and how to control and preserve scenes including consideration of location, weather conditions, time of day, and multiple locations

19. The criteria involved in sequencing and prioritising the work
20. The considerations that need to be taken into account when considering the logistics of the operation and co-ordination with other scene personnel.
21. How to resolve issues concerning welfare, time constraints, prevailing weather conditions, security, economy and safety.
22. How to establish access to the scene and identify and preserve the scene and potential evidence
23. How best to utilise recovery methods
24. The importance of conducting working practise safely
25. How importance it is to recognise the limitations of your own ability and the need for consultation with others for clarification purposes
26. The principles and factors involved in processing, evaluating and interpreting the results of the examinations
27. The principles involved in giving advice on the interpretation of results
28. The importance of procedures which need to be undertaken to avoid contamination, cross-contamination and the destruction of evidence
29. The principles and methods involved in the investigative process, the roles of the scientists and related personnel and the communication systems that need to be utilised
30. The range of use of equipment and consumables
31. Evidence preservation techniques
32. Screening methods, presumptive and physical tests for potential evidential material and sampling techniques
33. Continuity, security and integrity requirements
34. Specialised techniques and resources available both in house and at other sources
35. Potential evidence types and your own limitations relating to them
36. The various types of tests available
37. Sampling, packaging and preservation techniques and the requirements for different evidence types

Activity D: Interpret scene findings and order further examination

Activity Summary

This activity concerns interpreting the initial scene examination findings to determine the likely sequence of events that have taken place at the scene of an incident.

The activity covers:

- Analysing and postulating what is likely to have happened at the scene
- Deciding on which items and samples recovered from the scene are to be examined further
- Transferring items and samples to relevant locations and ensuring that they are stored securely

Understanding the uncertainty limitations and potential of any inferences drawn is of crucial importance to this activity.

Knowledge of the potential of various items and samples for further examination is of paramount importance in this activity.

This activity is relevant to any individual whose role is to carry out a detailed scene examination.
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This activity consists of four standards :

- D1 Analyse the likely sequence of events
- D2 Decide on which items and samples are to be examined further
- D3 Transfer the items to the designated locations
- D4 Store items and samples

Activity D: Interpret scene findings and order further examination

Performance Criteria

Standard D1: Analyse the likely sequence of events

You must ensure that you:

a Base the analysis on examination findings and information provided about the scene

b Consult relevant, reliable sources of information at an appropriate time and in an appropriate way to assist the reconstruction

c Consider alternative explanations for the scene examination findings

d Record relevant information accurately, comprehensively and at the time of the examination

Standard D2 : Decide on what items to be examined further

You must ensure that you:

a. Record and review the items and samples collected from the scene.

b. Estimate which items that, on further examination, are likely to give information that will assist the investigation

c. Get advice from relevant personnel, where necessary, regarding further examinations.

d. Request further examinations that will provide optimum results.

Standard D3: Transfer items and samples to the designated locations

You must ensure that you:

a Select a transportation method that enables items to be moved legally, securely and safely without risk of contamination, cross-contamination, destruction and loss

b Segregate where necessary, different items, in a manner that preserves their integrity

c Maintain continuity and security of items during transportation

d Decontaminate transportation containers and vehicles, where necessary, in a safe manner or destroy if appropriate

e Make records accurately, legibly and comprehensively at the time of the examination.

Standard D4: Store items and samples

You must ensure that you:

a Handle items in a way that preserves the potential evidence, maintains continuity, prevents contamination, cross-contamination or degradation and conforms to health and safety requirements

b Maintain the continuity and integrity of items

c Store and keep items in appropriate conditions and that the required disposal of items is carried out safely

d Decontaminate, where necessary, storage facilities in accordance with health and safety requirements

Activity D: Interpret scene findings and order further examination

Knowledge and understanding required for the activity

You need to know and understand:

1. The principles and factors involved in the examinations used
2. The importance of, and ways to establish, the accuracy, validity and reliability of examination methods
3. How to evaluate the results of examinations
4. The principles involved in processing, evaluating and interpreting examination findings
5. The relevance and the uncertainty of the inferences
6. Which sources of information are relevant
7. What recording systems are available and how to use them
8. What information is relevant and when and how it should be recorded
9. The potential evidential value of different types of examination.
10. Who to get advice from regarding further examinations.
11. What items and samples in combination with certain types of examination are likely to give the best information to assist the investigation.
12. Where different types of examination can be undertaken.
13. How to order further examinations
14. Continuity and security requirements and implications of not maintaining security
15. Relevant health and safety requirements
16. The causes of contamination and means of prevention
17. Decontamination procedures
18. Importance and need for segregation of potential evidential material

19. An agreed code of ethics and the need for impartial judgements

20. The types of transport available and factors to be considered when selecting the type of transport

21. Legal and organisational requirements

22. Required packaging and storage conditions or different evidence types

Activity E: Develop a laboratory examination strategy

Activity Summary

This activity is concerned with developing a forensic examination strategy that meets the needs of the case and the investigation.

The activity covers:

- Establishing the requirements of the case and of the investigators
- Developing a forensic examination strategy that will meet the needs of the case and those of the investigators

Communicating with investigators, to find out exactly what their requirements are, is of crucial importance in this activity.

The forensic examination strategy developed to meet the needs of the case must take account of scientific principles and practices.

The activity consists of two standards:

- E1 Establish case requirements
- E2 Determine the examination strategy

Activity E: Develop a laboratory examination strategy

Performance Criteria

Standard E1: Establish case requirements

You must ensure that you:

a Ascertain details of circumstances and consider these against exhibits received and examinations requested

b Confirm that the items submitted are appropriate for the work to be undertaken

c Determine the storage requirements of potential evidence and make arrangements for safe, secure and clean facilities

d Agree on the priority and sequence of the various aspects of work

e Record relevant information accurately, legibly and comprehensively

f Prepare equipment and the area where the examination is going to take place appropriately for the examination

g Identify, document and correct non-conforming equipment

Standard E2: Determine the examination strategy

You must ensure that you:

a. Consider details of case against requirements of investigation

b. Determine an examination strategy to take account of requirements of investigation

c. Review and adjust examination strategy on consultation with relevant personnel

d. Agree examination strategy with relevant personnel and plan the execution of the work

e. Communicate examination strategy to relevant personnel

f. Agree on the priority and sequence of the various aspects of work

g. Prepare equipment and work area appropriate to the examination

h. Identify and correct non-conforming equipment

i. Make effective working relationships with relevant personnel in order to co-ordinate casework

Activity E: Develop a laboratory examination strategy

Knowledge and understanding required for the activity

You need to know and understand:

1. The importance of establishing the details of the case
2. With whom, and how, communication is required
3. How to recognise relationships between the case and items received
4. The extent and range of laboratory facilities (e.g. equipment, methods and quality control)
5. The importance of assessing the effects of potential evidence on other evidence types
6. The type of advice you give to customers
7. The way in which you give advice to customers
8. How to sequence and prioritise work
9. The various recording systems available for use
10. How to identify and correct non-conformances in equipment
11. Legal and organisational requirements
12. The importance of developing an examination strategy
13. The importance of effectively communicating the examination strategy to relevant personnel
14. How to select the appropriate type of examination in the light of the evidential value
15. How to make effective working relationships with relevant personnel in order to co-ordinate casework
16. How to create effective working relationships with customers
17. The importance of adhering to a recognised code of conduct and to making impartial judgements
18. The reasons for and importance of establishing the circumstances of the case

19. The operational and scientific factors that need to be considered when performing different types of examination

20. The importance of assessing the effect of examinations of potential evidence on other evidence types

21. The principles and methods involved in the investigative process, the roles of the scientists and related personnel and the communication systems which need to be utilised

22. The importance of recording relevant information accurately, legibly and at the time of the examination

23. The importance of prevening contamination and cross-contamination and how this is done

24. The different types of equipment available for use

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Activity F: Prepare to carry out laboratory based examinations

Activity Summary

This activity is concerned with ensuring that adequate preparations are made prior to the examination of items and samples originating from an incident that is subject to forensic investigation.

The activity covers :

- The physical preparation of suitable equipment and the area in which the examination is going to be carried out in order to maintain the integrity of the items and samples
- The initial inspection of the items and samples and confirmation that the initial examination strategy is appropriate

Preparing to carry out forensic examinations applies in all cases, irrespective of the environment in which the activity is conducted, for example at a scene of crime or incident or in a specialised environment such as a laboratory.

Scientific principles and practices must be adopted throughout this activitiy.

Safe working practices are crucial in this activity so as to maintain the health and safety of oneself and others. The preservation, integrity and continuity of items, samples and potential evidence are of crucial importance and must be maintained at all times.

This activity is relevant to any practitioner who prepares items and samples that will be subject to forensic examination irrespective of whether the practitioner goes on to carry out the forensic examination personally.

This activity consists of two standards :

- F1 Determine the integrity of items and samples
- F2 Inspect items and samples submitted for examination

Activity F: Prepare to carry out laboratory based examinations

Performance Criteria

Standard F1: Determine the integrity of items and samples

You must ensure that you:

a. Transfer items safely and securely from storage facilities

b. Identify items and samples against records and identify any inaccuracies so that rectification may take place

c. Record the details of storage, handling, transfer and packaging of items which ensures continuity

d. Identify and document any packaging problems, and take appropriate action

e. Store and transfer materials within the laboratory in a way that avoids contamination, cross-contamination and loss of potential evidence.

Standard F2: Inspect items and samples submitted for examination

You must ensure that you:

a. Remove items and samples from packaging and handle safely in a manner that avoids contamination, cross-contamination and destruction

b. Confirm the identity and identification of submitted items against documentation

c. Identify scientific evidence that can be derived from the item and select relevant examination methods

d. Take appropriate action if you identify problems and potential problems

e. Decide on sampling strategy for items to be examined

f. Maintain continuity of items throughout the inspection process

g. Record information accurately, comprehensively and at the time of the examination

Activity F: Prepare to carry out laboratory based examinations

Knowledge and understanding required for the activity

You need to know and understand:

1. How to ensure that items are safely and securely received
2. The importance of ensuring the integrity of items and samples
3. How to confirm the identity of items and samples
4. The importance of identifying inaccuracies in items samples and records
5. The recording systems to use and how to record what information
6. The necessity of establishing the continuity of items and samples
7. The types of packaging problems that can occur
8. The action to take in relation to inappropriate labelling, packaging, inadequate seals, inadequate storage, contamination dangers and damaged packaging and seals
9. How contamination, cross contamination and loss of evidence can occur and how to avoid them in practice
10. How to store and transfer potential evidence in order to avoid contamination, cross contamination, degradation and loss of evidence
11. The identity of personnel with whom to clarify any discrepancies
12. Communication requirements
13. How to identify all relevant types of scientific evidence
14. How to assess the effects of examinations on other types of potential evidence
15. What pieces of evidence/materials could be used for examination
16. How to solve problems associated with insufficient material, contamination of material, inappropriate materials, additional evidence types
17. The principles of sampling

Activity G: Examine items and samples

Activity Summary

This activity is concerned with the location, identification and recovery of potential evidence from items and samples submitted for examination.

The activity covers :

- Locating and recovering potential evidence from items and samplesand its testing and comparison
- Testing potential evidential materials and their comparison
- Recording the details of examinations carried out and the collation of notes, including the notes made by colleagues

These functions may be carried out at the scene of an incident, in a specialised environment such as a laboratory or at some other suitable location. Scientific principles and practices must be adopted at all times.

The methods used to locate, recover and examine the scientific evidence will depend upon the particular items and samples and the evidence type.

Safe working practices are crucial in this activity so as to maintain the health and safety of oneself and others. The preservation, integrity and continuity of items, samples and potential evidence are of crucial importance and must be maintained at all times.

This activity is relevant to any practitioner who examines items and samples that have been submitted for forensic examination.

This activity consists of five standards :

- G1 Monitor and maintain integrity of items and samples
- G2 Identify and recover potential evidence
- G3 Determine case examinations to be undertaken
- G4 Carry out examinations
- G5 Produce laboratory notes and records

Activity G: Examine items and samples

Performance Criteria

Standard G1: Monitor and maintain integrity of items and samples

You must ensure that you:

a. Handle items and samples in a way which prevents contamination, cross-contamination and loss of evidence

b. Uniquely label items and samples and maintain the continuity of items and samples

c. Record information accurately, comprehensively and at the time of the examination

Standard G2: Identify and recover potential evidence

You must ensure that you:

a. Carry out examinations in a sequence which will ensure detection and optimum recovery of all types of potential evidence

b. Locate and recover potential physical evidence and traces

c. Identify the need for additional areas of expertise

d. Maintain the integrity and continuity of items and recovered material throughout the recovery process

e. Select and use methods that optimise recovery

f. Record relevant information accurately, comprehensively and at the time of the examination

Standard G3: Determine case examinations to be undertaken

You must ensure that you:

a. Select examinations that are relevant to the items and the context of the case

b. Plan and schedule examinations to enable reliable, fit for purpose results to be obtained

c. Seek expert advice in instances where additional specialist information is required

d. Record relevant information accurately, comprehensively and at the time of the planning

Standard G4: Carry out examinations

You must ensure that you:

a. Carry out relevant examinations safely and in a manner appropriate to the item being examined

b. Adapt working procedures and practices appropriately to allow for different circumstances and conditions and record these adaptations accurately

c. Identify insufficient and inconclusive results and take remedial action where appropriate

d. Seek expert advice in instances where additional specialist information is required which is relevant to the examination

e. Ensure that examination results are recorded accurately, comprehensively and at the time of the examination

Standard G5: Produce laboratory notes and records

You must ensure that you:

a. Make laboratory notes and records at the time of the examination and that they are fit for purpose, accurate, legible, clear and unambiguous

b. Order notes and record information in a way which supports third party scrutiny

c. Uniquely designate records and file them securely in a manner which facilitates retrieval

d. Accurately collect, order and combine laboratory notes on work carried out by others into the overall records

Activity G: Examine items and samples

Knowledge and understanding required for the activity

You need to know and understand:

1. The various methods available to detect evidential material
2. The procedures to follow in order to avoid contamination and cross-contamination, degradation and loss
3. How to store, handle, package or transfer items to preserve potential evidence
4. How to avoid loss of potential evidential material
5. The importance of maintaining continuity and integrity of items and samples.
6. The information that needs to be recorded
7. The importance of recording information accurately, legibly and comprehensively and the recording systems available
8. The range of recovery and detection methods available for use and how these methods optimise recovery and detection, minimise loss and avoid contamination
9. The importance of, and how to assess, the effects of examinations on other evidence types
10. The circumstances under which you might require additional expertise
11. The type of expert advice you might need
12. The use and relevance of different types of examination which you carry out and how to select the appropriate examination (and quality control)
13. The operational, scientific, forensic and quality control factors and principles you must consider when determining and carrying out the different types of examination
14. The criteria you should take into account when planning and scheduling examinations
15. The importance of carrying out examinations in a particular sequence
16. The purpose of the examination
17. How to ensure that the results you obtain are reliable and fit for purpose

18. The different circumstances and conditions you might be faced with
19. How to adapt working procedures and practises to accommodate different circumstances whilst retaining scientific validity
20. How to record any adaptations you have made
21. The established scientific principles you consider when identifying insufficient and inconclusive results and the remedial action you could take
22. The importance of recording information at the time of the examination
23. The importance of ensuring that notes and records are fit for purpose, accurate, legible, clear and unambiguous
24. The information you need to record and how you record it
25. The classification systems you use to ensure records are easily retrievable
26. The importance of collecting, ordering and combining notes accurately
27. Who else might require to use the notes

Activity: H: Interpret findings

Activity Summary

This activity concerns summarising and assessing the forensic examinations, interpreting the results and drawing conclusions before the final report or statement is prepared.

The opinions drawn by the forensic practitioner will be informed by databases, historical data and personal experience. Validated scientific methods, rigorous quality assurance procedures and checks are of crucial importance throughout this activity.

The conclusions drawn will address the requirements of the case as identified in activity A and will either :

- Provide support for one of several competing hypotheses
- Provide support for more than one hypothesis
- Not support any particular hypothesis over another

This activity is relevant to any practitioner who is responsible for interpreting the findings of forensic examinations.

This activity consists of two standards:

- H1 Collate results of examinations
- H2 Interpret examination findings

Activity: H: Interpret findings

Performance Criteria

Standard H1: Collate results of examinations

You must ensure that you:

a. Collect and combine results accurately in a clear and unambiguous format

b. Complete an accurate evaluation of examination results

c. Present summarised results clearly in a structured format

d. Ensure that evaluation, commentary and support information is accurate and presented clearly

Standard H2: Interpret examination findings

You must ensure that you:

a. Have complete, comprehensive and accurate examinations data

b. Base interpretations on documented results and information provided about the case

c. Consult relevant reliable sources of information at an appropriate time and in an appropriate way to assist the interpretation

d. Confirm results and data for accuracy, validity and reliability

e. Draw opinions from the results and data that are clearly based on agreed criteria and that these opinions are documented accurately

f. Record relevant information accurately, comprehensively and at the time of the interpretation

g. Consider alternative explanations, test alternative hypotheses and provide opinions

Activity H: Interpret findings

Knowledge and understanding required for the activity

You need to know and understand:

1. How to record results
2. How to ensure the records you make are accurate
3. The importance of, and ways of establishing the accuracy, validity and reliability of, examination methods
4. The importance of ensuring that the examination data are complete, comprehensive and accurate
5. The examination requirements
6. Methods which ensure clarity of presentation and meets the needs of the end user
7. How to present evaluation, commentary and support information
8. How to ensure the accuracy of evaluation, commentary and support information
9. The organisational requirements
10. The use and relevance of the different types of examination which you carry out
12. The scientific and forensic principles and practises on which your interpretations are based (e.g. the Bayesian approach
13. How to process, interpret, combine and evaluate results
14. The sources of information available for consultation and why they are reliable
15. The criteria on which opinions are based
16. The importance of independent interpretation of the findings
17. When and how to consider alternative hypotheses
18. How to test alternative hypotheses

Activity I: Report findings

Activity Summary

This activity is about reporting the findings of a forensic examination.

The activity covers :

- The production of reports on the forensic examinations that have been carried out
- The participation in pre-trial consultations with customers and officials involved in the judicial process
- The presentation of oral evidence to courts and enquiries

The reports of forensic investigations will be read by a wide variety of individuals, many of whom will have little knowledge of science. They may have to be read aloud in courts of law to inform judges and advocates and, in some jurisdictions, members of a jury. Reports must, therefore, be written as clearly and unambiguously as possible. Great care must be taken to ensure that all details relating to the examinations undertaken, and the scientific rationale on which the examinations are based, are described in language that can be understood by non-scientists.

Reports may provide factual information only (eg the identification of a drug, the fact that two DNA profiles match, the level of alcohol in a sample of blood). Where an opinion is provided the report must :

- Outline the background circumstances of the incident in question, as the writer understands them
- Give details of the requests made, and questions posed by, the customer/agency commissioning the work
- Describe the forensic examinations that were undertaken and the results of these examinations
- Make an assessment of the likelihood of the results of the examination being obtained given the hypotheses tested and the circumstances of the incident as understood by the writer

Pre-trial consultation may be required to explain the report to the customer/ agency commissioning the work or their legal representatives. These consultations may occur at any time before or during the trial. The writer of the report may be required to present, orally, the contents of his/her report in a court of law.

This activity is relevant to any individual who is responsible for reporting the results of scientific examinations.

The activity is made up of three standards :

- I1 Produce report
- I2 Participate in consultations before trial
- I3 Present oral evidence in court

Activity I: Report findings

Performance Criteria

Standard I1: Produce report

You must ensure that you:

a. Determine the type, extent and purpose of the information

b. Use information in the report which is current, relevant, accurate and unambiguous

c. Report all results accurately and clearly express the limitations of the tests used

d. Present a report that is logical, unbiased, accurate and relevant and that meets the needs of the end user

e. Express conclusions and opinions which are within your area of expertise and are firmly based on results and available information

f. Ensure that the report conforms to legal requirements and that you make appropriate reference to case notes and related materials

g. Consider alternative explanations to the findings

Standard I2: Participate in consultation before the trial

You must ensure that you:

a. Provide advice which is based on established scientific principles and is balanced and realistic within the context of the case

b. Clearly explain your findings and their interpretation in the context of the case

c. Consider alternative explanations, test alternative hypotheses and provide opinions

d. Identify, clarify and summarise areas of agreement and disagreement

e. Seek feedback to determine whether those involved understand the outcomes of the consultations

f. Record relevant information accurately and comprehensively

g. Create effective working relationships with customers

Standard I3: Present oral evidence to courts and inquiries

You must ensure that you:

a. Perform according to acceptable professional standards for appearance and behaviour

b. Deliver your evidence in an audible and understandable manner

c. Give evidence which is consistent with the contents of the written report

d. Deal with questions truthfully, impartially and flexibly in a language which is concise, unambiguous and admissible

e. Clarify unclear questions before offering a response

f. Give explanations to specific questions in a manner that facilitates understanding by non-scientists

g. Consider additional information and alternative hypotheses that are presented to you. Consider and evaluate these and express relevant opinions taking into account the limitations on opinions which cannot be given without further examination and investigation

h. Clearly differentiate between fact and opinion and ensure that the opinions you express are within your area of expertise

Activity I: Report findings

Knowledge and understanding required for the activity

You need to know and understand:

1. The type, extent and purpose of the report
2. How to ensure the information you use is current, reliable and accurate
3. How to structure your report to ensure that all results are accurately presented
4. The limitations of the tests used and the importance of clearly expressing these limitations
5. How to present balanced decisions, opinions and conclusions
6. The needs of the end user
7. The established scientific and forensic principles and practises on which you base your conclusions and opinions
8. The procedural requirements of the legal system
9. What the purpose of the pre-trial consultation is and what your role is
10. The legal requirements relating to scientific evidence
11. How to provide advice in light of established scientific principles and practices
12. How to ensure the advice you give is balanced, and realistic
13. The way to explain your findings
14. When and how to consider alternative hypotheses
15. How to test alternative hypotheses
16. The importance of recognising the limitations of one's own abilities and to consult with others
17. How to clarify areas of agreement and disagreement
18. How to seek feedback to ensure that those involved understand the outcomes of the consultations

19. The importance of adhering to a recognised code of conduct and to make impartial judgements
20. Relevant court procedures
21. The effect your appearance and behaviour can have on others
22. The methods you employ to ensure your evidence is audible and understandable
23. The correct titles to use when addressing court officials
24. The importance to ensure that evidence is consistent with the written report, statement or other relevant documentation
25. The importance of dealing with questions in a language that is unambiguous
26. How to clarify unclear questions before responding and why this is important
27. The methods used to present technical explanations to facilitate understanding by non-scientists
28. How to assimilate differing opinions and propositions in order to formulate opinions within your area of expertise
29. The principles involved in processing, evaluating and interpreting results of examinations