



MINISTRY OF COMMUNITY SAFETY
AND CORRECTIONAL SERVICES

**STUDY GUIDE
FOR
FORENSIC IDENTIFICATION
RE-CERTIFICATION EXAMINATION**

January 22, 2009

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What to Study

The Core Competencies and Ministry Accredited Training Standards are the basis for the Re-Certification Examination. They are available online at <http://www.opconline.ca/ident/2009/index.html> but are embedded in this document for your convenience.

1. Ministry Accredited Training Standards for Forensic Identification Officers (2006)
2. Core Competencies For Forensic Identification Officers (2006)

The following will also assist in preparation for the exams.

3. Ashbaugh, David R. , 1999. Quantitative-Qualitative Friction Ridge Analysis an Introduction to Basic and Advanced Ridgeology. Taylor and Francis
4. CFS Field Handbook for investigators (2008).

Core Competencies

The core competencies of forensic identification officers (from O. Reg. 3/99 Adequacy Regulation) were revised in 2006.

The forensic identification specialist must be able to:

<p>1. ATTEND CRIME SCENES</p> <p>a) Determine priority of call</p> <p>b) Determine resources required and available</p> <p>c) Schedule attendance of forensic identification specialist</p> <p>d) Arrive at scene promptly and adequately equipped to examine, collect, preserve and / or process physical evidence</p> <p>e) Become familiar with all available facts in the case to determine the sequence of events, victim impact, additional resources required and feasibility of recovering physical evidence</p> <p>f) Determine strategy and develop a plan of action to ensure safe and efficient forensic examination with minimal contamination of evidence</p> <p>g) Assess validity of information previously obtained</p> <p>h) Facilitate cooperation with investigators and other team members and assist primary investigator in conduct of forensic aspects of case</p> <p>i) Understand and comply with role and responsibilities as required by Ontario Major Case Management principles as per Ontario Regulation 354/04.</p>	
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<p>2. RECORD CRIME SCENES</p> <p>a) Document the crime scene prior to forensic examination and / or disturbance, e.g., by photographs, videographs, tape recordings, written notes as appropriate</p> <p>b) Document individual items of evidence and their location, for investigational or court purposes</p> <p>c) Measure the overall scene and the relative location of recovered evidence to enable the preparation of accurate and detailed scale drawings for investigators and possible court presentation</p> <p>d) Document damage to private property incurred during the investigation</p>	
<p>3. COLLECT, PRESERVE AND PROCESS EVIDENCE AT CRIME SCENES</p> <p>a) Minimize disturbance and contamination of the crime scene</p> <p>b) Locate, document, collect and preserve:</p> <ul style="list-style-type: none"> ▪ friction ridge impression evidence ▪ two and three dimensional impression evidence ▪ evidence for further examination at the forensic identification unit ▪ evidence for scientific analysis at a forensic laboratory ▪ other evidence as required for the investigation 	
<p>4. DOCUMENT AND PRESERVE CONTINUITY</p> <p>As per local service requirements:</p> <p>a) Document initial forensic examination and prepare report to assist in investigation</p> <p>b) Update the primary investigator on the status of the forensic evidence as laboratory examinations / processes are completed</p> <p>c) Maintain continuity of evidence and preserve it for further examination and / or presentation to court</p> <p>d) Arrange the timely and safe return of personal property</p>	

<p>5. PROCESS AND ANALYZE EVIDENCE</p> <ul style="list-style-type: none"> a) Assess the evidence for completeness to enable the reconstruction of the events of the crime b) Submit / share evidence with the appropriate agencies as required, e.g., Forensic laboratory, central fingerprint repository and other police services. c) Preserve and safeguard original photographic negatives and provide photographic prints as required for investigational and court purposes d) Preserve and safeguard original videotapes and provide a visual record of evidence for investigational and court purposes e) Analyze, compare, evaluate, individualize and preserve friction ridge impressions f) Confirm criminal record through comparison and matching fingerprint impressions g) Analyze, compare, evaluate, individualize and preserve two- and three-dimensional impressions h) Identify and / or verify the origin of other physical evidence e.g. physical match; trace evidence i) Select, process and preserve evidence for court and investigational purposes 	
<p>6. MANAGE EQUIPMENT AND SUPPLIES</p> <ul style="list-style-type: none"> a) Make equipment and supplies available and operational on a continual basis b) Maintain the work area in a clean, safe, and orderly fashion in compliance with Health and Safety requirements 	
<p>7. PREPARE FOR COURT, FORMAL INQUIRY AND CORONER'S INQUESTS AND CLOSE FILES</p> <ul style="list-style-type: none"> a) Prepare evidence for investigational and / or court purposes in a suitable, easily understandable format b) Inform all relevant parties of the evidence to be submitted in court c) Assist counsel in preparing for court d) Present and explain forensic evidence in a professional and understandable manner using appropriate scientific language e) Conclude forensic examination file in accordance with police service and court policies 	

8. ONGOING TRAINING AND SELF-DEVELOPMENT

- a) Engage in regular, ongoing training and / or professional development activities to ensure currency in knowledge, skills and abilities in the field
- b) Keep abreast of new forensic methods and technology
- c) Join professional organizations and / or read professional journals and publications
- d) Comply with requirements of the professional development model as prescribed

Technical Competencies

In addition to the Core Competencies, technical competencies that are developed in training have been identified by the Ontario Police College and the Canadian Police College. Together, the core competencies and the technical competencies provide the foundation for all questions on the re-certification examination. These are:

Photography and the photographic process:

- a. Photographic techniques for crime scenes and small objects
- b. Exposure and contrast control
- c. Use of filters, lenses of differing focal lengths and other accessories
- d. Close-up photography
- e. Electronic flash techniques (e.g. oblique, tented, bounce flash)
- f. Control of light and lighting techniques (e.g. long exposures through available light, oblique lighting, polarizing filter etc.)
- g. Lighting for large scenes at night (e.g. paint by light, multiple flash in the scene, multiple flash at the camera; rear curtain synchronization etc.)
- h. Use alternate lighting sources and techniques including ultraviolet and infrared and other specific bandwidths of visible light in forensic applications
- i. Special camera and lighting techniques for two and three dimensional impressions, such as, fingerprints, tires and footwear
- j. Processing and management of images including scanning and storage of images

Criminalistics:

- a. History of fingerprinting
- b. Skin structure
- c. Philosophy, ethics and scientific principles and methodology of the identification process
- d. Ridgeology
- e. Identification of Criminals Act
- f. Recording fingerprints and palmprints
- g. Fingerprint and palmprint pattern recognition and digit determination
- h. Developing latent fingerprints (powder and chemical methods)
- i. Recovery and preservation of physical evidence

- j. Use of alternate light sources to search for evidence
- k. Preparation and submission of evidence for laboratory examination
- l. Search and comparison of physical evidence (including two and three dimensional impression such as fingerprints and footwear and evidence suitable for physical matching)
- m. Crime scene measurement and sketching
- n. Preparation of charts
- o. Courtroom presentation of identification evidence
- p. Case law and statutes, regulatory and legislative environment for forensic identification
- q. Fingerprinting deceased persons and awareness of other methods of identifying human remains
- r. Comply with quality assurance procedures
- s. Case documentation
- t. Major case management Model, and responsibilities of the forensic specialist including responsibilities regarding search warrants

Ministry Training Standards

THE HISTORY OF FINGERPRINT IDENTIFICATION

Describe the particular contributions of various historical figures in the field of identification taking into account:

Grew: Described pores on hands and feet

Bidloo: Illustrated friction ridges and pore structures

Malpighi: Described several layers of the epidermis, one of which is named after him

Mayer first to remark that arrangement of ridges is never duplicated

Purkinje Described and classified fingerprint patterns in nine groups

Bertillon: Devised a method of personal identification through series of body measurements

Herschel Persistency tests showed that fingerprints do not change over lifetime

Faulds First to use fingerprints in criminal cases, one inculpatory and one exculpatory

Galton Responsible for acceptance of the use of fingerprints for personal identification

Vucetich Devised first practical classification method. In charge of first murder case to use fingerprints as evidence against accused

Henry Responsible for first classification system introduced into Europe, also adopted by North America

Foster First Canadian trained in fingerprinting, responsible for introducing fingerprinting in Canada

Whipple Demonstrated scientifically that the growth of friction skin is persistent

Wilder Demonstrated scientifically that friction skin is unique in nature

Cummins Demonstrated scientifically skin growth patterns in embryos

Hale Demonstrated scientifically morphogenesis of volar skin in embryos

Okajima conducted scientific research on incipient ridges

Ashbaugh Responsible for development of friction ridge analysis and application of principles of ACE-V methodology.

IDENTIFICATION OF CRIMINALS ACT

<p>Explain provisions of the legislation governing identification of criminals, including:</p> <ol style="list-style-type: none">1. the conditions under which a person may be subject to the Act2. statutory right to fingerprint is the Identification of Criminals Act3. appearance notices, promise to appear, recognizance or summons as per Criminal Code now covered under the Act	
<ol style="list-style-type: none">4. consent vs. statutory authority:<ol style="list-style-type: none">a) definitions of consentb) informed consent, vs. implied consentc) adult can consent anytimed) youths will be treated as adults in the context of the Act	
<ol style="list-style-type: none">5. the practical application of the use of force section6. differences between fingerprinting adults and youths7. the restrictions on publication of photographs and fingerprints8. the position of the courts with respect to taking inked footprints	
<ol style="list-style-type: none">9. that fingerprints are used to positively identify an individual in two ways:<ol style="list-style-type: none">a) maintaining an accurate criminal record of an individual; andb) comparison with crime scene impressions10. how many sets of fingerprints can be taken11. return or destruction of fingerprints upon acquittal12. fingerprinting procedure re dual offences13. provisions for Young Offenders under YCJA	

SKIN STRUCTURE AND COMPOSITION OF SECRETIONS

Describe skin structure: a) general description of the skin: i one of the largest organs in the body ii performs several functions; contains skeleton and organs; sensory input; waste elimination iii the layers of the skin	
b) friction ridge surfaces: i nomenclature; friction ridges, epidermal ridges, papillary ridges ii palmar and plantar surfaces iii skin layers: • epidermis and dermis • generating layer • dermal papillae	
c) incipient ridges: i AKA false or nascent ii not fully formed at differentiation iii may not always record at crime scenes or on inked impressions iv not as thick as fully developed ridges v frequently fragmented vi may not contain pores	
d) sweat pores: i opening on surface from sweat glands ii poroscopy and edgeoscopy	
e) abnormal ridges: i disease, damage or birth defect ii dissociation - ridges do not conform to usual fingerprint patterns	
f) effects of injury: i scars ii damage to epidermis only iii damage to generating layer	
g) palmar nomenclature: i distal, medial and proximal phalanges ii interphalangeal flexion creases iii interdigital or triradiate area iv thenar area v hypothenar area vi carpal delta and carpal crease	
Describe composition of secretions including: a) types of secretion glands: i eccrine, sebaceous and apocrine	
b) composition of eccrine sweat:	

<ul style="list-style-type: none"> i 98.5% to 99.5% water and the remainder solids ii solids 33% -50% inorganic and the remainder organic substances 	
<ul style="list-style-type: none"> c) inorganic salts: <ul style="list-style-type: none"> i chlorides, bromide, iodide and fluoride ii four factors affecting concentration of salts 	
<ul style="list-style-type: none"> d) organic substances: <ul style="list-style-type: none"> i amino acids, secreted more copiously in stressful situations ii fatty acids, lipids, waxes, tend to oxidize rapidly iii ammonia and urea 	
<ul style="list-style-type: none"> e) sebaceous and apocrine glands: <ul style="list-style-type: none"> i saturated fats, waxes, squalenes ii picked up by hands from other parts of body 	
<ul style="list-style-type: none"> f) foreign materials: <ul style="list-style-type: none"> i also picked up by hands from bodily secretions, hair, foods, automobiles etc. 	

FINGERPRINT PATTERN RECOGNITION

<p>Identify fingerprint patterns with not less than 75% accuracy given a test set consisting of a mix of all pattern types according to a modified Autoclass nomenclature, taking into account:</p> <p>a) basic terminology:</p> <ul style="list-style-type: none">i ridgeii minutiaeiii coreiv deltav recurving ridgevi recircuited ridge	
<p>b) pattern types:</p> <ul style="list-style-type: none">i archii tented archiii ulnar loopiv radial loopv whorl; central pocket loop; double loop; accidental	

DIGIT DETERMINATION

<p>Describe how the anatomical aspects of a latent fingerprint can assist in digit determination taking into account:</p> <p>a) this information is necessary to ascertain if it is anatomically possible for the matrix deposition to have taken place in the location described</p> <p>b) if it determined to be possible then this aspect will assist in digit determination</p>	
<p>Explain which hand should be searched first when searching a ridged tracing (e.g. "clockwise" whorl pattern)</p>	
<p>Identify two indications that a fingerprint was made by a thumb, taking into account:</p> <ul style="list-style-type: none">c) the shaped) the pattern area is located lower in the printe) side impressions are often thumbsf) thumbs are often found aloneg) its position and the tip ridges on thumbs are usually sloped in an ulnar directionh) marks adjacent to a latent will indicate the position of other digits. When placing your hand over these marks, including the latent print, an indication of which digits these are will be made	

COMPARISON OF FINGERPRINTS

<p>Explain the premises of friction ridge analysis:</p> <ul style="list-style-type: none"> a) persistence (fingerprints do not change from birth to death) b) uniqueness (nature never duplicates) c) clarity of first, second and third level detail 	
<p>Describe overall pattern (first level detail):</p> <ul style="list-style-type: none"> a) shape and size of finger 	
<p>Describe ridge characteristics (second level detail):</p> <ul style="list-style-type: none"> a) ridge ending b) bifurcation c) ridge dot d) short ridge e) enclosure f) spur g) crossover h) trifurcation i) frequency of various characteristics 	
<p>Describe third level detail:</p> <ul style="list-style-type: none"> a) shape and size of pores b) shape and size of ridge units c) overall intrinsic details 	
<p>Explain the philosophy of friction ridge identification:</p> <ul style="list-style-type: none"> a) continuous agreement of characteristics in sequence 	
<p>Describe expected differences and their causes:</p> <ul style="list-style-type: none"> a) crime scene vs. inked impressions b) size of impressions c) dirt on substrate or digit d) excessive ink e) deposition pressure and lateral pressure distortion f) injuries g) explanation to court re "unexplainable" differences 	
<p>Describe the physical conditions under which to conduct analysis:</p> <ul style="list-style-type: none"> a) alone b) away from telephone c) short periods of concentration d) when rested 	
<p>Demonstrate searching a latent fingerprint through a collection taking into account:</p> <ul style="list-style-type: none"> a) begin search with digit determination b) when you have an idea of which digit it is, select a starting point on the latent impression c) often starting points are areas such as the core or delta, look for some major ridge path deviation that is distinctive (this could be a lake next to a bifurcation etc) d) now that you have a point (or series of points) in mind look through your collection. 	
<p>Demonstrate Comparison procedures: ACE-V, taking into account: Analysis:</p> <ul style="list-style-type: none"> d) examine entire print for clarity e) indicators of irregularity or fraudulently produced 	

<p style="text-align: center;">fingerprints:</p> <ul style="list-style-type: none"> ▪ fraudulent fingerprints vs. fraudulent representation of fingerprint evidence ▪ positioning of impression at scene ▪ total absence of pore structure ▪ incompatible background ▪ trace materials lifted by tape incompatible with substrate ▪ two or more identical impressions ▪ outlines around impression <ol style="list-style-type: none"> 1. methods of producing fraudulent fingerprints: <ol style="list-style-type: none"> a) stamped b) transferred c) powdered 2. methods to dispel allegations of irregularity: <ol style="list-style-type: none"> a) systematic collection methods b) photography c) marking for continuity 3. slow, deliberate consideration of all information available 	
<p>Comparison:</p> <ol style="list-style-type: none"> a) always search from unknown to known b) assess continuous agreement of characteristics in sequence: <ol style="list-style-type: none"> i) Select small group of ridge characteristics ii) When necessary sketch the arrangement of those characteristics iii) Eliminate suspect impressions which do not contain the arrangement 	
<p>Evaluation:</p> <ol style="list-style-type: none"> a) side by side comparison of the two impressions b) determine agreement (or lack of agreement) of three levels of detail, pattern, placement of characteristics and shape of individual characteristics c) draw conclusions of inclusion or exclusion: <ol style="list-style-type: none"> i) positively an individualization ii) positively not an individualization iii) insufficient detail to form a conclusion 	
<p>Verification:</p> <ol style="list-style-type: none"> a) independent verification vs. simple agreement with the first opinion b) from originals when possible c) but must preserve continuity of original evidence d) verifier must be experienced in particular comparison type 	

COMPARISON OF PALM PRINTS

Describe palm prints using ridgeology terminology.	
Identify the palm print regions: 1. interdigital region: a) starts at the ulnar edge b) area above the distal transverse and proximal transverse crease c) below the metacarpal phalgeal creases	
2. hypothenar region: a) starts at the ulnar edge b) area below the distal transverse crease and to the ulnar side of the radial longitudinal crease 3. thenar region: a) starts at the radial edge b) area surrounded by the radial longitudinal crease c) cross hatch creases and starburst creases 4. carpal delta region: a) middle of the palm to the base b) area that creates a void when flat palm impressions are taken c) contains the carpal delta	
Identify the major creases in the palm taking into account: a) formed during differential growth b) each has its own characteristics c) distal transverse crease: i starts at the ulnar edge ii ends between the index finger and the middle finger d) proximal transverse crease: i starts at the radial edge of the palm ii ends at the hypothenar region e) radial longitudinal crease: i starts very near proximal transverse crease ii surrounds the base of the thumb iii usually passes to the radial side of the carpal delta	
Identify ridge flow (Level 1 detail): 1. ridge flow (Level 1 detail): a) different in each region of the palm b) relatively predictable	
2. ridge flow in interdigital region: a) more often than not, below each finger is a delta b) generally clear detail	

<ul style="list-style-type: none"> c) below little finger; "Mound over Flat" ridges d) tail on delta below the middle finger is almost always ulnar e) looping formations usually found in area between and below the little and ring fingers f) usually 4 deltas can be 6 or more 	
<p>3. ridge flow in the hypothenar region:</p> <ul style="list-style-type: none"> a) patterns are common in the mid to lower hypothenar region. b) clear detail c) funnel area: Ridges diverge, Many ridge endings d) ridges flow "Down and out" and exit the Ulnar side of the palm e) carpal delta usually at the base f) inward Loop: Usually two deltas 	
<p>4. ridge flow in the thenar region:</p> <ul style="list-style-type: none"> a) patterns are common in the upper thenar region (also called Vestiges) b) cross hatch creases c) starburst crease d) ridges flow in an arc "Long over Short" e) usually very poor ridge detail f) cross hatch creases emanate from base of the thumb 	
Determine which hand made an impression.	
Orient the palm.	
Identify latent palm print shapes:	
<p>1. shapes in the hypothenar region:</p> <ul style="list-style-type: none"> a) "L" shape b) "long egg" shape 	
<ul style="list-style-type: none"> c) shapes in the interdigital region <ul style="list-style-type: none"> i Undulating shape ii Triangular shape d) shapes in the thenar region <ul style="list-style-type: none"> i "Short Egg" shape e) shapes in the base of palm region <ul style="list-style-type: none"> i "W" shape only if the wrist did not make contact 	

SEARCHING EVIDENCE IMPRESSIONS

Describe the need to obtain elimination impressions from: 1. victim and complainant 2. relatives, friends, visitors 3. police officers 4. identification personnel	
Determine if a crime scene fingerprint is an evidence impression.	
Determine the pattern type of the crime scene impression and known impressions taking into account: 1. partial impressions 2. impression may be only part of larger pattern type	
Determine the digit of the impression taking into account: 1. need to photograph and lift all impressions, including smudges 2. impressions found alone - pattern type to digit 3. ulnar/radial trends 4. recognizing thumb impressions 5. ridge tracing	
Identify files or collections against which evidence impressions can be searched: 1. persons known to have been at the scene 2. suspects 3. single fingerprint file 4. RCMP submission 5. reverse search 6. circulate to other police services 7. ten finger file	
Demonstrate searching techniques.	

TAKING INKED FINGERPRINTS

<p>Take inked fingerprints to the extent that:</p> <ol style="list-style-type: none"> 1. friction ridge detail is clearly recorded 2. the impressions are correctly located on the fingerprint forms 3. palm impressions are recorded on separate sheets and 4. all pertinent personal information is included on the fingerprint form 	
<p>Explain the uses of inked fingerprints for:</p> <ol style="list-style-type: none"> 1. criminal records 2. crime scene comparisons 	
<p>Utilize RCMP forms for rolled and plain impressions, including:</p> <ol style="list-style-type: none"> 1. physical description information 2. date and signatures 	
<p>Use equipment taking into account:</p> <ol style="list-style-type: none"> 1. work surface at height to keep arm, wrist and hand of subject parallel to floor 2. fingerprint form holders, fixed left or right of inking surface for operator comfort 3. inking plate, roller and ink 4. applying ink to the plate 5. pre-inked strips 6. requirement for and method of keeping equipment clean 7. hand washing facilities for subject before and after fingerprinting 	
<p>Demonstrate control of subject:</p> <ol style="list-style-type: none"> 1. control needed to ensure best quality fingerprint impressions 2. calm and relaxed subject will aid in obtaining good quality impressions 3. stances for control of subject 4. safest stances to reduce opportunity for assault on technician 5. grasping hands for best control and thus good quality impression 	
<p>Roll the impressions:</p> <ol style="list-style-type: none"> 1. thumb in towards body 2. fingers outwards away from body 3. nail edge to nail edge 4. continuous motion; drop, roll, lift 5. unused area of inking surface for each digit 	
<p>Collect plain impressions:</p> <ol style="list-style-type: none"> 1. no rolling 2. used to check correct order of rolled impressions and for comparisons 3. fingers all together, thumb separate 4. ink to third joint 5. placement on C-216 form 6. centered within correct boxes 	

<ul style="list-style-type: none"> 7. impression within 15° either side of vertical 8. flexion crease just above bottom line of box 9. plain impressions may be placed on angle if too large to fit 	
<p>Account for injuries, amputations, abnormalities:</p> <ul style="list-style-type: none"> 1. bandaged digits noted in digit space on form "unable to print" 2. amputation date noted in digit space 3. abnormalities noted in description box 4. extra digits inked and recorded in plain impression box 5. five main digits recorded in rolled impression boxes 	
<p>Check the results:</p> <ul style="list-style-type: none"> 1. rolled nail to nail, full pattern area recorded 2. all deltas recorded 3. flexion crease 2-3 mm above bottom line of box 4. impressions centered and square in box 5. inking even and correct density 6. clear sharp impressions with no smearing 7. impressions rolled in correct order on form 	
<p>Take palm impressions:</p> <ul style="list-style-type: none"> 1. curved vs. flat surfaces 2. gripping the hand 3. significant areas of palm, tri-radiate, thenar and hypothenar 4. gripping the hand of the subject 5. making the impression 6. recording the writers' palm (outside, ulnar extension of palm to end of little finger) 	
<p>Clean up:</p> <ul style="list-style-type: none"> 1. for subject; hand cleaner and washing facility 2. for equipment; non-flammable, non-greasy solvent 3. covering pre-inked strip to prevent drying out 	

EXAMINING THE CRIME SCENE

Define what constitutes a crime scene.	
Define evidence.	
Explain Locard's principle: 1. two way transfer of trace evidence at every contact 2. suspect to victim 3. victim to suspect 4. suspect to scene 5. scene to suspect	
Protect of the scene from contamination by: 1. complainant, victim, friends, family, neighbours 2. persons not directly involved 3. police, fire, ambulance personnel	
Take precautions to prevent contamination taking into account: 1. fragility of fingerprint and other impressions 2. perishability 3. special precautions for DNA 4. universal precautions	
Plan the search by: 1. obtaining details before entering the scene 2. talking to first officer, investigators, witnesses, victim and complainant	
Conduct a walk through the scene to determine the path of contamination taking into account: 1. the route to the scene 2. the point of entry 3. object of attack 4. other logical areas or objects 5. the path of exit	
Photograph the crime scene: 1. overall to show scene as found to establish where evidence was found 2. mid range photographs of points of interest 3. close ups of points of interest	

COLLECTION OF PHYSICAL EVIDENCE

<p>Collect impression evidence taking into account:</p> <ol style="list-style-type: none"> 1. using universal precautions in handling: <ol style="list-style-type: none"> a) sharps b) bodily fluids and tissue 	
<ol style="list-style-type: none"> 2. health and safety precautions: <ol style="list-style-type: none"> a) structural integrity of scenes b) firearms c) hazardous materials: <ol style="list-style-type: none"> i) chemical ii) biological iii) radiological iv) nuclear 	
<ol style="list-style-type: none"> 3. handling exhibits to mitigate damage and/or contamination caused by the examination techniques 	
<p>Collect and label samples from victim/suspect for DNA analysis, in compliance with CFS requirements as noted in the <i>Handbook of Forensic Evidence for the Investigator</i> taking into account methods for:</p> <ol style="list-style-type: none"> 1. blood 2. buccal swabs 3. hair 4. hairs and fibers from crime scenes 5. firearms' residues from suspected shooters 	
<p>Collect evidence for examination in police service facility, including:</p> <ol style="list-style-type: none"> 1. fingerprints 2. 2-dimensional impressions 3. 3-dimensional impressions 4. physical matching 	
<p>Describe the functions of the Forensic Laboratory taking into account:</p> <ol style="list-style-type: none"> 1. identifying objects and materials 2. revealing additional information 3. detecting and quantifying drugs or poisons 4. comparing objects and materials 	
<p>Describe the possible conclusions that may be reached following an examination:</p> <ol style="list-style-type: none"> 1. certainty 2. probability 3. possibility 	
<p>Obtain impressions/DNA for elimination purposes.</p>	

CRIME SCENE FINGERPRINTS

Choose methods for examination of a large variety of substrates taking into account: 1. the suitability of various surface materials: a) size b) surface continuity c) material d) cleanliness	
2. four types of chance impressions: a) latent b) visible/patent c) deposit d) take-away	
3. suitability of impressions: a) very small partial impressions may have sufficient detail	
4. the composition of impressions	
5. the age of impressions	
6. life span of impressions: a) composition of impression b) effect of environmental conditions, freezing, hot sun, humidity c) substrate on which it has been deposited	
7. the methods of dealing with adverse environmental conditions to improve chances of fingerprint deposits being amenable to development in certain environmental conditions: a) huffing b) freeze-thaw	
8. age of the deposit factors: a) person b) substrate c) environment	

CRIME SCENE EXAMINATION USING ALTERNATE LIGHT SOURCES

Describe and demonstrate the use of an alternate light source to detect impression evidence, bodily fluids and trace evidence taking into account: 1. properties of visible light: a) photoluminescence b) chemoluminescence c) fluorescence d) luminescence	
2. properties of invisible light: a) infrared b) ultraviolet	
3. structure and function of an alternate light source: a) strength of the light b) range of visible light c) exciter Filters d) ultraviolet e) infrared f) laser	
4. method of operation: a) fibre optics b) interchangeable filters c) barrier Filters	
5. searching the scene: a) sequential plan b) protecting the scene from equipment contamination c) with white light d) with 450 nm filter e) with 530 nm (Laser) f) with ultraviolet g) with Infrared	
6. describe and locate items under alternate light sources: a) bodily fluids: i blood ii semen iii urine iv saliva b) hairs c) fibres d) inherently fluorescing fingerprints e) footwear impressions	
7. photograph items	
8. collect and package	

POWDER DEVELOPMENT OF FINGERPRINT IMPRESSIONS

Describe characteristics of metallic, granular, fluorescent and magnetic powders: 1. granularity 2. metallic 3. colour 4. fluorescence 5. magnetic 6. comparison testing procedure of each	
Describe and demonstrate selection of fingerprint powder for development of visible and latent impressions taking into account: 1. visible impressions: a) little or no further development required before photography b) may need to enhance with powder before lifting	
2. three dimensional impressions: a) may be possible to cast after photography	
3. latent impressions: b) powder and related development methods of development c) chemical methods of development (general reference only)	
4. powder development methods: a) metallic powders b) granular powders c) magnetic powders d) fluorescent powders	
5. care of fingerprint powders care of powders: a) contaminants and humidity b) container size and amount of powder carried	
6. other powder choice factors: a) adherence to substrate b) contrast with substrate colour	

USE OF FINGERPRINT BRUSHES

<p>Describe and demonstrate:</p> <p>a) loading a fiberglass brush with metallic or granular powders:</p> <ul style="list-style-type: none"> i history of development ii outstanding characteristics <p>b) loading the brush with powder:</p> <ul style="list-style-type: none"> i metallic powders ii granular powders <p>c) development of fingerprint impressions using a fiberglass brush:</p> <ul style="list-style-type: none"> i almost perpendicular to surface ii very gentle contact with impression iii follow direction of the ridges <p>d) cleanup technique:</p> <ul style="list-style-type: none"> i very careful technique required ii use clean squirrel or camel hair brush iii follow ridge flow iv angle brush at 45° from surface and draw it along surface v watch for abrasion, stop immediately 	
<p>Describe and demonstrate:</p> <p>1. powdering with hair brush:</p> <ul style="list-style-type: none"> i contaminated surfaces ii easier to clean iii extreme care needed while searching for latent impressions iv does not hold as much powder as fiberglass brush v can be emptied of powder by tapping over suitable container <p>2. using a hair brush for cleanup</p> <p>3. powdering technique with a hair brush on contaminated surfaces</p>	
<p>Describe and demonstrate:</p> <p>a) using a magnetic wand and magnetic powders:</p> <ul style="list-style-type: none"> vi biggest advantage - wand does not touch impression vii magnetized tip can be easily wiped clean 	
<p>Describe and demonstrate care of brushes:</p> <ol style="list-style-type: none"> 1. carrying and storing in fingerprint kit 2. storing brushes 3. cleaning a contaminated brush 	
<p>Describe:</p> <ol style="list-style-type: none"> 1. carbon fiber brushes: <ul style="list-style-type: none"> a) no real advantage over fiberglass <ul style="list-style-type: none"> i more expensive 2. feather duster <ul style="list-style-type: none"> a) Advantage - applies small amount of powder especially for multicoloured surfaces 	

PROTECTING AND LIFTING POWDERED IMPRESSIONS

<p>Describe and demonstrate protection and collection of powdered impressions to the extent that:</p> <p>1. The impressions are correctly marked for identification and continuity:</p> <ul style="list-style-type: none"> a) importance for court b) must contain four pieces of information <ul style="list-style-type: none"> i address ii date iii initials or badge number of identification officer iv identifying number for that particular impression 	
<ul style="list-style-type: none"> c) the impressions are protected for future production in court: <ul style="list-style-type: none"> 1. do not lift if potential for destruction is high 2. acetate cover 3. tape 4. protective container 5. lifting tape 6. fingerprint tape: <ul style="list-style-type: none"> a) various types and sizes 	
<p>photographs are taken:</p> <ul style="list-style-type: none"> a) photographs should always be taken before lifting b) medium distance shot to locate the impression in the scene c) full size (1:1) d) scale in frame for accurate size check e) potential for defense arguments if no photograph taken 	
<p>1. elastomer materials:</p> <ul style="list-style-type: none"> a) description of the materials b) useful for irregular surfaces c) elastomer mixing and lifting technique 	
<ul style="list-style-type: none"> d) dental stone and similar materials: <ul style="list-style-type: none"> i description of the material ii useful for textured surfaces iii techniques 	
<ul style="list-style-type: none"> e) lift backings: <ul style="list-style-type: none"> i white file cards ii white acetate sheets iii acetate sheets: <ul style="list-style-type: none"> ▪ black ▪ clear ▪ frosted 	

RELATED POWDER DEVELOPMENT METHODS

<p>Describe and demonstrate the use of smoke, and powder suspension methods of impression development by:</p> <ol style="list-style-type: none">1. selecting the appropriate methods of impression development on polished metal, galvanized metal and wet surfaces	
<ol style="list-style-type: none">2. developing impressions using camphor smoke taking into account:<ol style="list-style-type: none">a) impressions dry out on some substrates and will not readily accept powder and/or can be easily damaged by brush development techniquesb) highly polished and galvanized surfacesc) camphor smoke techniqued) possible difficulty in lifting from galvanized surfaces	
<ol style="list-style-type: none">3. developing impressions using powder suspension also called Small Particle Reagent, SPR or molybdenum disulfide) taking into account:<ol style="list-style-type: none">a) mixing and using SPR to develop impressions on wet surfaces or on non-porous substrates that have become wet after impression depositedb) preparing the formulac) technique, spray or immersion	
<ol style="list-style-type: none">4. using materials safely and cleaning up	

CHEMICAL DEVELOPMENT OF FINGERPRINT IMPRESSIONS

<p>Describe substrates that will accept chemical development taking into account:</p> <ol style="list-style-type: none"> 1. porous materials such as paper/cardboard; raw wood; leather; and skin 2. non porous materials such as glass, smooth nonporous, non ferrous surfaces, plastics, untreated metal, and waxy surfaces 	
<p>Describe matrix of friction ridge secretions taking into account:</p> <ol style="list-style-type: none"> 1. types of secretion glands 2. composition of eccrine sweat 3. inorganic salts 4. organic substances 5. sebaceous and apocrine glands 6. foreign materials 	
<p>Select chemical process appropriate to substrate and matrix taking into account: the sequencing of processes for</p> <ol style="list-style-type: none"> 3. non destructive: <ol style="list-style-type: none"> a) porous substrates: <ol style="list-style-type: none"> i) visual examination ii) fluorescent /alternate light source examination iii) iodine fuming examination b) non porous substrate: <ol style="list-style-type: none"> i) visual examination ii) powder development 	
<ol style="list-style-type: none"> 7. destructive processes: <ol style="list-style-type: none"> a) chemical development of porous substrates: <ol style="list-style-type: none"> i) powder techniques ii) D.F.O. for amino acids iii) ninhydrin for amino acids iv) physical developer for salts b) chemical development of nonporous substrates: <ol style="list-style-type: none"> i) cyanoacrylate (CA) fuming for lipids/fatty acids ii) powders iii) dye stains for enhancement of CA iv) fluorescence examination 	
<ol style="list-style-type: none"> 8. Photograph exhibits at every stage of process. 	

IODINE FUMING

Describe and demonstrate the use of iodine fuming for development of impressions on porous surfaces using a fuming pipe and impregnated crystals taking into account: 1. benefits of iodine: a) crystals sublime easily at body temperature b) fumes dissipate quickly c) fumes are non destructive to fingerprint impression d) fumes do not affect non-metallic substrates e) has been successfully used on human skin	
1. theory of use: a) temporarily absorbed by waxes, greases etc. in deposit of impressions b) time limit for expectation of good development 2-5 days c) equipment, cabinet, pipe, impregnated crystals d) physical reaction (not a chemical reaction)	
2. enhancement of impressions: a) naphthylamine treatment on flat paint, raw wood, Styrofoam etc.	
3. transfer from human skin: a) specific areas of body during assault or handling after death b) time limits on living and dead victims c) systematic search, divide bodies into squares d) low rate of success but as good as any on bodies	
State the time limitations of the method.	
Transfer impressions from surfaces using: 1. the silver plate transfer method: a) theory of process b) equipment required c) the technique and/or 2. fix impressions with naphthylamine	
Comply with health and safety requirements taking into account: 1. toxicity of crystals and fumes: a) in both forms highly corrosive to metal b) avoid skin contact with the crystals c) generate fumes only with adequate ventilation d) do not breathe fumes	
2. removal of iodine stains: a) air circulation b) ammonia fumes c) steam	
3. storage of iodine: d) fumes very volatile, will escape from any container e) keep container in vented storage f) do not use metallic caps on containers	

D.F.O. (1,8 DIAZAFLUOREN-9-ONE)

Prepare D.F.O. recipe: 1. formulae with HFE -7100	
Describe and demonstrate the use of D.F.O. to develop fingerprint impressions on porous surfaces taking into account: 1. origin of D.F.O: a) 1988 at Home Office Research Establishment, England, reported better results than with ninhydrin	
2. substrates: a) paper products or other porous substrate b) not including thermal paper	
3. process: a) two immersions in D.F.O. (allow to dry between immersions) b) heat at 100° C for ten minutes (three minutes if planning to use Physical Developer later) c) reaction with amino acids d) fluoresces strongly under 470 nm	
4. sequential development: a) D.F.O. then ninhydrin, then physical developer	
5. health and safety considerations: a) ventilation	

NINHYDRIN

Prepare ninhydrin and zinc chloride in accordance with recipes provided utilizing HFE-7100	
Describe and demonstrate the use of ninhydrin to develop fingerprint impressions on paper (and other porous surfaces) taking into account: 1. chemical names: a) 1,2,3 triketohydrindene hydrate b) 1,2,3, indantrione monohydrate	
2. history: a) synthesized 1910 b) reported for fingerprint use 1954 c) became most successful method on paper d) presently most common method	
3. age of latents: a) no limit providing substrate has remained dry	
4. chemistry of the process: a) reacts with amino acids and ammonia b) reaction results in Ruhemann's purple colour c) for best success must rigidly follow established procedure	
5. methods of application: a) immersion (dipping) b) spraying c) brushing or swabbing	
6. the development environment: a) humidity b) temperature c) steam iron 7. recommended procedure: a) quick dip b) allow solvents to evaporate c) set exhibits in environment of 70% relative humidity d) leave for several days e) if quick preliminary result are needed, heat at 80° C for three minutes	
8. stability of the impressions	
9. removal of staining: a) immersion in 1%-3% ammonia in water	
10. modification of colour: a) use zinc chloride to give orange which is also fluorescent at 488 nm when Ruhemann's purple close to colour of substrate	
11. health and safety considerations: a) ventilation b) add acid slowly to alcohol, never vice versa c) toxicity of chemicals	

PHYSICAL DEVELOPER

<p>Describe the use of physical developer to process fingerprint impressions on paper taking into account:</p> <p>1. history:</p> <ul style="list-style-type: none">a) Home Office formulated PD in 1975 specifically for identification use	
<p>2. technical details:</p> <ul style="list-style-type: none">a) surfactant stabilized solution containing a redox system, an acidic buffer and detergentsb) the detergents protect the silver nitrate in solution prior to exposure to greasy fingerprintc) the oils and greases of the fingerprint deposit strip the detergents from the silver nitrated) the redox solution then converts the silver nitrate to metallic silver that is deposited on the impression	
<p>3. purpose:</p> <ul style="list-style-type: none">a) for developing lipid impressions on porous surfacesb) useful for greasy footwear on papers and cardboardc) especially valuable for substrates which are, or have been, wet since the impression was depositedd) maximum age of impressions as yet unknown but seven years claimed so far	
<p>4. sequential use:</p> <ul style="list-style-type: none">a) can be used following processing with D.F.O. and/or Ninhydrinb) tests have developed 12% to 13% more impressions following D.F.O. or Ninhydrinc) special considerations of heat during D.F.O./Ninhydrin processes	
<p>5. process:</p> <ul style="list-style-type: none">a) water or maleic acid pre-wash to prevent premature deposit of silverb) document carefully slid into solutionc) careful handling required to avoid depositing marks on documentd) washing in distilled then tap water	
<p>6. cleanliness:</p> <ul style="list-style-type: none">a) equipment must be spotlessly clean to prevent precipitation of the silver out of solutionb) the various solutions should be mixed and stored only in glassware dedicated	

<p>to a single solution to avoid cross contamination while mixing</p> <p>c) store in tightly capped brown bottles</p>	
<p>7. formulae:</p> <p>a) stock detergent solution</p> <p>b) silver nitrate solution</p> <p>c) redox solution</p> <p>d) P.D. working solution</p> <p>e) adjusting the sensitivity of the reagent</p>	
<p>8. health and safety considerations:</p> <p>a) MSDS sheets</p> <p>b) caution re allergic reactions to detergents</p> <p>c) ferric nitrate and maleic acid are listed as irritants</p> <p>d) silver nitrate is toxic and mildly corrosive, causes staining</p>	

CYANOACRYLATE FUMING

<p>Describe and demonstrate the use of cyanoacrylate fuming to develop fingerprint impressions taking into account:</p> <p>1. origin of the process:</p> <ol style="list-style-type: none"> 1958 first developed as an adhesive methyl/ethyl 2-cyanoacrylate still not known precisely which components of fingerprint secretions cause the cyanoacrylate to polymerize 	
<p>2. history of use in Identification:</p> <ol style="list-style-type: none"> 1977 – Japanese identification service 1978 – demonstrated by Tokyo Metropolitan Police 1979 – effect observed in England 1981-2 – Bourdon patents for USA and Canada 	
<p>3. basic process:</p> <ol style="list-style-type: none"> air tight chamber a few drops of cyanoacrylate slow, easy to control degree of development 	
<p>4. other considerations:</p> <ol style="list-style-type: none"> inhibitors heat air circulation chemical reactions atmospheric pressure humidity: <ol style="list-style-type: none"> humidity is possibly a catalyst for development 80% Relative Humidity too much humidity can make impressions fragile still debate re catalytic properties of humidity humidity does make impressions easier to see because of 'frosted' appearance 	
<p>5. age of impressions:</p> <ol style="list-style-type: none"> oldest known to date deposited nine years before development 	
<p>6. developed impressions:</p> <ol style="list-style-type: none"> whitish, usually permanent occasionally fragile must use care when dyeing impressions vacuum development often results in very transparent impressions that must be dyed to visualize 	
<p>7. enhancing impressions:</p>	

<ul style="list-style-type: none"> a) powders b) dye staining in conjunction with alternate light sources 	
<p>8. damage and cleanup:</p> <ul style="list-style-type: none"> a) damage to electrical switches, plastic surfaces b) some deposits will wash off with soap and water c) others require solvent which may attack painted or plastic substrates 	
<p>9. handling and health and safety:</p> <ul style="list-style-type: none"> a) tissue bonders, wear gloves b) wear goggles when opening a fuming chamber c) soak hands in warm soapy water to attempt to separate bonded skin d) products commercially available to release the bonding 	

ADHESIVE TAPE EXAMINATION

<p>Describe and demonstrate the use crystal violet to develop fingerprint impressions taking into account:</p> <ol style="list-style-type: none">1. the recipe for crystal violet dye2. the basic crystal violet dye process for adhesive tapes3. methods of examining balled adhesive tape4. handling precautions and health and safety considerations	
<p>Describe and demonstrate the use of sticky side powder to develop fingerprint impressions taking into account:</p> <ol style="list-style-type: none">1. the recipe for sticky side powder2. mixing powder in a suspension3. application of suspension4. handling precautions and health and safety considerations	
<p>Describe and demonstrate the use of titanium dioxide for the development of fingerprint impression on dark tapes taking into account:</p> <ol style="list-style-type: none">1. the recipe for titanium dioxide2. mixing powder in a suspension3. application of suspension4. handling precautions and health and safety considerations	

SILVER NITRATE

<p>Describe the use of silver nitrate to develop impressions that contain salt taking into account:</p> <ol style="list-style-type: none">1. historical and current uses:<ol style="list-style-type: none">a) fingerprint impressions, technique now replaced by much more successful ninhydrin processb) footwear impressions during winter months2. theory of process:<ol style="list-style-type: none">a) silver nitrate reaction with saltb) product is actinic, darkens in light3. methods of application:<ol style="list-style-type: none">a) immersionb) brushing, swabbingc) spraying4. removing stains:<ol style="list-style-type: none">a) mercuric nitrate or mercuric chloride solution5. formulae and:<ol style="list-style-type: none">a) 3%, 5% and alcohol based silver nitrate reagents	
<p>Comply with health and safety requirements:</p> <ol style="list-style-type: none">1. mercuric chloride or nitrate clearing solution caustic solution, eye and hand protection required	

THERMAL PAPER EXAMINATION

<p>Use muriatic acid to develop impressions that contain amino acids on thermal paper taking into account:</p> <ol style="list-style-type: none">1. history and theory of process:<ol style="list-style-type: none">a) discovered accidentally by using muriatic acid to clean floorsb) the acid etches the amino acid into the thermal paperc) physical reaction similar to iodined) the impression will dissipate over time	
<ol style="list-style-type: none">2. method of application:<ol style="list-style-type: none">a) closed vesselb) vapour developmentc) result will be greenish coloured impressionsd) must be photographed immediately	
<p>Comply with health and safety requirements:</p> <ol style="list-style-type: none">1. muriatic acid will cause burns to skin2. hand and eye protection required3. good ventilation required (fume hood if indoors)	

FINGERPRINT ANALYSIS REPORT

<p>Complete a fingerprint analysis report taking into account:</p> <ol style="list-style-type: none"> 1. Bench notes 2. Explanation of how individualization was made, demonstrates thoroughness of analysis 3. Permits quality reviews and controls 4. Implications of Daubert case in USA and related case law in Canada 	
<p>Technical report format</p> <ol style="list-style-type: none"> a) title page b) detail or introduction <ol style="list-style-type: none"> i who and why ii where and when iii what iv how 	
<ol style="list-style-type: none"> c) analysis of unknown print <ol style="list-style-type: none"> i substrate ii matrix iii development medium iv deposition pressure v pressure distortion (lateral) vi clarity of level 1; level 2 and level 3 * vii anatomical aspects 	
<ol style="list-style-type: none"> d) substrate distortion <ol style="list-style-type: none"> i flexibility ii shape iii contamination iv soft (mold) 	
<ol style="list-style-type: none"> e) matrix particulars <ol style="list-style-type: none"> i sweat / sebaceous ii wet iii mud type print iv paint/ blood v corrosive matrix vi matrix absent/take away 	
<ol style="list-style-type: none"> f) development medium <ol style="list-style-type: none"> i iodine fuming ii fingerprint powders iii ninhydrin iv silver nitrate v physical developer vi cyanoacrylate / dye vii metal deposition 	
<ol style="list-style-type: none"> g) deposition pressure <ol style="list-style-type: none"> i flattening of the ridges ii broadening of the ridges iii furrow width iv light touch 	
<ol style="list-style-type: none"> h) pressure distortion -lateral <ol style="list-style-type: none"> i smearing / smudging 	

	ii	double tap	
	iii	twisting	
	iv	longitudinal	
	v	lateral	
i) clarity	i	first level detail --non specific.. acknowledges the presence of friction ridge detail.	
	ii	second level detail--major ridge path configuration	
	iii	third level detail-- intrinsic detail (ridge units, pores); most individualizing power; determines level of tolerance	
j) anatomical aspects	i	normal way of holding / touching item	
	ii	digit determination	
	iii	clusters	
k) writing tips	i	clear	
	ii	concise	
	iii	correct	
	iv	consistent	
	v	careful	
	vi	confident	
	vii	objective and neutral	

TWO-DIMENSIONAL FOOTWEAR IMPRESSIONS

Locate and photograph two-dimensional footwear impressions: a) using a scale for photography	
Preserve, collect two-dimensional footwear impressions taking into account: 1. difficulty of assessing the value at the scene: a) collect and then examine later b) may need studio lighting	
2. why two-dimensional impressions are often overlooked 3. pattern files: a) footwear databases available (SICAR and Solemate) 4. where to look: a) anywhere person could have walked at the scene b) include chairs, tables desks, papers etc.	
2. materials of which they may be composed: a) dust, dirt, sand, soil b) oil, grease c) blood d) take-away impressions	
3. locating impressions: a) utilize methods identified in crime scene examination and crime scene examination using alternate light sources	
4. sequential procedure: a) photograph b) depending on substrate select method to enhance impression	
5. lifting methods: a) lifting film (Mylar) and electrostatic charge b) electrostatic lifting device c) rubber or gelatin lifters d) dental stone powders and tapes	
Compare impressions taking into account: 1. class (manufactured) characteristics a) intentional or unavoidable characteristics that repeats during the manufacturing process b) are shared by one or more other shoes	
2. random (accidental) characteristics e) characteristics in which the size, shape, position, orientation, f) depend, to some degree, on chance	
3. wear characteristics g) changes in the surface of the outsole that are observable in the impression	

<p>and/or known shoe and that reflect the erosion of the surface of the outsole</p> <p>h) primarily used in the elimination of footwear</p>	
<p>4. test impressions</p> <p>i) need to make them</p> <p>j) methods of making them</p> <p>5. expected differences and their causes</p> <p>k) crime scene vs. known impressions</p> <p>l) substrate</p> <p>m) explanation to court re "unexplainable" differences</p> <p>6. physical conditions under which to conduct analysis</p>	
<p>procedure using ACE-V as per fingerprint comparisons</p> <p>analysis:</p> <p>i examine for clarity</p> <p>ii indicators of irregularity</p> <p>iii slow, deliberate consideration of all information available</p>	
<p>comparison:</p> <p>iv always search from unknown to known</p> <p>v assess continuous agreement of characteristics in sequence</p> <p>vi when necessary sketch the arrangement of those characteristics</p> <p>vii eliminate suspect impressions which do not contain the arrangement</p>	
<p>b) evaluation:</p> <p>i side by side or superimposition comparison of the two impressions determine agreement (or lack of agreement) of detail, pattern, placement and shape of characteristics</p> <p>ii draw conclusions of inclusion or exclusion:</p> <ul style="list-style-type: none"> • identification • non-identification • insufficient detail to form a conclusion 	
<p>verification:</p> <p>iv independent verification</p> <p>v from originals when possible</p> <p>vi preserve continuity of original evidence</p> <p>vii verifier must be experienced in particular comparison type</p>	

THREE-DIMENSIONAL FOOTWEAR IMPRESSIONS

Describe the preservation, collection and examination of three-dimensional footwear impressions taking into account: 1. photography a) placement of footwear scale for photography	
2. reasons for casting: a) more information than in photograph b) without cast may not be able to form definite opinion c) replicate footwear (or other 3 dimensional object)	
3. general procedure: a) protect b) photograph c) clean out d) strengthen e) use release agent f) build a retaining wall g) mixing, no measure vs. pre-measured methods h) pouring stone i) curing j) marking for continuity identification k) cleaning cast	
4. characteristics of various casting materials: a) compression strength b) setting times c) size stability d) size of the impression related to object size e) equipment required	
5. casting in snow – sulphur: a) type of sulphur b) method of heating c) preparation of impression, pouring trough d) pouring the sulphur, temperature e) health and safety of sulphur	
6. casting in snow – wax: a) snow-print wax, origins and description b) method of use c) cost d) evaluation of the above two methods of casting in snow	
7. casting with elastomer materials: a) cost b) shelf life c) dimensional stability d) rigidity e) effect of temperature	

<ul style="list-style-type: none"> f) ease of application g) ease of release h) photographic reproduction i) method of use <p>8. casting with dental stone</p> <ul style="list-style-type: none"> a) modifying setting time <p>9. casting impressions in water:</p> <ul style="list-style-type: none"> a) partly filled with water b) completely submerged 	
<p>10. Compare impressions taking into account:</p> <ul style="list-style-type: none"> a) must have suspect shoe b) physical conditions under which to conduct analysis c) procedure using ACE-V as per two-dimensional footwear impressions 	
<ul style="list-style-type: none"> d) class (manufactured) characteristics <ul style="list-style-type: none"> i) intentional or unavoidable characteristics that repeats during the manufacturing process ii) are shared by one or more other shoes e) random (accidental) characteristics <ul style="list-style-type: none"> i) characteristics in which the size, shape, position, orientation, ii) depend, to some degree, on chance 	
<ul style="list-style-type: none"> f) wear characteristics <ul style="list-style-type: none"> i) changes in the surface of the outsole that are observable in the impression and/or known shoe ii) reflect the erosion of the surface of the outsole iii) primarily used in the elimination of footwear g) expected differences and their causes: <ul style="list-style-type: none"> i) crime scene vs. known impressions ii) substrate iii) explanation to court re "unexplainable" differences 	

TWO-DIMENSIONAL TIRE TRACK IMPRESSIONS

Locate and photograph two-dimension tire track impressions ensuring use of a scale for photography.	
<p>Preserve and collect two-dimensional tire track impressions taking into account:</p> <ul style="list-style-type: none"> a) assessing the value at the scene b) test impressions: <ul style="list-style-type: none"> i) need to make them ii) methods of making them c) pattern files: <ul style="list-style-type: none"> i) tire track and tread databases available (e.g. Tread Assist) d) materials of which they may be composed: <ul style="list-style-type: none"> i) dust, dirt, sand, soil ii) oil, grease iii) blood iv) take-away impressions 	
<ul style="list-style-type: none"> e) locating impressions: <ul style="list-style-type: none"> i) utilize methods identified in crime scene examination and crime scene examination using alternate light sources f) sequential procedure: <ul style="list-style-type: none"> i) photograph ii) select method to enhance impression depending on substrate 	
<ul style="list-style-type: none"> g) lifting methods: <ul style="list-style-type: none"> i) lifting film (Mylar) and electrostatic charge ii) electrostatic lifting device iii) rubber or gelatin lifters iv) dental stone powders and tapes 	

COMPARISON OF OTHER IMPRESSIONS

Perform impression comparisons on tool marks and gloves	
Apply the four step scientific method (ACE-V) to the examination of glove and tool impressions	
Compare crime scene impressions with the objects, or test impressions, and give an opinion as to their origins taking into account: a) location, preservation, collect and examination of various types of impressions i) gloves ii) fabric iii) tools	
b) characteristics and value for individualization: i class ii individual	
c) scientific method must followed enhance accuracy and objectivity: i) analysis ii) comparison iii) evaluation iv) verification d) test impressions: i) need to make them ii) methods of making them	

PHYSICAL MATCHING

Explain the division of responsibility between the Forensic Identification Officer and the Forensic Laboratory.	
Describe five factors, which may be considered.	
Explain three methods of illustrating the fit of the pieces.	
Make and illustrate a physical match with an appropriate technique taking into account: a) division of responsibility between forensic identification officer and forensic laboratory b) factors to consider: i edge fit ii surface fit iii edge irregularities iv surface irregularities v variations in thickness	
c) methods of illustrating the fit: i photography in juxtaposition ii side by side iii overlay iv minimizing reflections for photography	

VERIFICATION OF THE IDENTITY OF UNKNOWN DECEASED

Explain the role of the police in identifying unknown deceased persons.	
Explain the reliability of commonly used methods of identification: a) visual b) photographic c) clothing and personal effects d) fingerprinting e) dental records f) DNA	
Explain the role of forensic dentists and the CPIC dental characteristics file.	
Explain the reasons for fingerprinting cadavers: a) inquest b) criminal investigation c) release of body to relatives d) religious e) insurance f) estate settlement g) government records h) unknown deceased i) verification of identity j) elimination of impressions from the crime scene k) proof of death of a known criminal: i) RCMP submission requirements	
Explain methods for dealing with decomposing cadavers: a) maceration b) desiccation c) advanced decomposition d) incineration e) control of odours	
Describe recommended methods of fingerprinting cadavers in various stages of decomposition: a) recently dead b) cadaver spoon c) ink d) fingerprint powder e) dealing with rigor f) minimizing effects of wrinkling g) string wrap h) injection i) casting	
Identify sources of comparison fingerprints: a) local criminal files b) RCMP criminal files c) RCMP civilian files d) OPP records e) non-criminal files	

<ul style="list-style-type: none"> f) private company files g) armed forces h) local area police services i) foreign countries j) latent fingerprint search (residence or business) 	
<p>Describe the roles of various agencies:</p> <ul style="list-style-type: none"> a) police b) CPIC missing person file c) coroner d) forensic pathologist e) forensic dentist f) CPIC dental characteristics file g) forensic laboratory 	
<p>Describe health and safety considerations:</p> <ul style="list-style-type: none"> h) universal precautions i) particle mask j) apron or coveralls 	
<p>Identify legal considerations:</p> <ul style="list-style-type: none"> k) cutting or amputation digits to prepare them for examination 	

CRIME SCENE MEASUREMENT AND SKETCHING

<p>Measure and sketch indoor and outdoor scenes ensuring that:</p> <ul style="list-style-type: none"> a) the field sketch is proportionate to the scene b) all significant objects or structures within the crime scene can be accurately located c) the measurements can be understood by another draftsman d) the measurements will permit production of an accurate plan view scale diagram 	
<p>Taking into account:</p> <ul style="list-style-type: none"> a) equipment: <ul style="list-style-type: none"> i measuring tapes, 2, 15 and 30 meters in length ii clipboard iii squared drawing paper iv drawing pencils, 2H lead v eraser vi tire marker or lumberman's crayon vii pocket compass viii stakes or pegs for outdoor scenes 	
<ul style="list-style-type: none"> b) measurement types: <ul style="list-style-type: none"> i continuous ii additive iii offset iv triangulation 	
<ul style="list-style-type: none"> c) measurement basics: <ul style="list-style-type: none"> i two measurements to locate one point ii two points to locate an object iii base lines and stations 	
<ul style="list-style-type: none"> d) measurement accuracy: <ul style="list-style-type: none"> i tie to base line or station not moveable objects ii tie to closest base line or station iii tie longest dimension of object to base line or station iv tie two points on same side of object to base line or station 	
<ul style="list-style-type: none"> e) Pythagoras: <ul style="list-style-type: none"> i 3,4,5 rule for checking inside and outside right angled corners 	
<ul style="list-style-type: none"> f) field sketch: <ul style="list-style-type: none"> i large and neat enough to 	

<ul style="list-style-type: none"> ii read and understand split if too large for one sheet; overlapping sketches at split for ease of later reconstruction iii no additive measurements iv direction shown on each sheet 	
<ul style="list-style-type: none"> g) indoor scenes: <ul style="list-style-type: none"> i dealing with inaccurate construction ii proving squareness of all corners of rooms 	
<ul style="list-style-type: none"> h) outdoor scenes: <ul style="list-style-type: none"> i using limited break symbols ii obtaining maps/plans from municipal or other planning offices iii indicating: natural waterways, roadways, and elevations 	

PLAN DRAWING

<p>Make a plan drawing taking into account:</p> <p>a) equipment required:</p> <ul style="list-style-type: none"> i drawing paper of suitable size ii lead holders with 2H and 4H leads iii sanding board iv eraser v erasing shield vi dust bag vii dusting brush viii set squares, 1 @ 45°, 2 @ 30°, 60°, 90° ix T square x metric architects scale xi drafting instrument kit xii French curve 	
<p>b) constructing right angled figures:</p> <ul style="list-style-type: none"> i using two set squares 	
<p>c) size of the finished plan:</p> <ul style="list-style-type: none"> i choosing paper size ii size of the crime scene iii scale of the drawing iv size of the courtroom – viewing distance 	
<p>d) layout:</p> <ul style="list-style-type: none"> i plan ii title block iii legend iv north indicator 	
<p>e) labeling vs. legend</p> <p>f) setting paper on the board</p> <p>g) starting with baselines</p> <p>h) symbols</p>	

SEARCH & SEIZURE

<p>Explain the principles of search and seizure taking into account:</p> <ul style="list-style-type: none"> a) Hunter Vs. Southam b) R. Vs. Collins c) R. Vs. Edwards d) R. Vs. Plante e) the warrant presumption f) reasonableness of search g) informational Searches 	
<ul style="list-style-type: none"> h) Reasonable Expectation of Privacy (R.E.O.P.): <ul style="list-style-type: none"> i) presence at the time of the search ii) possession or control of property or place searched iii) ownership of the property iv) historical use of the property v) the ability to regulate access, including the right to admit or exclude others vi) the existence of a subjective expectation of privacy and vii) the objective reasonableness of the expectation 	
<p>Explain the Conventional Search Warrant 487 taking into account:</p> <ul style="list-style-type: none"> 1. standard of Issuance 2. judicial Pre-conditions 	
<p>Explain The General Warrant 487.01 and its uses.</p>	
<p>Explain obtaining a Sample from a suspect taking into account:</p> <ul style="list-style-type: none"> a) consent b) discard or throwaway samples c) seized pursuant to a conventional search warrant d) prior judicial authorization 	
<p>Explain the DNA Investigative Warrant taking into account:</p> <ul style="list-style-type: none"> a) jurisdiction: provincial court judge only b) standard of issuance: (reasonable grounds to believe) c) statutory pre-conditions 	
<p>Explain the guidelines for Grounds for Belief taking into account:</p> <ul style="list-style-type: none"> a) privacy and security of the person b) proposal for the execution of the warrant c) conclusion an Orders Requested 	
<p>Explain issues related to the execution of the Warrant:</p>	

<p>a) the conditions outlined in the warrant must be strictly adhered to during the actual execution of the warrant</p>	
<p>b) execution of the DNA warrant under s. 487.06(1):</p> <ul style="list-style-type: none"> i plucking of hair ii buccal swabs iii blood by pricking skin with a lancet iv shall include terms and conditions v inform subject of <ul style="list-style-type: none"> • contents of the warrant • nature of the sample to be harvested vi delay pending challenge 	
<p>Explain issues related to Search incident to arrest (strip search) taking into account that:</p> <ul style="list-style-type: none"> a) the arrest must be lawful b) the search is conducted incident to arrest c) the purposed must be connected d) the search must be conducted in a reasonable manner: <ul style="list-style-type: none"> i preserve privacy (same gender, private location) ii physical needed for body cavity search iii justification must parallel the level of intrusion 	
<p>2. Explain the limitations of Regulatory Searches:</p> <ul style="list-style-type: none"> a) R v Colarusso 	
<p>3. Explain issues related to Impression Warrants under 487.092:</p> <ul style="list-style-type: none"> a) reasonable grounds to believe Offence against this Act or any other Act of Parliament b) reasonable grounds to believe Information concerning the offence will be obtained by the print or impression c) reasonable grounds to believe it is in the best interest of the administration of justice d) terms and conditions 	

MAJOR CASE MANAGEMENT

<p>1. Provide a summary of the development of the Ontario Major Case Management (OMCM) system taking into account Justice Archie Campbell's findings in the Bernardo Investigation Review, June 1996.</p>	
<p>2. Provide a summary of recommendations taking into account:</p> <ul style="list-style-type: none">a) common major case management systemb) common major case management software systemc) province-wide coordinated responsed) inter-disciplinary supporte) coordinated early recognition systemf) specialized training	
<p>3. Describe the OMCM system, and Regulation 354/04 taking into account:</p> <ul style="list-style-type: none">a) the major case management framework and its objectivesb) the definitions provide in the OMCM Manual for:<ul style="list-style-type: none">i major caseii threshold and non threshold casesiii policy & procedureiv case conference and case reviewv expertvi person of interestvii suspectviii triggering mechanisms	
<p>4. Describe the standards and responsibilities provided in the OMCM Manual for:</p> <ul style="list-style-type: none">a) a forensic identification officerb) a scenes of crime officerc) the competency requirements of the forensic identification officer in for a major case:d) the responsibilities of the scene investigatore) crime scene examinationf) requirements for accessing expert resources through the Office of the Coronerg) standards for post mortem examinations	

THE EXPERT WITNESS

<p>1. Explain “expert witness” in the context of Canadian courts:</p> <ul style="list-style-type: none"> a) definition as used in Canadian courts and Canadian Criminal Code b) difference between expert witness and expert in chosen field c) qualifying as an expert d) attacks on qualifications e) privileges of expert witness f) responsibilities of expert witnesses 	
<p>2. Prepare curriculum vitae (CV).</p>	
<p>3. Explain the importance of a pre-trial conference with the Crown taking into account:</p> <ul style="list-style-type: none"> a) discussing the case with investigator/Crown b) how evidence will be introduced c) your qualifications and how to introduce them d) preparing questions for Crown e) giving a copy of your CV to Crown f) discussing your conclusions g) discuss analysis report 	
<p>4. Prepare charts and other exhibits for court taking into account:</p> <ul style="list-style-type: none"> a) one chart per accused b) clean and professional c) keeping simple and to the point d) supporting by report, lifts, notes and photographs e) having the illustration checked after it is prepared to ensure no errors made at this stage 	
<p>5. Explain the requirements of full disclosure as it impacts on case preparation.</p>	
<p>6. Describe or present expert testimony taking into account:</p> <ul style="list-style-type: none"> a) establishing credibility b) nonverbal aspects of communication c) verbal aspects of communication 	
<ul style="list-style-type: none"> d) preparing courtroom presentation for comparisons: <ul style="list-style-type: none"> i familiar with all areas of both impressions ii check every single ridge feature common to both impressions iii describe procedures used when making the comparison iv maintain objectivity in presenting evidence 	

<p>e) preparing photographs:</p> <ul style="list-style-type: none"> i are you an expert in photography? ii chronological order/story iii read your notes/report to prepare iv use reference points (visual) / (colors, notes on photos, etc.) v notes vi numbered/identified vii index viii booklets with individual photographs ix sufficient # of copies 	
<p>f) enhancement & retouching of photographs:</p> <ul style="list-style-type: none"> i retouched photographs are acceptable in court <ul style="list-style-type: none"> • have an original photo to produce • keep track of enhancement (digital) • have all negatives/originals on hand 	
<p>g) research/experiments:</p> <ul style="list-style-type: none"> i notes ii photographs iii proper techniques 	
<p>h) plan drawing:</p> <ul style="list-style-type: none"> i original dry-mounted on rigid surface ii photos for judge & jury (8 x 10) iii scale ruler iv are you an expert in plan drawing v submit a C-216 for the offence at hand vi never refer to the suspect by FPS number vii do not answer any questions that could bring prejudice to the accused 	
<p>i) preparing for common questions:</p> <ul style="list-style-type: none"> i credibility of the discipline? ii number of fingerprints identified? 	
<ul style="list-style-type: none"> iii training in fingerprints? <ul style="list-style-type: none"> • number of times testified as an expert • expert can make a mistake • expert should use 	

	<p>notes</p> <ul style="list-style-type: none"> • expert should belong to a professional association • expert's conclusions should be verified • expert should be a police officer 	
iv	fingerprints can be planted?	
v	possibility that two persons may have the same fingerprint?	
vi	identical twins may have the same fingerprints?	
vii	philosophy of identification?	
viii	uniqueness and persistency?	
ix	what is a fingerprint?	
x	minimum number of "points"?	
xi	fingerprint enhancement techniques (powders, chemical products, reactions with residue)?	
xii	changes in the evidence due to fingerprint examination?	
xiii	police force /quality assurance mechanisms?	

CENTRE OF FORENSIC SCIENCES

1. Describe the responsibilities of: CFS Forensic Laboratory Forensic Services:	
<ul style="list-style-type: none"> a) biology (including DNA) b) chemistry c) documents examination d) firearms and tool mark examination e) photo analysis f) toxicology g) pathology 	
2. Describe and demonstrate packaging methods:	
<ul style="list-style-type: none"> a) to avoid contamination b) to ensure continuity 	
3. Comply with Submission requirements:	
<ul style="list-style-type: none"> a) form CFS-069 	

SUPPORT SERVICES

<p>Describe the interrelated responsibilities of forensic identification services taking into account:</p> <p>a) assistance available from the OPP:</p> <ul style="list-style-type: none"> i) laser, portable or fixed ii) large scale cyanoacrylate fuming iii) physical developer processing iv) extra personnel at serious crime scenes v) examination of cadavers by laser, cyanoacrylate etc. vi) helicopter, fixed wing aircraft, float equipped aircraft vii) marine unit, boats and divers viii) canine unit 	
<p>b) assistance available from the RCMP:</p> <ul style="list-style-type: none"> i) ground scan radar ii) vacuum metal deposition chamber iii) computer data base on motor vehicle tracks iv) computer data base on snowmobile tracks v) computer data base on footwear impressions vi) crime scene impression searches in the Latent Print Section 	
<p>c) research and development through NRC.</p>	
<p>d) assistance available from other police services (using current examples):</p> <ul style="list-style-type: none"> i) vacuum metal deposition chamber through Toronto PS and Peel Regional Police ii) AVID (video analysis) 	
<p>e) private services through CFS</p> <ul style="list-style-type: none"> i) procedures for obtaining services of other experts 	
<p>Explain the RCMP submission requirements on the death of a known criminal.</p>	

BLOODSTAIN PATTERN RECOGNITION

Comply with health and safety issues regarding blood.	
Describe the Canadian perspective on the science.	
<p>Explain the basic tenets of bloodstain pattern analysis taking into account:</p> <ol style="list-style-type: none"> 1. blood will behave according to the laws of physics. When it is in a liquid state, in motion, it can be referred to the laws of physical science known as ballistics (the science of projectiles in motion). 2. the size of a projected bloodstain has a direct relationship to the speed at which it is traveling; a small drop is moving much faster than a larger one 3. you can tell the direction a bloodstain was moving by its appearance (shape). A bloodstain will always point in the direction that it is moving 4. bloodstain patterns are predictable and reproducible 	
<p>List and define the three categories of bloodstain patterns and identify the different pattern types:</p> <ol style="list-style-type: none"> 1. passive <ol style="list-style-type: none"> a) passive drops b) drip patterns c) spill patterns d) pool pattern 	
<ol style="list-style-type: none"> 2. projected <ol style="list-style-type: none"> a) low velocity impact b) medium velocity impact c) high velocity impact d) cast off e) arterial gush 	
<ol style="list-style-type: none"> 3. transfer <ol style="list-style-type: none"> a) transfer pattern 	
<p>List the majority of observations, which could result from a qualified bloodstain pattern analysis of a blood-letting scene taking into account:</p> <ol style="list-style-type: none"> 1. location of the origin of a blow 2. the type of impact or blow used to create a specific pattern 3. the number of blows, shots ... etc. 4. movement and directionality of persons and/or objects while they were shedding blood 5. movement of victim and/or objects following violence 6. position of victim and/or objects during bloodletting 7. if an artery was cut 	
Explain the benefits of performing proper bloodstain pattern analysis.	

CAMERA CONTROLS

<ol style="list-style-type: none"> 1. Operate a digital SLR camera 2. Maintain the camera 3. Grip the camera for hand-held photography 4. Mount the camera securely on a tripod 5. Mount and remove lenses 6. Load and unload storage media 7. Focus an image 8. Set exposure controls 9. Select exposure system 	
<p>Taking into account:</p> <ol style="list-style-type: none"> a) camera types by viewing system: <ol style="list-style-type: none"> i) viewfinder cameras ii) single-lens reflex cameras (SLR) iii) view cameras b) how the SLR works c) F-stops & shutter speeds d) care of the camera e) installing and removing lenses f) LCD display g) manual focus and manual exposure h) auto focus and auto exposure i) hand holding SLR camera j) mounting systems k) common accessories 	

EXPOSURE WITH NATURAL AND ARTIFICIAL LIGHT

<ol style="list-style-type: none"> 1. Photograph subjects under light of varied intensity by: <ol style="list-style-type: none"> a) Determining exposures b) Employing various TTL metering modes 	
<ol style="list-style-type: none"> a) metering methods: <ol style="list-style-type: none"> i) matrix ii) centre weighted iii) spot iv) gray card 	

FILTERS

Use photographic filters to enhance contrast, reduce haze and reduce glare by: a) maintaining filters in good working order b) identifying filters by their names and types c) demonstrating the function of each type	
Taking into account: a) what a filter is and how it works: i) polarizing ii) UV iii) skylight	
b) care and handling of glass, and acrylic filters c) forms of filters (series-size, threaded, holder-type) d) protocol when introducing photographic evidence in court where filters were employed to alter contrast considerably, eliminate glare reflections or penetrate atmospheric haze	

ELECTRONIC FLASH

1. Identify parts and describe their function. 2. Identify and describe various flash techniques. 3. Employ the following techniques and compute accurate exposures: a) feathered flash b) fill-flash c) bounce flash d) multiple flash at camera e) painting with flash a variety of flash techniques	
4. Maintain an electronic flash unit. Taking into account: a) how electronic flash works b) camera-flash connection c) distance d) manual flash e) automatic flash f) dedicated flash g) basic operation h) matching camera and flash i) taking the picture in TTL mode j) taking the picture in aperture priority mode k) ready light l) difficult situations m) basic off-camera operation n) exposure considerations o) positioning the flash p) bounce flash exposure q) multiple flash units	

LENSES

<p>1. Use lenses of different types for a variety of subjects to be photographed under variable conditions by:</p> <ul style="list-style-type: none">a) carrying out routine lens cleaningb) compare characteristics of normal, wide angle and telephoto lenses in relation to angle of view, depth-of-field and magnificationc) select appropriate lens focal length for a given photographic subjectd) control depth of fielde) recognizing the effects of lens flare and take corrective measures	
<p>Taking into account:</p> <ul style="list-style-type: none">a) lens characteristicsb) focal lengthc) magnificationd) angle of viewe) perspectivef) mounting systemsg) focush) aperture and depth of fieldi) focal length and depth of fieldj) distance setting and depth of fieldk) how to select the lens for the jobl) using normal lensesm) using wide-angle lensesn) using zoom lenseso) using macro lenses	

LIGHT AND LIGHTING

<p>1. Operate a digital SLR camera to photograph subjects in natural and artificial light by:</p> <ol style="list-style-type: none">maintaining the camera in good working ordergripping the camera for hand-held photographymounting the camera securely on a tripodmounting and remove lensesloading and unloading storage mediasetting ISO speed for camera's exposure systemfocusing an image(s)setting manual controls for existing light exposures	
<p>Taking into account:</p> <ol style="list-style-type: none">light travels in straight linesangles of incidence and reflectionshape, texturehard, soft, medium lightlighting & subject contrastcolour temperature, Kelvin, primaries, complementaries, filtersmedia latitude,contrast effectdirectionality of lighting, strengthtime of day, weather, seasons	
<p>k) types of lights:</p> <ul style="list-style-type: none">tungsten,tungsten-halogen,quartz,reflector	
<p>l) common accessories:</p> <ul style="list-style-type: none">floodlightsumbrellasbounce lightreflectorratiosdiffuserspaintingbafflesscreensflagssnoots	

<p>m) angle of incidence, relative intensity, light balancing</p> <p>n) inverse square law</p> <p>o) single dominant source</p> <p>p) modelling, texturing, colouring, brightness ratio, tonal composition</p> <p>q) lighting control:</p> <ul style="list-style-type: none">• main• fill• accent• background lights <p>r) relative camera position, angle of incidence</p> <p>s) soft, pastel shades, cold, blue cast</p>	
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PHOTOGRAPHY USING ALTERNATE LIGHT SOURCE

<p>1. Employ the alternate light source in photography to make visible using exciter filters taking into account:</p> <ul style="list-style-type: none"> a) the filter best suited to the subject for the intended outcome b) the filtration and media required c) wavelengths of visible light d) safety precautions e) applications for ALS photography f) exciter and barrier filters g) fluorescence, chemoluminescence and luminescence h) reflected and luminescent photography 	
<p>2. Employ ultraviolet and infrared photography to increase contrast between two or more pigmented materials taking into account:</p> <ul style="list-style-type: none"> a) the photographic technique best suited to the subject for the intended outcome b) appropriate radiation source for that technique c) the filtration and media required d) focusing the image and produce an acceptable print of subjects photographed by reflected ultraviolet e) safety precautions 	
<ul style="list-style-type: none"> f) ultraviolet wavelengths: <ul style="list-style-type: none"> i) UV sources ii) applications for UV iii) exciter, barrier and UV filters iv) fluorescence, chemoluminescence and luminescence v) reflected UV and fluorescence UV photography 	
<ul style="list-style-type: none"> g) infrared wavelengths: <ul style="list-style-type: none"> i) actinic, hot-object, calorific and warm infrared ii) IR sources iii) applications for IR iv) exciter, barrier and IR filters v) reflected IR and luminescence IR photography 	

PERSPECTIVE

<p>1. Describe and demonstrate how perspective can be controlled.</p> <p>2. Re-create a witness point of view of a scene.</p> <p>Taking into account:</p> <ul style="list-style-type: none">a) the dependency linear perspective has upon the focal length of the camera lensb) degree of enlargement and viewing distance of the imagec) linear perspectived) focal length of the picture-taking lense) magnification of the recorded imagef) viewing distance of the recorded image	
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CLOSE-UP PHOTOGRAPHY

<p>1. Photograph inked fingerprints with acceptable exposure and balanced lighting.</p>	
<p>2. Perform close-up photography of small objects displaying fine detail using natural and artificial lighting.</p>	
<p>Taking into account:</p> <ul style="list-style-type: none">a) shapeb) surface texturec) texture accentsd) transilluminatione) tentingf) image-to-object ratiog) macrophotographyh) focal distancei) close-up filtersj) bellows unitk) extension tubesl) macro lensesm) exposure factorn) ringflash	

DIGITAL PHOTOGRAPHY

1. Describe the three major digital capture devices currently in use in digital cameras.	
2. Describe how these images are processed by on-board computers, using appropriate terminology.	
3. Follow established guidelines for capturing, uploading and preserving digital images, taking into account: a) a digital image workflow b) the need for consistency c) the need for image integrity d) established guidelines	
4. Choose the appropriate file type for capture taking into account: a) the relationship between file type and capture speed b) selection controls	
5. Select the appropriate file type at capture stage, taking into account: a) the relationship between file type and image resolution, and b) camera control	
6. Evaluate the need for and select the proper exposure mode.	
7. Use digital camera settings to capture and preserve RAW image data, taking into account: a) the need for high quality capture b) camera controls	
8. Use histogram reviews to ensure proper exposure of subject content, taking into account: a) the relationship between histogram display and exposure, and b) camera controls	
9. Select the appropriate white balance and ISO setting for a variety of photographic situations, taking into account: a) the relationship between ISO sensitivity and image noise, and b) camera controls governing white balance and ISO	
10. Utilize metering modes under a variety of conditions, taking into account: a) lighting conditions b) use of the proper metering mode c) meter controls	
11. Recognize and avoid errors that cause flash card failure, taking into account: a) the steps to follow when failure is detected b) troubleshooting techniques cards and c) how to preserve cards for image retrieval.	

MANAGING DIGITAL IMAGES

<p>1. Use the appropriate computer software to rename and safeguard image files, taking into account:</p> <ul style="list-style-type: none">a) the need for consistency through standard operating procedures in particular the Enhancement Standards provided by the Scientific Working Group on Imaging Technology, SWGIT of the International Association for Identificationb) requirements and limitations of the software	
<p>2. Create images suitable for evidence disclosure by copying and converting these files to JPEG thereby creating images compatible with mainstream computers taking into account:</p> <ul style="list-style-type: none">a) the steps taken in converting RAW images to JPEG.b) requirements of the computer software.	
<p>3. Use RAW capture to preserve image integrity taking into account:</p> <ul style="list-style-type: none">a) the steps taken in preserving RAW data andb) the requirements of the computer software.	
<p>4. Create and maintain an image data base, taking into account:</p> <ul style="list-style-type: none">a) steps taken to transfer information from the metadata to the data baseb) preserving image data andc) maintaining image integrity	
<p>5. Create and archive photo CDs, taking into account:</p> <ul style="list-style-type: none">a) using appropriate computer softwareb) care, handling and labeling of CDs	

DIGITAL NIGHT PHOTOGRAPHY

<p>1. Take photographs under low light situations, with and without digital based electronic flash, taking into account:</p> <ul style="list-style-type: none">a) selection of appropriate light source(s)b) the steps taken to ensure adequate exposurec) low light settings.d) multiple light sources	
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IMAGE PROCESSING AND ENHANCEMENT

<p>1. View and manage images within an Adobe Photoshop © environment including:</p> <ul style="list-style-type: none">a) opening and closing files.b) zooming in and out on an imagec) arranging multiple windows on a computer monitord) using keyboard shortcuts and menu selections	
<p>2. Ensure all enhancements will be recorded and written in a metadata file attached to the image by setting up the history tracker within preferences.</p>	
<p>3. Create a print out of all enhancements performed, taking into account:</p> <ul style="list-style-type: none">a) various preference settings within Photoshop ©b) accessing file information in the metadatac) software printing capabilities	
<p>4. Adjust overall exposure and colour casting by:</p> <ul style="list-style-type: none">a) locating and use the auto levels features within Adobe Photoshop ©b) working on a duplicate of the original filec) choosing between the various features located within the levels dialogue box	
<p>5. Enhance the overall image of photographs captures using RAW images by open images within Adobe Photoshop © RAW Converter taking into account:</p> <ul style="list-style-type: none">a) preserving original datab) converting RAW images into a workable format	

CALIBRATING FINGERPRINT IMAGES

<p>1. Calibrate fingerprints to a scale of 1:1 using Adobe Photoshop ©, taking into account:</p> <ul style="list-style-type: none">a) creating duplicate files of the original imagesb) maintaining minimum resolution standards	
<p>2. Increase contrast between fingerprint ridge detail and background substrate by viewing selected channels and using the channel mixer function taking into account:</p> <ul style="list-style-type: none">a) information from selected channelb) adjustments using the channel mixer feature	

IMAGE ENHANCEMENT

<p>1. Convert to various colour modes for image enhancement and outputting final product in RGB mode, taking into account:</p> <ul style="list-style-type: none">a) duplicate imagesb) converting to a colour mode suitable for printer output	
<p>2. Create duplicate images, convert colour modes, select appropriate channels and combine them to perform an enhancement, taking into account:</p> <ul style="list-style-type: none">a) preserving the originalb) converting to various colour modesc) selecting the appropriate channel to split or combine	
<p>3. Use hue/saturation adjustment layers taking into account:</p> <ul style="list-style-type: none">a) making global adjustmentsb) locating and enhancing individual colour channels within the hue/saturation dialogue boxc) using that action to enhance subsequent images and play back the enhancement record	

ILLUSTRATING IMPRESSION COMPARISONS

<p>Explain and demonstrate the illustration of impression comparisons taking into account:</p> <p>1. reasons for using illustrations:</p> <ul style="list-style-type: none"> a) provides illustration of process b) visual aid for court c) memory jogger for jury d) courts have ruled opinion alone insufficient 	
<p>2. the degree of enlargement, contrast and orientation of the photographic enlargements taking into account</p> <p>a) planning the illustration:</p> <ul style="list-style-type: none"> i) mounting board ii) photographic paper iii) size of illustration iv) contrast v) inked impressions 	
<p>b) layout:</p> <ul style="list-style-type: none"> i) unknown on left ii) both photographs oriented similarly iii) labeling iv) placement of indicator lines 	
<p>c) preparing illustrations suitable for courtroom presentation of fingerprint and other types of impression comparisons</p>	
<p>d) areas vs. points:</p> <ul style="list-style-type: none"> i) individual features indicated ii) areas containing several features iii) areas closer to actual mental process 	
<p>e) assembling the illustration:</p> <ul style="list-style-type: none"> i) equipment required ii) degree of enlargement of photographic prints iii) orienting and making impressions same size iv) making a mock-up v) selection of features to illustrate placement of indicator lines vi) mounting the photographic prints vii) lettering and indicator lines viii) checking for accuracy and neatness 	

CREATING CHARTS USING DIGITAL MEDIA

<p>1. Illustrate impression comparisons suitable for presentation in court:</p> <ul style="list-style-type: none">a) fingerprint comparison chartb) footwear comparison chartc) physical match comparison chart	
<p>2. Explain reasons for using illustrations:</p> <ul style="list-style-type: none">a) provides illustration of processb) visual aid for court	
<p>3. Using Adobe Photoshop © and Microsoft PowerPoint©</p> <ul style="list-style-type: none">a) calibrate images as noted elsewhere in this documentb) overlay and align found and known imagesc) create new documents with images in alignmentd) match contrast and brightness of impression evidencee) create a new folderf) manage and track enhancement to the images as noted elsewhere in this documentg) import images into PowerPoint	
<ul style="list-style-type: none">h) create charts in accordance with rules of charting:<ul style="list-style-type: none">i lines point at 90 degrees to area illustratedii lines must end in furrow and not touch the area of agreementiii placement of the line must not obstruct the view of other areas of agreementiv lines must not cross each other	
<ul style="list-style-type: none">i) layout:<ul style="list-style-type: none">i found image on left, known image on rightii use alphabetic indicators for areas of agreement (v numbering)	
<ul style="list-style-type: none">j) areas vs. points:<ul style="list-style-type: none">i individual features indicatedii areas containing several features	