

Trace Evidence, Questioned Documents, Cyber

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1:06 PM

- Trace Evidence
 - Hairs
 - Fibers
 - Glass
 - Paints
 - Soils
 - Gunshot residues
 - Accelerants
 - Explosive residues
- Hair
 - Class Characteristics
 - Species
 - Race
 - Body Area
 - Pulled, plucked, or cut
 - mtDNA
 - Individualization
 - DNA from the follicle
 - In odd circumstances, processes applied to the hair may allow individualization
- Fibers
 - Class Characteristics
 - Type (e.g. cotton, nylon)
 - Dye peculiarities
 - Individualization
 - Fabric fracture match (whole piece of material, not a specific fiber).
- Hair and Fiber Detection
 - Oblique lighting
 - ALS
 - Generally, trace evidence is searched for and collected before fingerprint processing is conducted.
 - Cross contamination is biggest issue, therefore use proper crime scene equipment (shoe coverings, disposable collection devices, etc.) and change gloves frequently.
 - 90% of fiber transfers lost in first 8 hours.
- Hairs and Fibers Documentation
 - ALWAYS photograph in place with and without scale
- Hairs and Fibers Collection
 - Use disposable forceps, gloved hand, gel lifters, or lifting tape for collection.
 - Collection:
 - Visible - collect immediately. Seal in paper container. It won't be there later!
 - General Collection - adhesive tape, 8-10 inch strips applied to item or area repeatedly.
 - Don't over use tape on multiple objects or areas.
 - Hairs and Fibers Packaging
 - Individual
 - Package in glassine envelopes, paper in a druggist fold, or evidence container. AVOID plastic containers.
 - Tape Lifts
 - Place tape onto transparent surface (document protector) and seal in envelope.
- Glass
 - Class Characteristics

- Type
- Individualization
 - Fracture match
- Other determinations
 - Direction of Force/projectile
 - Sequence
- Car windows are tempered glass, so when they break the glass is diced up and not sharp. The windshield is made of laminated glass, so the glass is in between two laminated sheets.
- Direction of Projectile
 - A high-velocity projectile such as a bullet often leaves a hole that is wider at the exit side, and hence its examination is important in determining the direction of impact.
- Direction of Force
 - The direction of impact can also be accomplished by applying the 3R Rule.
 - *Radial* cracks form a right angle on the *reverse* side of the force.
- Sequence
 - The sequence of impacts when there have been successive penetrations of glass is frequently possible to determine because a fracture always terminates at an existing line of fracture.
- Glass Collection/Packaging
 - Collection for "Type" Examination:
 - Collect samples of fragments and possible sources
 - Package secure in a druggist fold/box
 - Mark as "fragile" and "sharp"
 - Collection:
 - Take hair combings of individuals believed to be exposed to glass breakage. Collect in clean paper. Seal and secure all edges.
 - Take any clothing exposed to possible glass breakage. Seal and secure all edges.
 - Handle carefully, so as not to dislodge small fragments
- Trace - Paints
 - Class Characteristics
 - Color
 - Basic layering
 - Chemical characteristic comparison
 - Individualization
 - Possibility for "mechanical fit"
 - Complex color sequence
- Paints - Collection
 - Paint Chips and Transfer Collection
 - Visible - collect immediately. Seal in container.
 - General collection - lift full thickness of the paint transfer
 - Cut, dislodge, or pry with a clean knife.
 - Package in small pill bottles or druggists fold, unless mechanical fit is possible.
 - Paint chips should be packaged in a manner as to protect their edges from damage for a later fracture matching.
 - Mechanical fit - wrap in cotton, place in box or pill bottle
- Soils
 - Class Characteristics
 - Type
 - Content
 - Individualization
 - Contaminants
 - Unique environmental characteristics
 - Primary environmental unique characteristic is plant pollen.

- Soil Collection:
 - Visible Questioned
 - Dry before packaging
 - Collect all evident soil present
 - Seal in pill bottle or pharmacist fold.
- Control Samples
 - Hair - 20 hairs plucked from suspect contributor
 - Fibers - collect suspect item
 - Paint - from an unmarked surface near the damaged area
 - Glass and Building material - collect the known sample for comparison to the suspect sample
 - Soil - at least 8 samples (1/2 cup) around suspect area at 3 feet and 15 feet, in N, S, E, and W direction
 - Dry soil before packaging.
- Mechanical Fit
 - Mechanical fit is an individualization by fitting two or more pieces of something together
 - Paint flakes
 - Broken reflector lens
 - Broken metal
 - Matches/match books
 - Tape
- Duct Tape as Evidence
 - Physical Fit
 - Composition, Construction, and color
 - Scrim evaluation - higher grade = higher scrim count
 - Chemical analysis of adhesive layer
 - Recipes proprietary
- Submitting Tape Evidence
 - When submitting evidence, keep a few things in mind:
 1. It is best to submit tape still adhered to the object it is found on. Don't attempt to unravel wadded tape. Other types of evidence such as DNA, latent prints, and other trace evidence may be present.
 2. If tape does need to be manually removed from its substrate, place it adhesive side down on some type of clean plastic sheeting such as a cut open plastic bag or transparency
 3. Also, remember not to tear or distort the tape.
 4. Lastly, remember to never alter the ends of tape since a physical fit can be obtained at these locations
- Additional Steps
 - If it is necessary to cut the tape or an accidental tear occurs, make sure to initial next to the location of the cut.
 - This ensures that the examiner knows the cut or tear is not probative to the case.

Fire/Explosive Evidence

- General Chemical Evidence
 - Nature - Class and Individual Characteristics
 - Determinations
 - Identify chemical composition (e.g. drug identification, presence of accelerants)
 - Comparison to known standards
 - Extremely accurate based on lab techniques such as GCM, ESM, IR Fluoroscopy
- Fire/Arson Scenes
 - Fire =