

The background of the slide is a black and white photograph of a crime scene. It shows a concrete surface with several dark, irregular bloodstains. A white crime scene tape with the words 'CRIME SCENE DO NOT CROSS' printed on it in a repeating pattern is stretched across the lower portion of the image. The entire scene is framed by a white border with rounded corners.

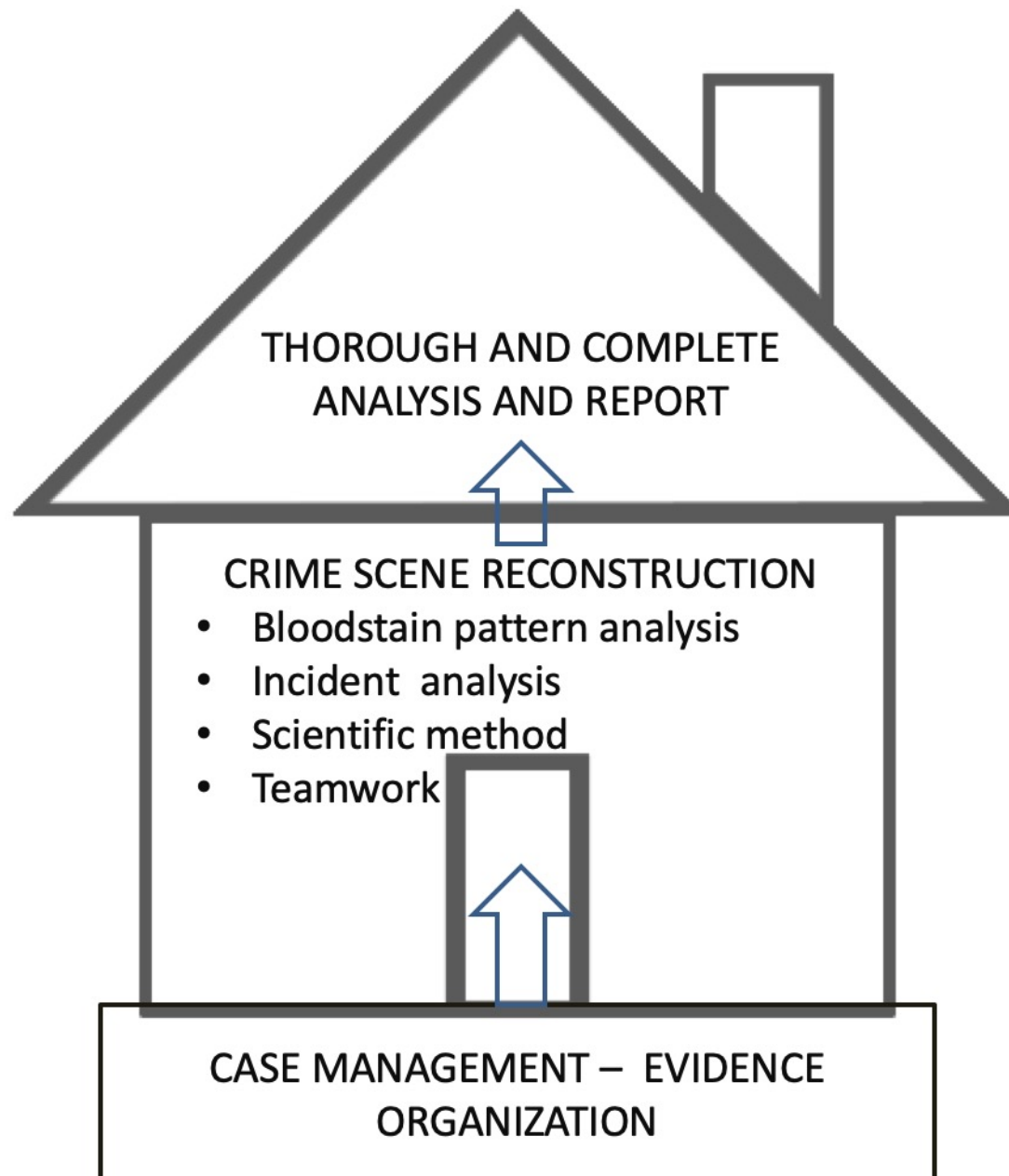
BLOODSTAIN RECONSTRUCTION

Graff Investigative & Forensic Training

Characteristics of a Bloodstain Pattern Reconstructionist

- Established procedures & methods
- Attention to detail
- Committed to objective evidence
- Organized





I know those DNA results were in a
report here somewhere



Organization Methodology

1
Review

2
Organize

3
Prepare

4
Analyze

5
Report



Review Materials

- Review ALL materials.
 - Brief once-thru making notes.

2
Organize

Method of Organization for the Analyst

Spreadsheet the data

Image log

Evidence log



- Expand evidence spreadsheets to later track lab submittals & results, evidentiary relationships, and record analysis.

Expand image log spreadsheets to later record observations and analysis



Image Correlation Demonstratives

- Correlate scene images to scene sketches.
- Aid to review & explain images in context.
- Hyperlinks
 - Example:




Correlate images through demonstrative.

Sketches & Images Guide

Sketches are 3D top-down views of living room, kitchen, and bedroom.

 symbol represents image #, photographer location, and direction of camera.

Each  is hyperlinked to its respective image.

Each image slide includes the image # in the lower right corner.
Each sketch can be accessed from any image slide.



link to living room sketch



link to kitchen sketch



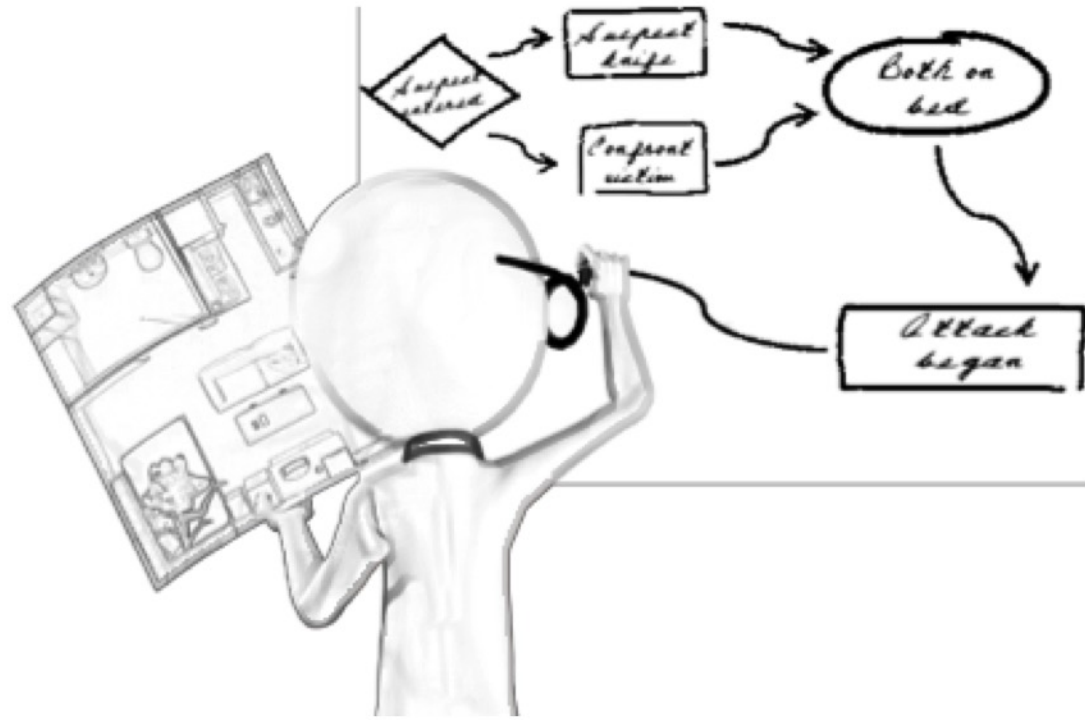
link to bedroom sketch



Example of hyperlinks between scene sketch and scene images.

Detailed BPA & Reconstruction

- Foundation for Analysis:
 - Image and Evidence Spreadsheets



4 Analyze

Analysis Recorded on Expanded Evidence Spreadsheets

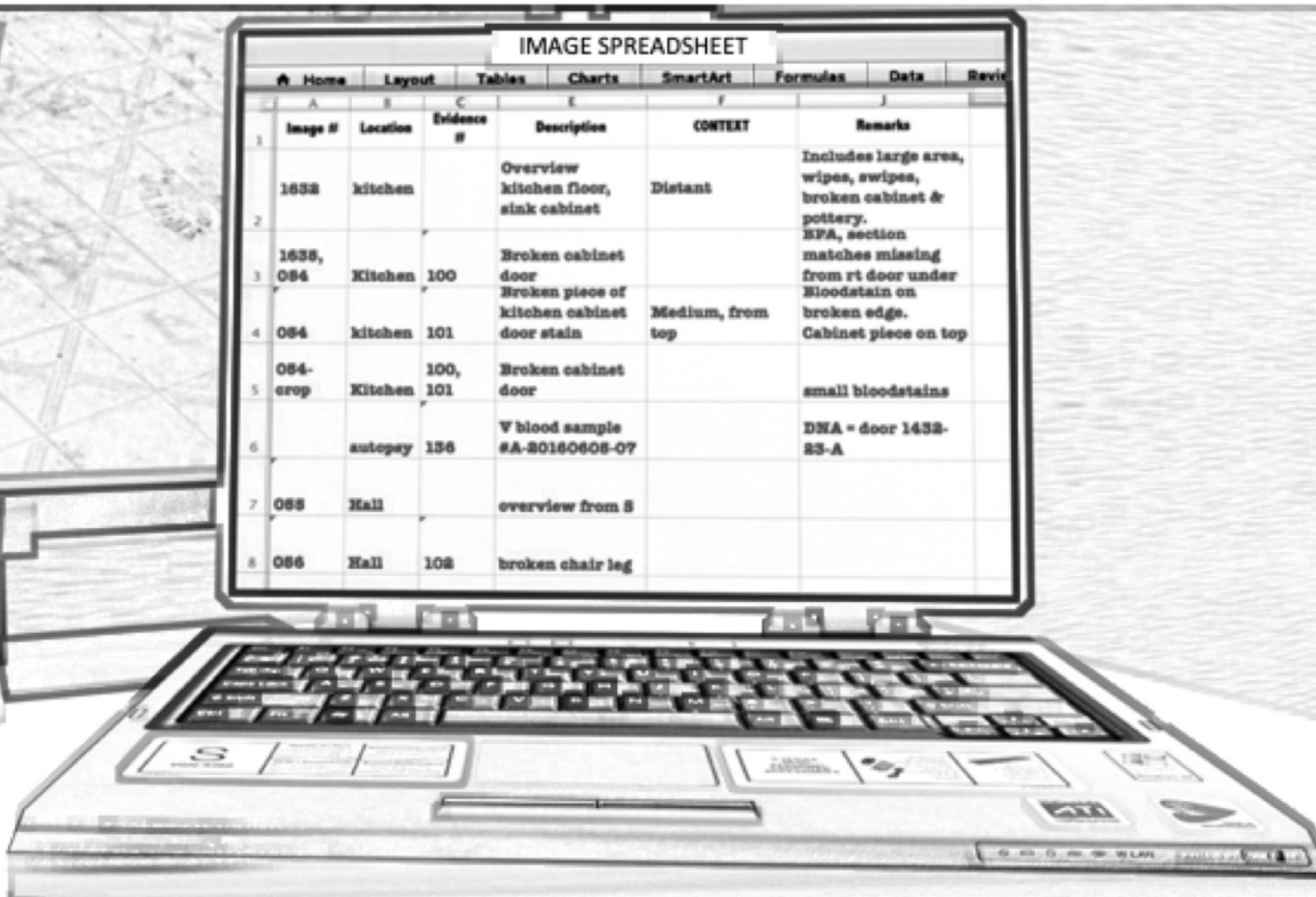
EVIDENCE TRACKING.xlsx

	A	B	C	D	E	F	G	H	I
	Image #	Location	Evidence #	DATE REC'D	Description	REFERENCE	Lab ref#	Related Images	Remarks
1						Scene narrative		1632, 049, 050, 054, 156	EPA, section matches missing from
2	1635, 054	Kitchen	100	6/5/15	Broken cabinet door	p4			
3	054	kitchen	101	6/5/15	stain sample from 100	Scene narrative p4	1432-23-A	054	DNA = V 1432-28-A
4	054-crop	Kitchen	100, 101		Broken cabinet door	close-up			small bloodstains
5		autopsy	136	6/5/15	V blood sample 8A-20160605-07	Autopsy report p3	1432-28-A		DNA = door 1432-23-A
6	055	Hall			overview from S	distant			
7	056	Hall	102		broken chair leg	medium, from top			
7	056	Hall	102		broken chair leg	from top			

- Cross reference images, lab reports: DNA, fingerprints, trace evidence, firearms evidence, case information.
- Columns for observations and analysis.

4 Analyze

Analysis Recorded on Expanded Image Spreadsheets

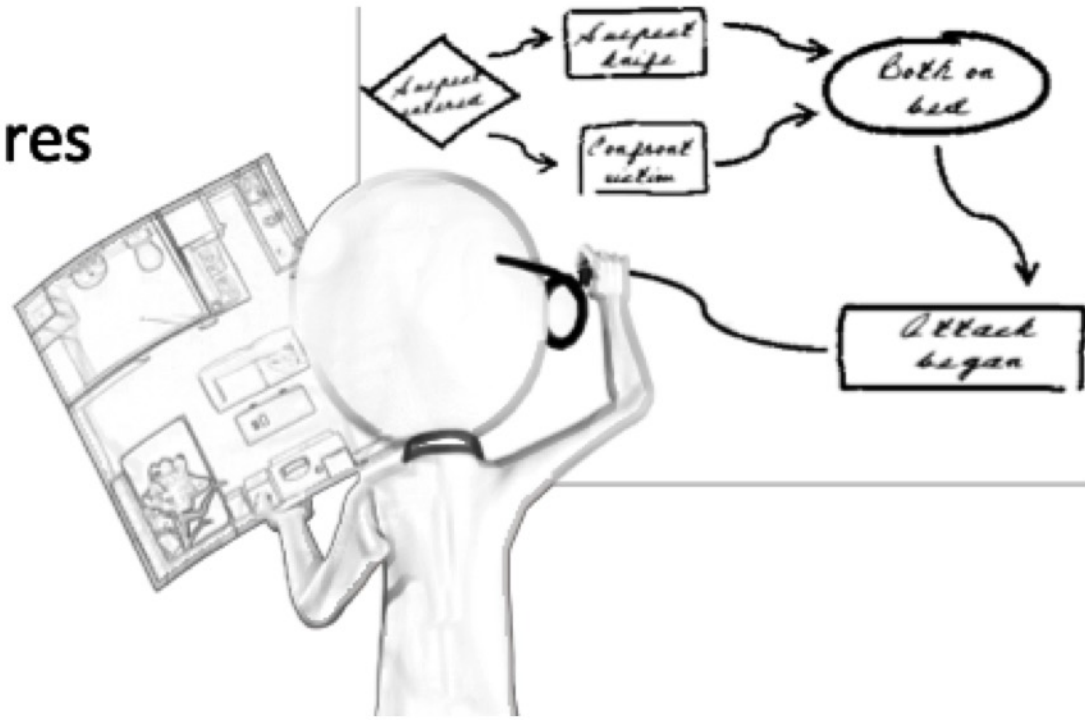


	A	B	C	D	E	F	G
	Image #	Location	Evidence #	Description	CONTEXT	Remarks	
1	1632	kitchen		Overview kitchen floor, sink cabinet	Distant	Includes large area, wipes, swipes, broken cabinet & pottery.	
2	1632,					BPA, section matches missing from rt door under	
3	084	Kitchen	100	Broken cabinet door		Bloodstain on broken edge.	
4	084	kitchen	101	Broken piece of kitchen cabinet door stain	Medium, from top	Cabinet piece on top	
5	084-crop	Kitchen	100, 101	Broken cabinet door		small bloodstains	
6		autopsy	136	V blood sample #A-20160608-07		DNA - door 1432-23-A	
7	088	Hall		overview from B			
8	086	Hall	102	broken chair leg			

Columns for observations and analysis

Detailed BPA & Reconstruction

- Accepted Practices
 - Analysis of scene images & evidence
 - Flowcharting
 - Scientific method
 - Established procedures



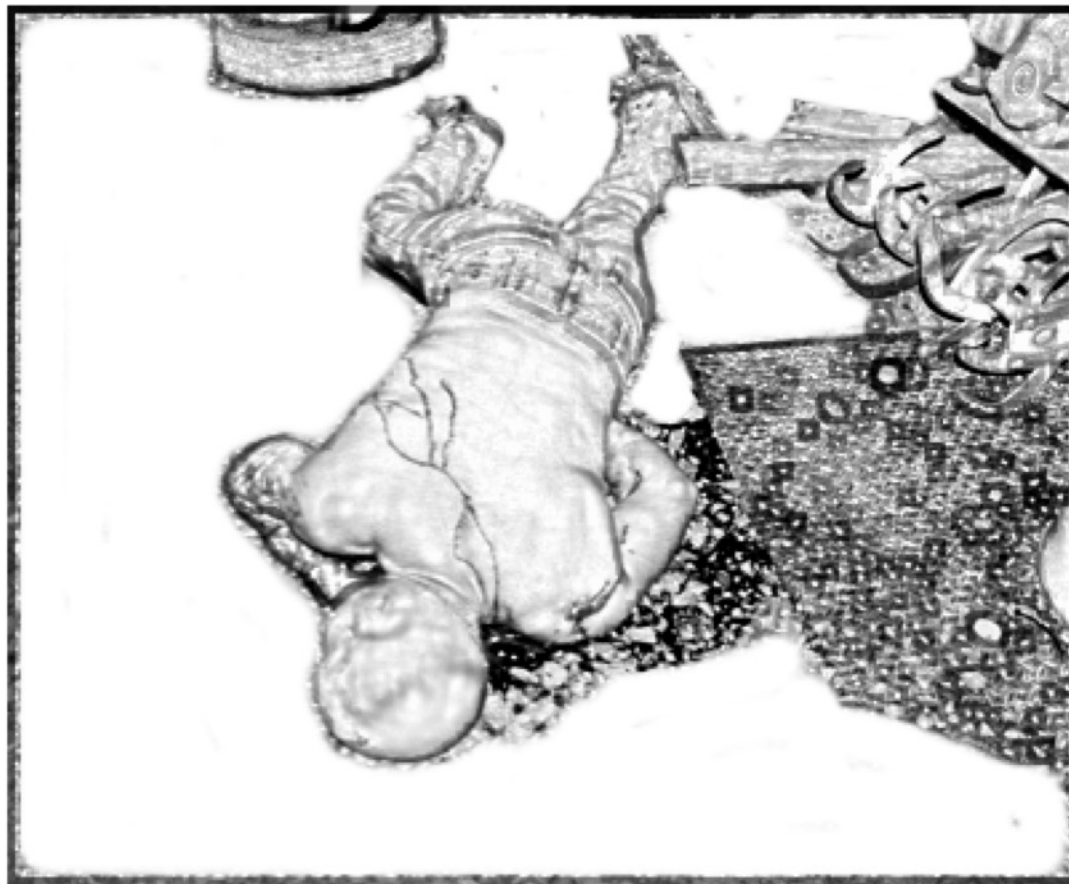
Procedures: BPA

- **First: Review entire scene:**
- **Describe what you see:**
 - **size, shape, margins, distribution**
 - **Focus on fluid dynamics**
 - **Identify relationships between fluid dynamics and bloodstain characteristics.**
 - **Stain characteristics vs mechanism.**



Procedures: BPA

- First: Describe what you see:



Example:

Body found in front of work shop.

Blood flows from chest and shoulder injuries.

First: Describe what you see (Vicinity of body)



Misting stains, slight
radiation downward,
round to elliptical

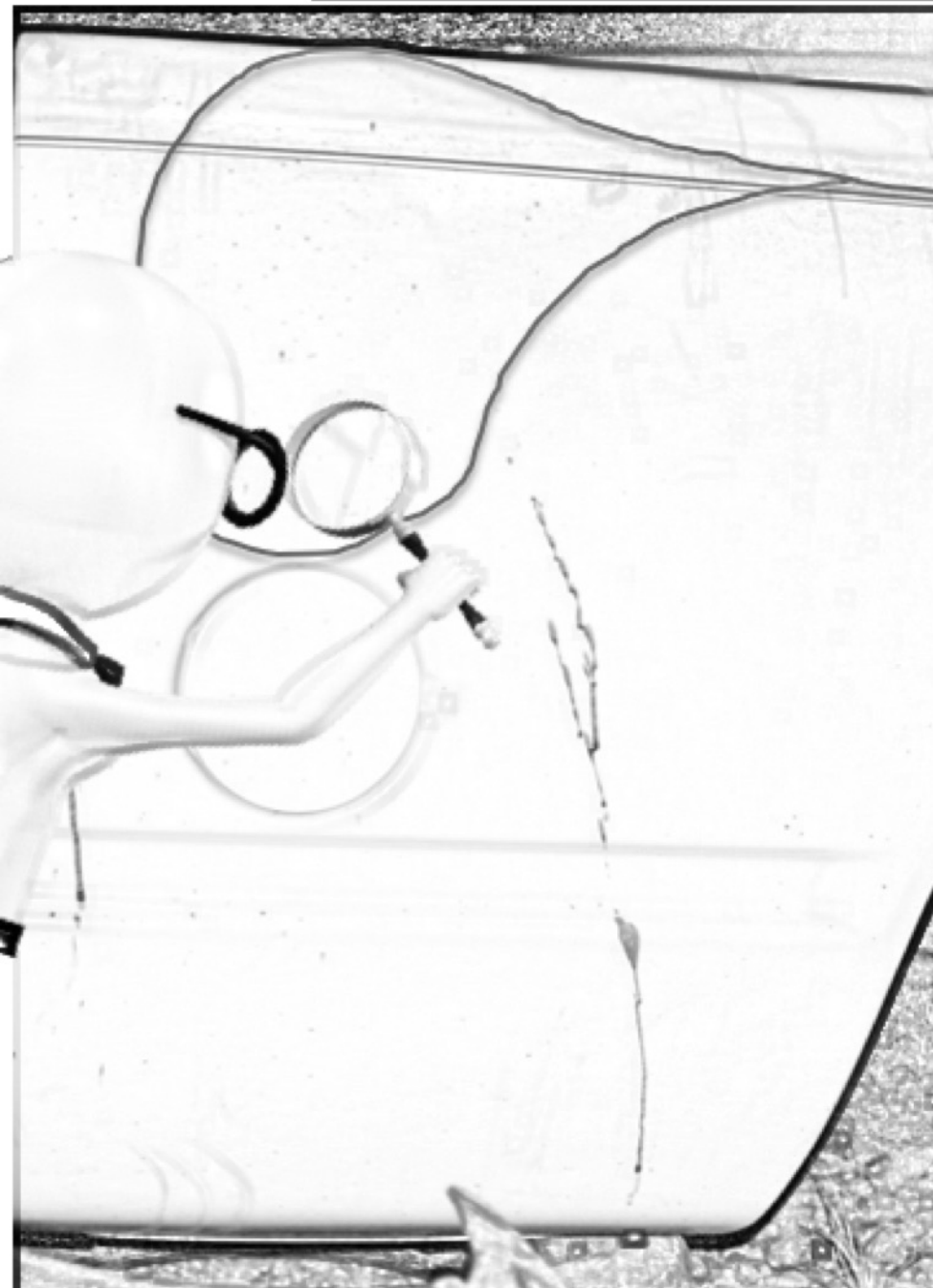
Limited volumes with flows

Procedures: BPA

- Second: Begin Pattern Classification process:
 - Broad: include all possible mechanisms
 - “I don’t know” is OK



Second: Pattern Classification



Misting stains, slight radiation downward, round to elliptical

Possible classifications

- **Complex pattern: high energy impact and projected.**
- **Expired**

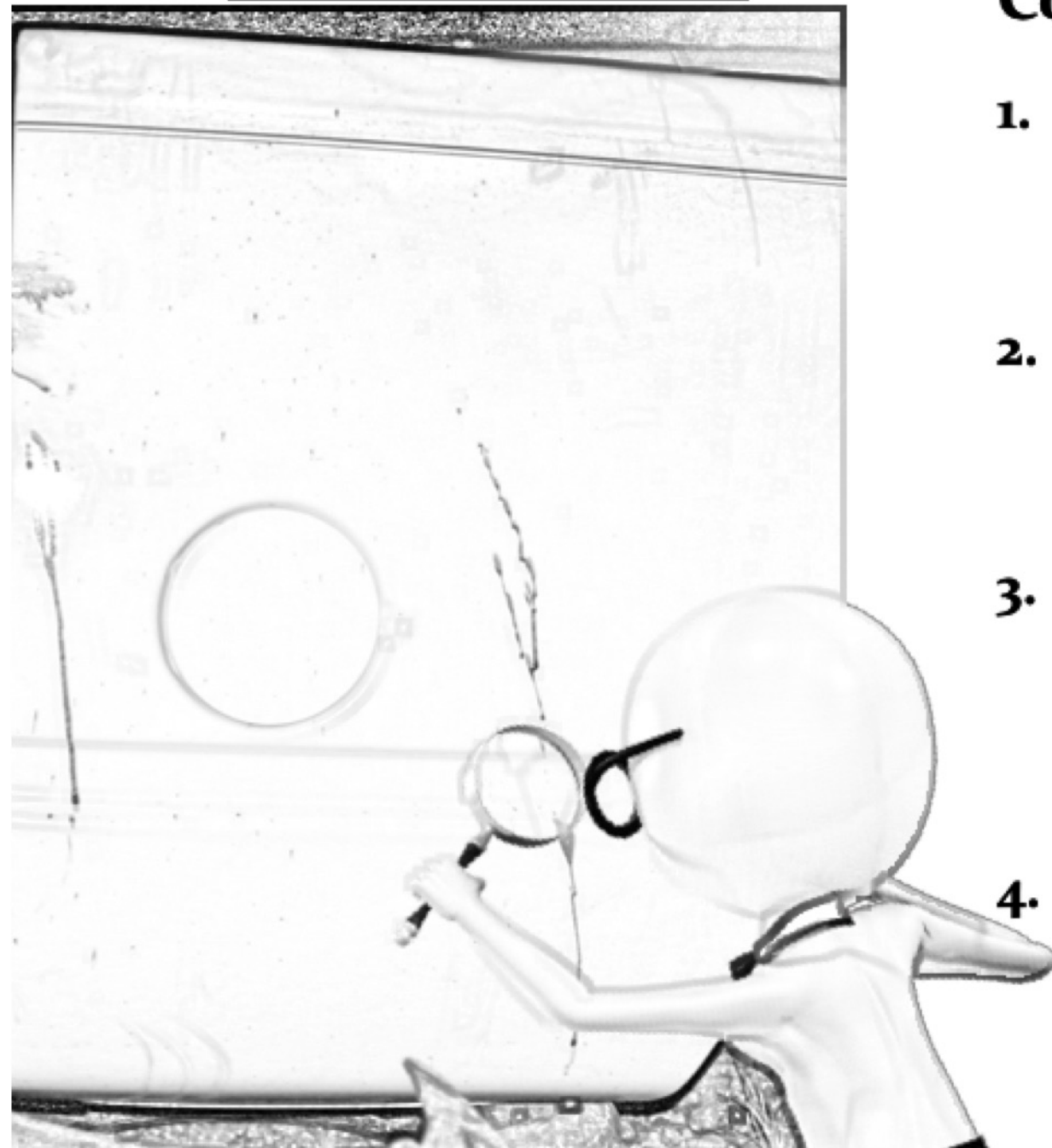
Procedures: BPA

- **Third: Consider Context**

- Interrelationships of patterns
- Medical/autopsy reports
- DNA & impression evidence
- Firearms related evidence
- Statements & subjective evidence (with caution)
- Use context to exclude or narrow classifications



Third: Consider Context



Context:

- 1. No impact mechanism in vicinity.**
- 2. Previously injured victim walked to this location.**
- 3. Two perforating gunshot wounds through chest & lung .**
- 4. Exclude impact. Can't exclude expired or projected.**

Procedures: BPA

- **Fourth: Apply scientific method.**
 - Consider ALL relevant data.
 - Formulate hypotheses for each possible mechanism and sequence.
 - Test each possibility.
 - “Test, don’t guess”
 - Include “null” hypothesis
 - Adopt as way of thinking



Procedures: BPA

- **Fifth: Auditing**
 - Re-check all case materials and referenced sources.
 - Ensure all viable possibilities were considered.



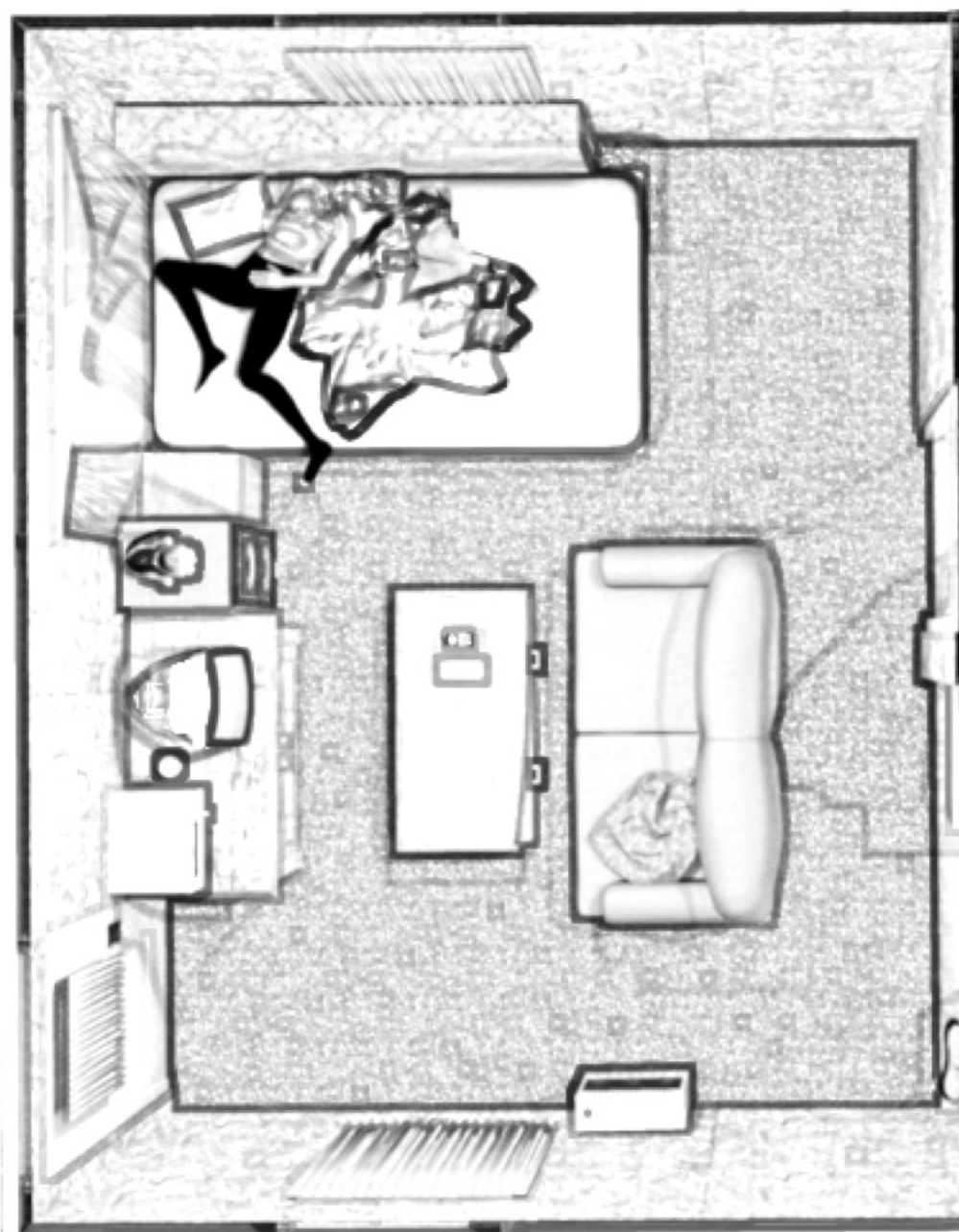
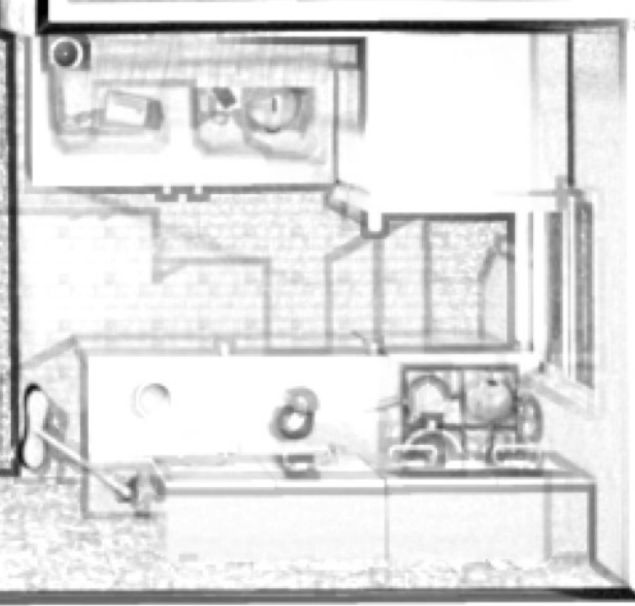
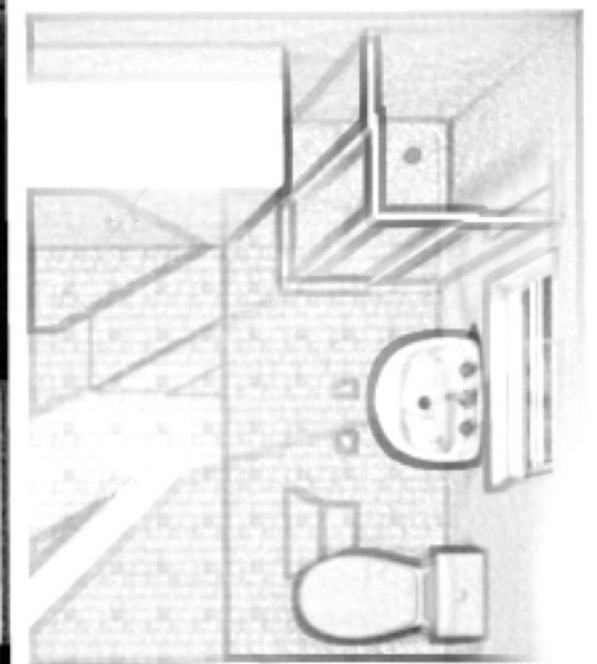
Procedures: BPA

- **Sixth: Peer review**
Have others examine
process and conclusions.



Practical Exercise #1 (Part I)

- Review case scenario
- Review images
 - Initial observations. (Describe what you see)
 - Identify possible bloodstain pattern classifications.
 - Use image analysis spreadsheet or document of your choice.
 - Electronic
 - Paper



Reconstructing Bloodstain Scene Includes:

- Evaluating bloodstain patterns in the CONTEXT of scene evidence.
- Context provides meaning to BPA.

Reconstruction

- Explores all possible scenarios.
- Excludes impossible scenarios.
- Determines best explanation.



Sherlock Holmes



“Eliminate all other factors, and the one which remains must be the truth”

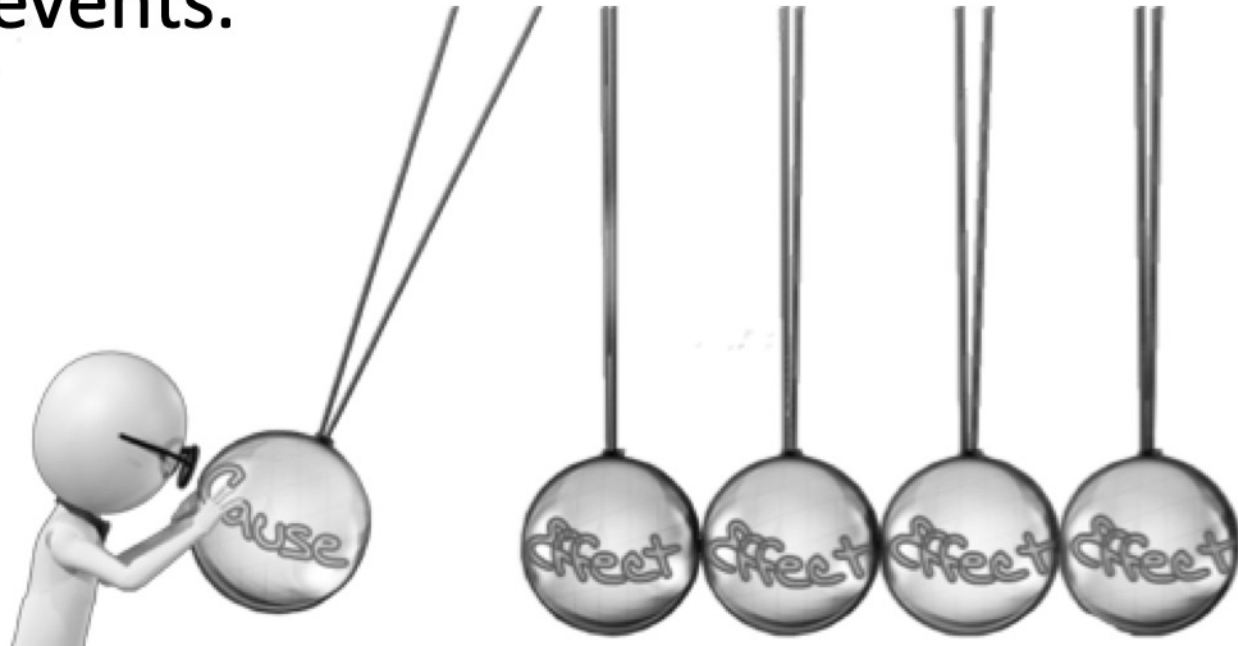
“The Sign of Four”, Sir Arthur Conan Doyle



Shooting Reconstruction, Michael and Lucien Haag, 2nd edition, p.10

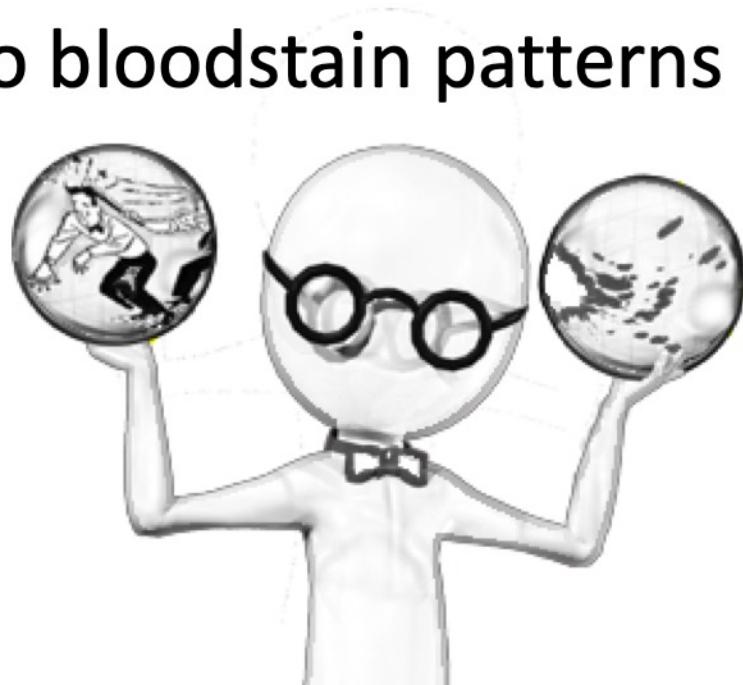
Reconstructing Bloodstain Patterns

- Identifying cause and effects.
- Identifying relationships of all available evidence.
- Sequencing of events.



Crime Scene Reconstruction

- Incorporates 6-step BPA methodology as part of Incident Analysis.
- Associates actions to bloodstain patterns and other evidence.



Charles M. Tidy (1843-1892)

- English Medical Man
- Author: Legal Medicine (1882)

Relationship between
bloodstains and actions that
caused them.



Edward Heinrich (1881-1953)

Use cause and effect to find a chain of circumstances.

Evaluate each fact before fitting it into a pattern.

"Crime analysis is orderly procedure... Answer what happened, where, when, who and why".

Reconstruction of events by associating:

evidentiary contacts & factual evidence with actions.



Actions: From Objective Evidence

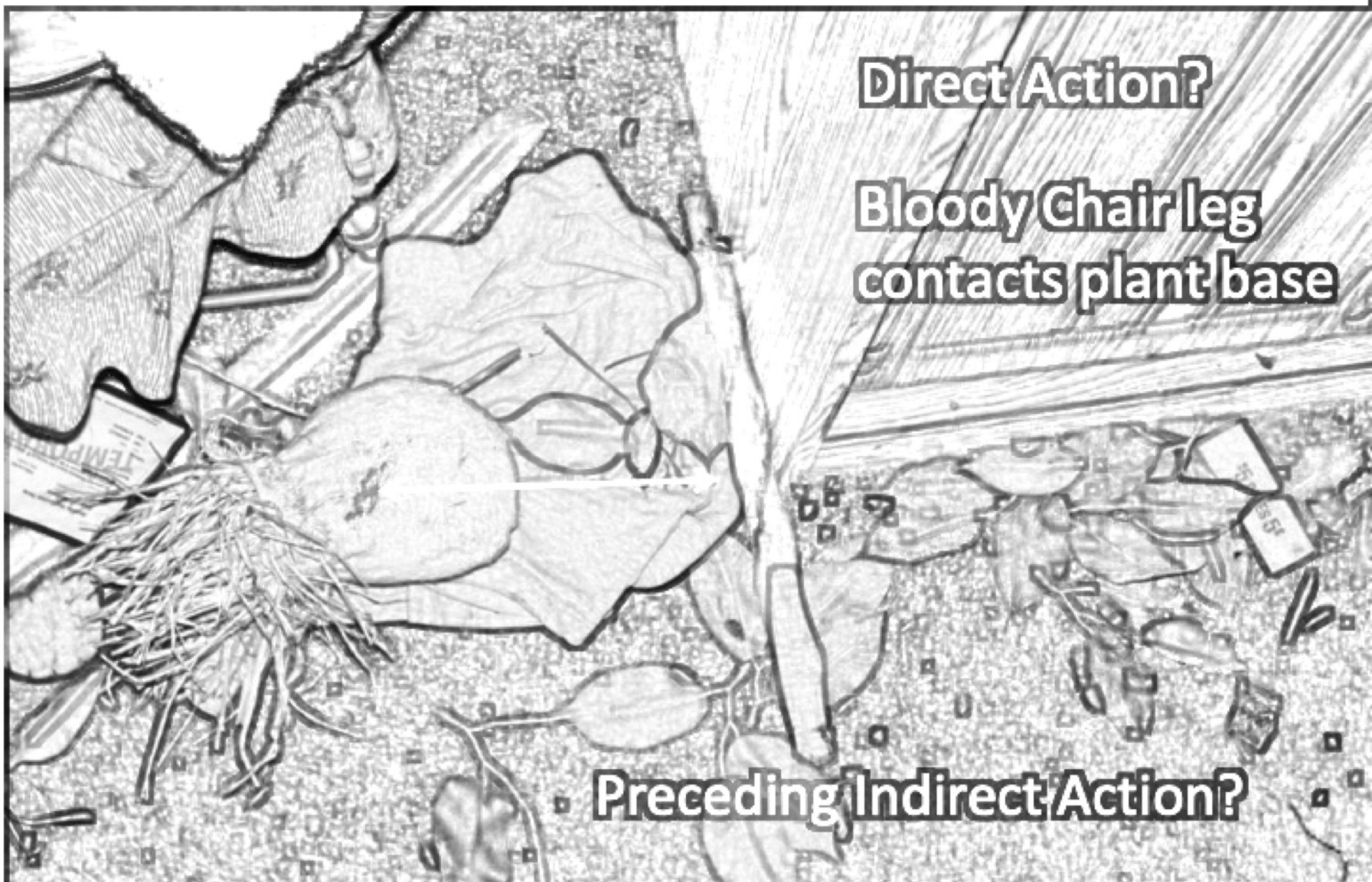
- Each evidence item has associated action.
- Each action includes:
 - Who?
 - What?
 - When? Sequence to another action.
 - Where?
 - How? Relationships to other evidence
 - Example: blood impacts tile wall



Actions Associated With Evidence

- Direct: Directly caused or resulted in creation of evidence.
- Indirect: Preceding actions at least one step removed from evidence.

Example #1 Blood Transfer Pattern

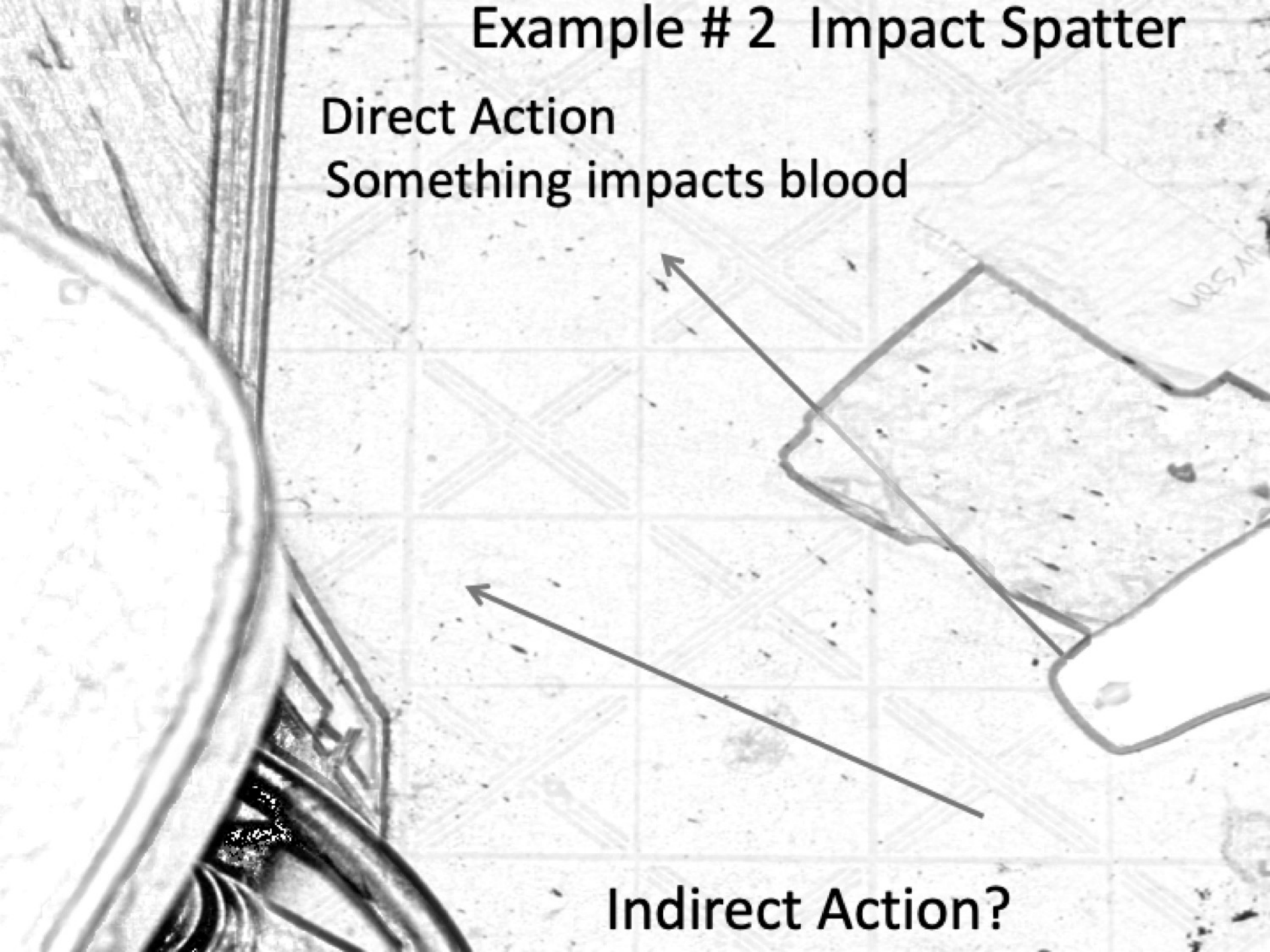


Example # 2 Impact Spatter

Direct Action

Something impacts blood

Indirect Action?



Actions in BPA

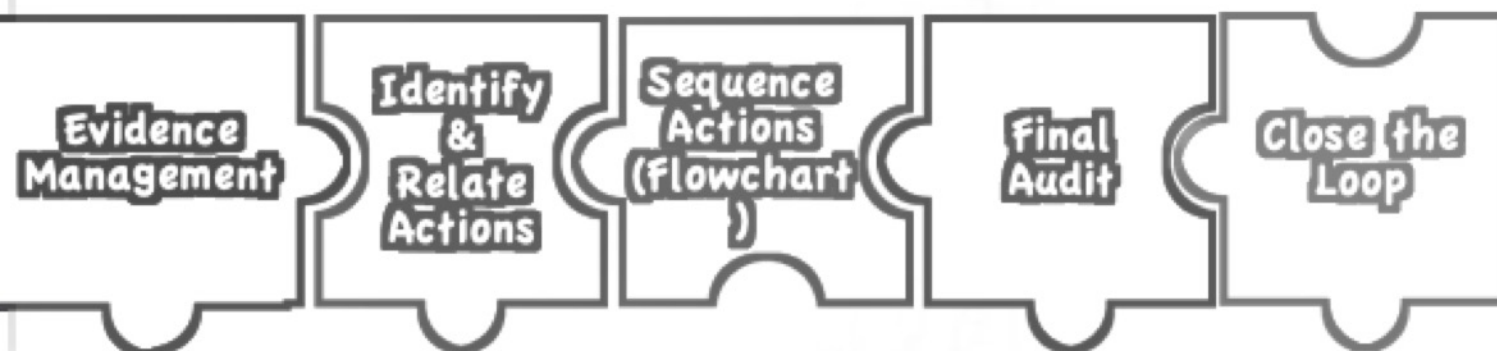
(Summary)

- Every action
 - Includes a person or physical object.
 - Direct or indirect.
 - Activity that can be sequenced to other actions.
 - Relationship to bloodstain or other evidence.

Actions - Kitchen

Action	Image #	Description	Evidence #	Description	Source	Observations	Related Images
Bloody hand contacts freezer door	007	Palm shaped print on freezer door of Fridge			CSR-P.2	Bottom of door, fingers point left see 033 for context	032,033, 1628
Bloody hand contacts table	018	Table N side of kitchen			CSR-P.1	Finger and palm like stains on kitchen side of table see 033 for context	033,1628
Rug moved	032	Rug over blood-pottery	07	Piece of broken pottery	CSR-P.2	Rug shifted over blood/pottery	033,048,156,159,160,
Blood event forms 2 large pools	032	2 large pools in kitchen	05,06	Samples from each pool	CSR-P.6	drag marks through blood	033,048,1628,1632, 1632
Pottery broken	033	Broken pottery with neck in front of fridge	08	Piece of broken pottery	CSR-P.2	Phone book on top of jug neck, two large pools of blood,	032,156,159,160,1628
Blow to victim	044	Impact spatter	16	Blood sample	CSR-P.3	To southeast Two or more blows see 049 for context	049
Finger swipes	048	Finger like blood swipes		Center of kitchen floor	CSR-P.3	See 032, 033 for context	032,033,1628
Wipes/swipes	049	Multiple wipes/swipes		Center of kitchen floor	CSR-P.3	See 032, 033 for context	032,033,1628
Cabinet door piece broke off	049	Piece of door Laying on top of blood	21		CSR-P.4	Blood event before door broke	050,054,156,1632
Edge torn on cabinet door	050	Broken cabinet door		Hole in existing cabinet	CSR-P.4	Blood dripped and collected on edge – after door broke see 054 for context	049,054,156,1632
Door broken	054	Broken piece of cabinet door-hole in cabinet door	21		CSR-P.4	Blood flow pattern right side of door flows into broken edge. Blood flow ref in 050 does not continue to top of piece	049,050,156,1632
Bloodstained hand contacts countertop	060	Left palm transfer			CSR-P.5	Made after blood shed see 087	061,087
Bloodstained hand contacts countertop	061	Left hand contact and swipe		Stain to the right of 060	CSR-P.5	Made after blood shed see 087	060,087
Pottery pieces placed in trash	156	Pieces of broken pottery in trash under sink		Pieces of broken pottery in trash	CSR-P.2		032,033, 156, 159, 160 Pause in assault
Blood contacts broken pottery	159	Bloodstain on edge	09	Piece of broken pottery from trash		Blood stain occurred after pottery broken	032,033,156,160,1632
Blood contacts broken pottery	160	Piece of broken pottery with blood	10	Piece of broken pottery from trash	CSR-P.2	Blood on pottery curve and	032,033,156,159,1632
Drag	1628	Drag trail leading out of kitchen				Between blood pools	032,1637,1638
Drag	1638	Drag trail in blood				In	032,1637,1628

Incident Analysis Process

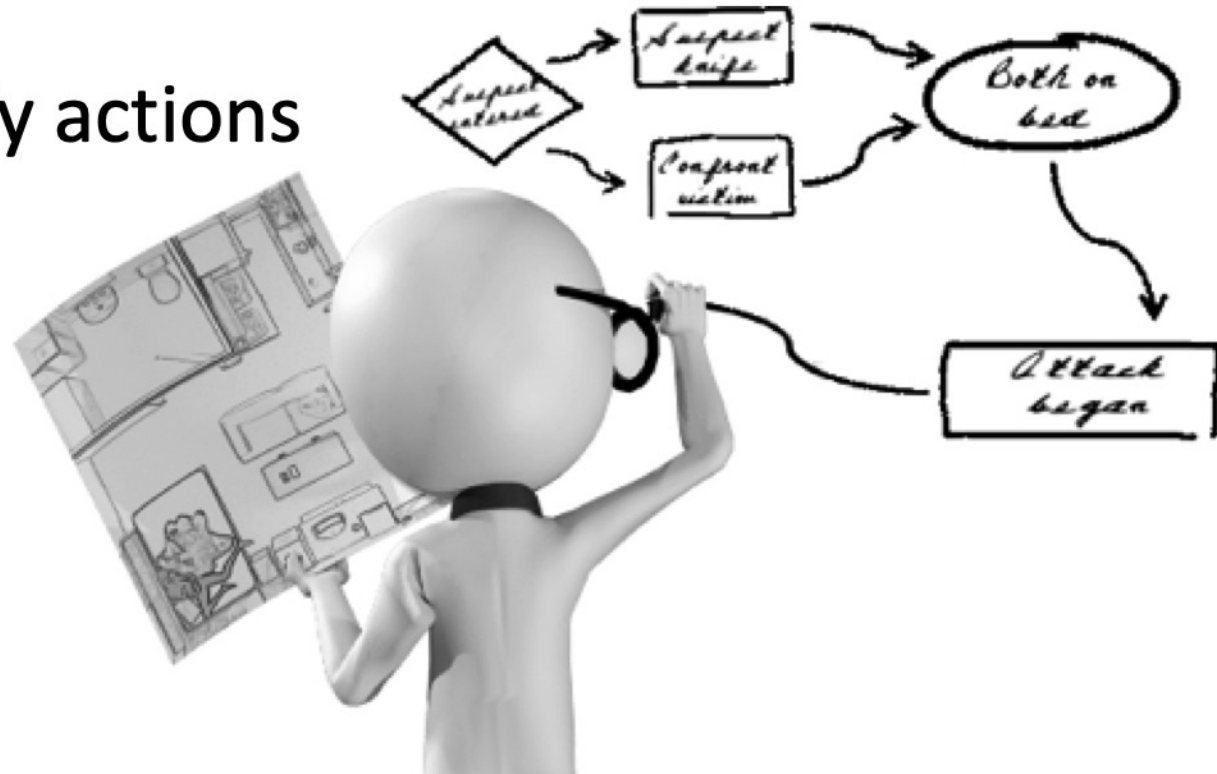


Sequence the Actions

- Flow chart: Most understandable method for sequencing events.
- Begin with “fact beyond change” actions.

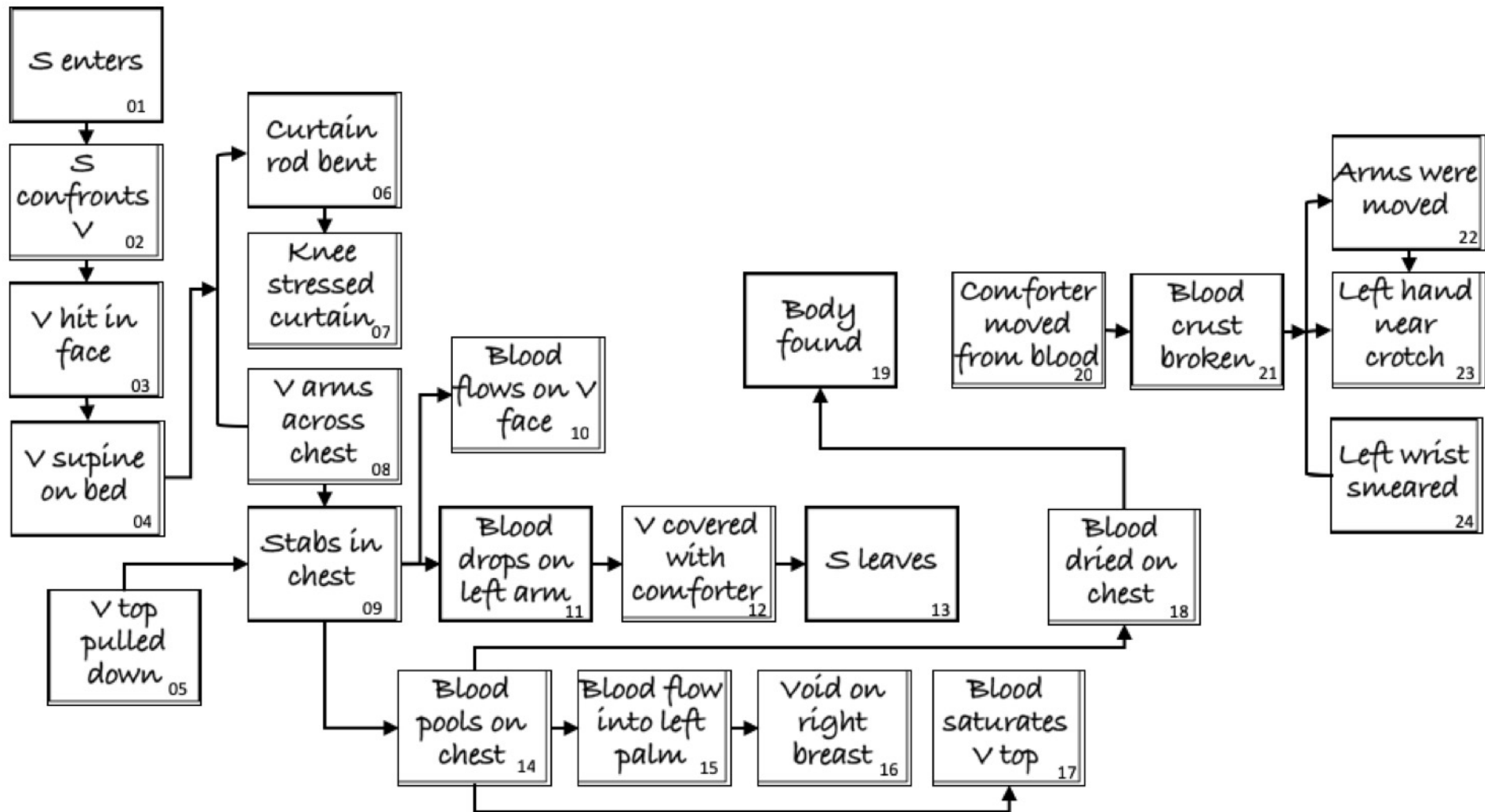
–Then identify actions

- Before
- During
- After
- Unknown



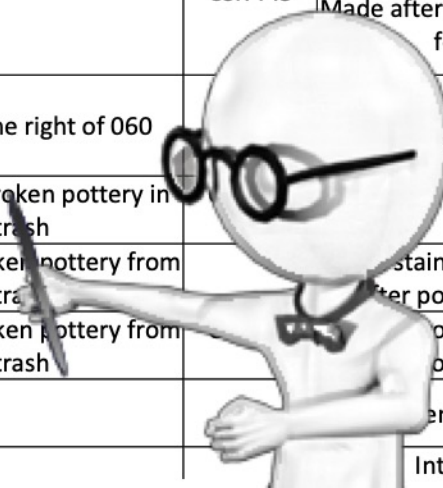
Practical Exercise #1 (Part II)

- Review case scenario
- Review images
 - Document Initial observations.
 - Identify possible bloodstain pattern classifications.
- Identify & sequence actions associated with the incident.
 - Use Actions spreadsheet or document of choice
 - Flowchart: Sticky notes, electronic or both



Actions - Kitchen

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Blood contacts broken pottery	159	Bloodstain on edge	09	Piece of broken pottery from trash		stain on edge – occurred after pottery was broken	032,033,156,160,1632
Blood contacts broken pottery	160	Piece of broken pottery with blood	10	Piece of broken pottery from trash		top on interior curve on broken edge	032,033,156,159,1632
Drag	1628	Drag trail leading out of kitchen				between two blood pools	032,1637,1638
Drag	1638	Drag trail in blood				Into utility hall	032,1637,1628



Incident Analysis Process

