BLOODSTAIN PATTERN ANALYSIS

I. Definitions
- A. Low energy
- B. Impact spatter
- C. Satellite
- D. Misting
- E. Diluted
- F. Arterial and arteriole
- G. Skeletonization
- H. Wipes and swipes
- I. Contact
- J. Void Patterns
- K. Cast-off
- L. Projected
- M. Blood dripping into blood

II. Definition exercises
- A. Low Energy Spatter
  1. No-motion drips – Students drips blood from eye-dropper while walking along paper
  2. Motion drips – Students drip blood from eye-dropper while running along length of paper
  3. Blood bounce – Student drips blood from an eye-dropper onto a solid object between dropper and paper causing the blood to "bounce" onto the paper
- B. Medium energy spatter
  1. Rat trap – students place a small amount of blood on the base of a rat trap and the trap is sprung causing the blood to spatter onto a paper target
  2. Falling object – students drop a solid object (block of wood or similar) onto a small pool of blood on a paper target
  3. Cast-off – students dip a variety of weapons (pipe, hammer, wrench) into a container of blood getting blood onto the weapon. The student then swings the weapon over their head causing the blood to be "cast-off" of the weapon and onto a paper target.
- C. High Energy Spatter
  1. Gunshot – these patterns are demonstrated through a pre-created video of various caliber weapons being fired through a bloody sponge.
  2. Misting – blood is drawn via syringe into a hollow tube that is affixed to a can of air. The blood is then expelled onto a paper target
  3. Machinery – demo by video only
- D. Transfer Patterns
  1. Wipes / Swipes – students get various objects covered with blood and then move them across a paper target
  2. Contact Stains - students get various objects covered with blood and then place them down and pick them up from a paper target
  3. Voids – an object is placed on white paper and then students drip blood from an eye-dropper onto the paper and the object. The object is then removed and a void area (no blood) is left that outlines the object
- E. Altered Bloodstains
  1. Skeletonization – students drip blood onto a vinyl floor tile and allow it to dry. Air is then blown across the dried blood to show how the blood leaves a perimeter stain or skeleton of the original stain

2. Blood flow patterns – Students drip blood onto a vertically held vinyl floor tile or similar object. Students then turn the object to demonstrate how blood will change direction to flow with gravity
3. Diluted Blood – instructors set up a mock scene in a bathroom using blood that is diluted with water. Students are tasked with locating all the diluted bloodstains

III. Interpreting Bloodstain patterns
- A. Physical properties of blood
  1. Liquid properties
     a. flows, has movement
     b. affected by gravity
     c. surface tension
     d. cohesion, adhesion, absorption
     e. spreads to fill available space
     f. viscosity
  2. Forward motion
     a. continues forward until stopped by opposing force
     b. forward speed stays constant
  3. Every action has equal and opposite reaction
     a. satellite spatter
     b. blood dripping into blood
     c. blow back spatter
- B. Stain shape and Impact angle relationship
- C. Determining motion and directionality
  1. General sequence of events
  2. Droplet directionality
  3. Pattern directionality
  4. Repetitive patterns

V. Reconstruction exercises
- A. Scene Reconstruction
  1. Separating Patterns
  2. Sequence of Events

VI. Collecting blood
- A. Locating
- B. Identifying
- C. Sample collection
- D. Comparison standards
- E. Analysis

SAFETY:

All bloodstain exercises are created with USDA approved Bovine whole blood with added sodium to retard coagulation or a commercially available synthetic blood substitute made from Corn Syrup and Red Food Color.

All students are required to participate in all exercises.

Students will be provided with Tyvek coveralls, full face shields, and either Latex or Nitrile gloves.

All contaminated materials are either disposed of in bio-hazard containers or cleaned with warm water and bleach (real blood only)