Blood (Serology) Note Guide

<u>Blood collection</u>

        Package in _____ container, such as a _____, so that no mold grows—dry
        blood _____ still be analyzed

<u>Blood analysis</u>

Step 1: Use _____ to determine if the substance found is blood
        Examples
            1. Hematest—Hemastix test strip turns _____ due to detection of
               _____ by-products
            2. Luminol Test—detects _____ or _____ blood (spray suspected
               area and if blood is present, it will _____ in the dark)

Step 2: Is it human blood?
        Determine using . . . .
            a. _____
            b. Precipitin Test
                = the more _____ and _____ method
                    • very _____ and _____ test
                    • a _____ is added to the crime scene sample . . . if it is human blood,
                      it will _____ as a reaction

Step 3: If human, then analyze it further
          a. B_____ T_____
              A, B, and O blood types based on _____ on surface of _____
              blood cells
                     Genotypes   Phenotypes

              NOTE: A and B are _____ to each other, but both A and B are dominant over
              O
          b. DNA fingerprint, etc. (see DNA notes)

<u>Bloodstain Pattern Analysis</u>
        How is it useful???
            --assists investigators to better understand _____ that took place at CS
               -such as to _____ statements, apprehending a suspect, _____ past events,
               and _____ the accused

<u>Properties of Human Blood</u>
- C_____ throughout body to _____ oxygen, electrolytes, nourishment, hormones, vitamins, and antibodies to tissues an organs
- Contains _____ blood cells (erythrocytes), _____ blood cells (leukocytes), and _____
- Held together by _____ cohesive forces

<u>Blood . . .</u>

- Does _____ fall in _____ drop form (spherical)
- Will not _____ apart as it falls through air
- Is _____ times more viscous than _____
- Has average volume of 0.05 ml (diameter = 4.56 mm)

- Blood hitting surface
  --_____ smooth surface = creates _____ spatter
  --wood or concrete = create _____ spatter
  (fig. 11.2, pg. 192)

  - S_____ blood = random distribution of bloodstains

Significance of SPATTERED blood . . .
- Allows for determination of area or location of _____ of blood source
  (_____—see picture)
- Place someone at a crime (on clothing)
- ***May determine _____ that created pattern (including speed of drop at impact, weapon used, direction of travel, angle of impact,)***

Classify spatters (3):
LVIS—_____ impact velocity impact
Force = up to 5ft/sec
diameter= _____mm+
MVIS—_____ velocity impact
Force = 5-25 ft/sec
diameter = _____ mm
HVIS—_____ velocity impact
Force = +100 ft
Diameter = < ____mm

Weapon used . . .

Impact spatters:
1-Gunshot—_____ pattern (<1mm blood spots)
--Size range dependent on _____ of blood, caliber of weapon, # of shots and location on body, hair/clothes . . .
--_____ or back spatter possible

2-Beating or stabbing—sizes 1-3 mm
--depends on _____ and _____ of blood
--only exposed blood makes spatter (_____ 1st blow)
--type of weapon influences pattern

Size, Shape, and Directionality (deals with "flight" of bloodstain)

- Direction of travel
  --_____ end of elongated bloodstain points in direction of _____ (impact angle < 90 degrees)
  Picture:

  --_____ bloodstain = no travel, dropped at _____degree angle
  Picture:

- Impact _____ calculation (for _____ bloodstains)
  1st find ratio of width to length

(see picture)
Then take the arc sin of that ratio

Thus . . .

Angle of impact $= \sin^{-1}$ (width/length)

Other Bloodstain patterns

Satellite or _____ spatter = _____ drops, circular or oval, 0.1=1 mm size

_____ pattern = _____, free falling drops on horizontal surface

Castoff pattern = multiple _____ to same area where wound has occurred and blood has accumulated

Expirated patterns = blood that has _____ in lungs, sinuses, or airway
passages is _____ from body

Arterial patterns = breaching of _____ and result is _____ or spurts of blood

Blood transfer pattern = blood stained object _____ unstained object (can be a _____)

_____ blood = _____ changes . . . red –to— reddish brown —to— black

Documentation of Bloodstain:

- D_____ size, shape, and distribution of stains and patterns
- Use _____, video, diagrams, and notes
- _____ articles of evidence with significant or questionable patterns (non-airtight container)

(Remember _____ can be used to detect or enhance bloodstain patterns)