Forensics – Lab

Effect of Height on Blood Drops

Name _____

Period _____

Scenario:

The police examined the blood spatter at a crime scene. From the size of the droplets, it appeared that the blood had passively dripped as the injured person walked across the floor. The person may have experienced a second injury, because two different patterns of blood spatter appeared halfway across the room. The second injury seemed to be from a source higher up on the person's body.

By examining the size and shape of blood spatter, forensic scientists are able to reconstruct a crime. A partial story of the crime emerges as the blood-spatter analysis starts to "tell the story."

Objectives:

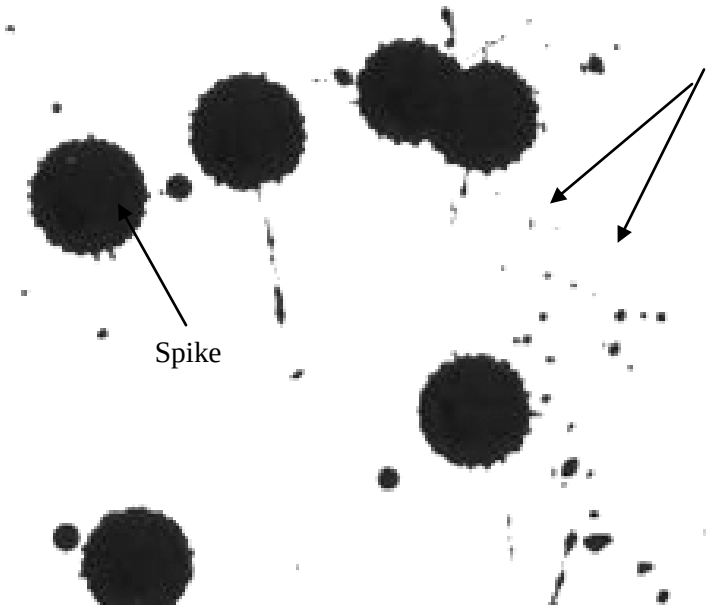
- Prepare reference cards of blood spatter produced from varying heights
- Compare and contrast the blood spatter produced from different heights.
- Distinguish between the blood spatter formed at the point of contact with satellite blood droplets.
- Distinguish between satellite droplets and spine-like formations of blood droplets.
- Form a hypothesis about the effect of height on the size and shape of blood-spatter droplets.

Materials: *(per group)*

- 1 dropper bottle of simulated blood
- 12 index cards
- 4 metric rulers
- 1 meter stick

Safety Precautions:

- Simulated blood may stain clothing.
- Spread meat paper under where you will work.



Background:

A blood spatter pattern is created when a wound is inflicted and blood leaves the body. This pattern can help reconstruct the series of crime scene events surrounding a shooting, stabbing, or beating. Blood forms droplets as it falls from a wound. A drop of blood that falls on a flat surface will not totally flatten out – the blood drop will have a curved surface. The reason for this shape is the cohesive nature of blood. Blood tends to pull together because of cohesion and resist flattening out on a surface. The result is that the surface of the blood is elastic, giving the top of the blood spatter a spherical appearance. If any of the blood does overcome cohesion and separates from the main droplet of blood, it will form small secondary droplets known as satellites. If blood is dropped onto a smooth surface, such as glass or marble, the edge of the drop of blood appears smooth and circular. However, if the blood lands on a porous surface, such as wood or ceiling tile, then the edge of the drop of blood may form small spikes or extensions. Spikes are still connected to the main droplet, whereas satellites are totally separated.

As you compare the blood dropped from various heights, note which height causes blood to form more satellites.

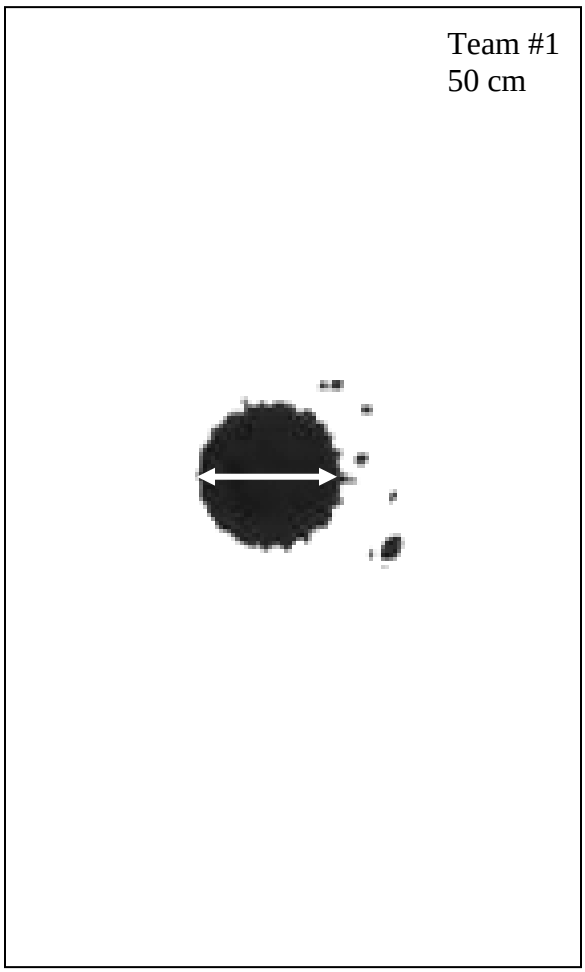
Procedures:

Day 1

1. You will prepare **two** 5 × 8 cards **for each height** used.
2. Label the top-right corner of each card with
    a. team number
    b. height of the blood drop
3. Use a meter stick to measure the distance above the card.
4. Hold the meter stick vertically, squeeze out ONE drop of simulated blood from a height of 25 cm onto the index card. Try to aim towards the center of the card.
    a. Repeat this height for the second card.
5. Follow step 4 for the other heights of 50, 100, 150, 200, and 250.
    a. Remember to prepare two cards for each height.
6. Allow the index cards to dry completely. DO NOT move the cards until they are dry (at least 20 minutes). When you do move the cards, do not turn them on their sides because blood is affected by gravity.

Day 2

7. Measure the diameter of each of the spatter patterns and record the data on the table (pg 3).
    a. Take the measurements at the widest part of the main drop. (see diagram below)
    b. DO NOT include the satellites or spikes with your measurement.
8. Determine the average diameter for each height.
9. Prepare a bar graph comparing the effect of height on the average diameter of the blood drop.
    a. Your graph should contain a title, labeled x-axis and y-axis and properly scaled.



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Hypothesis:

Form a hypothesis about the effect of height on the size and shape of blood-spatter droplets.

Data:

Effect of Height on Diameter of Blood Drop			
Height of drop (cm)	Diameter of drop (cm) CARD 1	Diameter of drop (cm) CARD 2	Average
25			
50			
100			
150			
200			
250			

Conclusions: (answer on back)

1. What is the relationship between the height from which the blood is dropped and the size of the blood spatter droplets? (Justify this answer with data!)
2. True or False: As the height from which the blood is dropped increases, the size of the blood spatter continues to increase. (Justify this answer with data!)
3. Hypothetical Situation - Blood is dropped from heights of 25 cm and 350 cm. Compare and contrast the outer edges of blood droplets produced from these two heights.
4. Examine the blood spatter produced by dropping blood from the six different heights. Is there a relationship between the height from which the blood is dropped and the number of satellites produced? (Justify this answer with data!)