#1 Stain Diameter as a Function of Distance Fallen

Using an eyedropper or pipette, deposit single drops of blood onto a smooth cardboard surface at varying distances. Once the blood has dried, measure the diameter of the stains and determine whether or not there is a correlation between the distance the drop fell and the size of the stain. If so, is there a distance at which the correlation stops or is minimized? Next, drop blood from one or two distances onto a paper towel and a piece of glass. How does the target surface affect the appearance and size of the bloodstain?

Results and Observations for Exercise #1:

Stain Number	Distance Fallen (in inches)	Stain Diameter (in millimeters)	On Paper Towel	On Glass
1	3"			
2	6"			
3	9"			
4	12"			
5	18"			
6	24"			
7	36"			
8	48"			
9	60"			
10	72"			

Comments for Exercise #1:

#2 Determination of Impact Angle

Each group will receive a sheet of paper depicting five bloodstains, each of which was deposited onto a target surface at a different angle. Carefully measure the width and length of each stain, then, using either a scientific calculator or the trigonometric sine table provided in this manual, determine the impact angle of each stain. How does the appearance of each stain change with the angle of impact?

Results and Observations for Exercise #2:

Stain Number	Width (in millimeters)	Length (in millimeters)	Width/Length	Angle of Impact
1				
2				
3				
4				
5				

Comments for Exercise #2:

#3 Directionality and Area of Convergence

Each group will receive a smooth cardboard surface containing bloodstains consistent with stains that would be found at a crime scene as a result of a beating or a stabbing. Study the stains, noting both their relative size and their appearance. Determine the directionality of the stains. Next, choose a representative sample with which to work and, using a pencil and a straightedge, trace lines back along the long axis of each of the chosen stains in order to determine the Area of Convergence.

Results and Observations for Exercise #3:

1. Was the average diameter of the stains you observed more than 1 mm or less than 1 mm?

2. How were you able to determine which direction the blood was traveling when it hit the cardboard?

3. How many areas of convergence were you able to find?

Comments for Exercise #3:

#4 Transfer Patterns, Drying Time, and Sequence of Events

Using an eyedropper or pipette, deposit multiple drops of blood onto a smooth cardboard surface and, at varying time intervals, wipe through each drop with a piece of paper towel, keeping track of the elapsed time. Next, use bloodstained paper towels and latex gloves to swipe across clean pieces of the cardboard, making note of the direction of each swipe. Finally, deposit a series of stains (swipes, wipes, and blood drops) onto the cardboard surface and, after the blood has dried, attempt to determine the sequence of events.

Results and Observations for Exercise #4:

1. What happens to a bloodstain when it is wiped through before it is allowed to completely dry? Is the appearance of the stain different depending upon the time interval?

2. What can you tell about the direction of a blood swipe by observing the resulting transfer pattern?

3. What did you observe that might help you in determining the sequence of events when blood is deposited at different time intervals and by different methods?

Comments for Exercise #4:

#5 Determination of Area of Origin

A 6-foot, 1-inch man has been shot and killed by his wife. The bullet entered the man's forehead. There is no exit wound. The wife claims that she shot her husband in self-defense as he ran toward her in a drunken rage, clutching a butcher knife. A butcher knife is in fact, found on the floor near the man's right hand, and the BAC results indicate a high blood alcohol level. Small stains consistent with those produced as the result of a gunshot are observed on the floor near the body. The stains are measured at the scene and the measurements are included in the table below. Complete the rest of the table and then answer the questions that follow. To determine the distance from the floor for each stain, use the following equation: **DTS = tan *A* (DPOC)**

DTS = the distance from the target surface (in this case the floor)

tan = tangent

A = the angle of impact

DPOC = the distance from the point of convergence.

Stain Number	DPOC (inches)	Width (mm)	Length (mm)	Width/ Length	Angle of Impact	tan *A*	DTS (inches)
1	9.25	0.6	1.5				
2	14.5	0.3	0.65				
3	17.25	0.3	0.9				
4	16.5	0.6	1.6				
5	28.5	0.1	0.4				
6	26.5	0.25	1.0				
7	17.25	0.2	0.7				
8	17.0	0.15	0.35				
9	15.5	0.2	0.5				
10	13.75	0.15	0.5				

Results and Observations for Exercise #5:

1. What was the highest value from the last column? _____

2. What was the lowest value from the last column? _____

3. What is the average of the values from the last column? _____

4. Was the wife telling the truth? _____

Comments for Exercise #5:

Trigonometric Table for Bloodstain Pattern Analysis

angle	sin	tan	angle	sin	tan
0	.0000	.0000	46	.7193	1.0355
1	.0175	.0175	47	.7314	1.0724
2	.0349	.0349	48	.7431	1.1106
3	.0523	.0524	49	.7547	1.1504
4	.0698	.0699	50	.7660	1.1918
5	.0872	.0875	51	.7771	1.2349
6	.1045	.1051	52	.7880	1.2799
7	.1219	.1288	53	.7986	1.3270
8	.1392	.1405	54	.8090	1.3764
9	.1564	.1584	55	.8192	1.4281
10	.1736	.1763	56	.8290	1.4826
11	.1908	.1944	57	.8387	1.5399
12	.2079	.2126	58	.8480	1.6003
13	.2250	.2309	59	.8572	1.6643
14	.2419	.2493	60	.8660	1.7321
15	.2588	.2679	61	.8746	1.8040
16	.2756	.2867	62	.8829	1.8807
17	.2924	.3057	63	.8910	1.9626
18	.3090	.3249	64	.8988	2.0503
19	.3256	.3443	65	.9063	2.1445
20	.3420	.3640	66	.9135	2.2460
21	.3584	.3839	67	.9205	2.3559
22	.3746	.4040	68	.9272	2.4751
23	.3907	.4245	69	.9336	2.6051
24	.4067	.4452	70	.9397	2.7475
25	.4226	.4663	71	.9455	2.9042
26	.4384	.4877	72	.9511	3.0777
27	.4540	.5095	73	.9563	3.2709
28	.4695	.5317	74	.9613	3.4874
29	.4848	.5543	75	.9659	3.7321
30	.5000	.5774	76	.9703	4.0108
31	.5150	.6009	77	.9744	4.3315
32	.5299	.6249	78	.9781	4.7046
33	.5446	.6494	79	.9816	5.1446
34	.5592	.6745	80	.9848	5.6713
35	.5736	.7002	81	.9877	6.3138
36	.5878	.7265	82	.9903	7.1154
37	.6018	.7536	83	.9925	8.1443
38	.6157	.7813	84	.9945	9.5144
39	.6293	.8098	85	.9962	11.4301
40	.6428	.8391	86	.9976	14.3007
41	.6561	.8693	87	.9986	19.0811
42	.6691	.9004	88	.9994	28.6363
43	.6820	.9325	89	.9998	57.2900
44	.6947	.9657	90	1.0000	∞
45	.7071	1.0000			

Notes

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