Crime Scene:

Tom Kohlfing, a local physics teacher and a member of Laura Fishmann’s weekly Saturday night poker game with colleagues, was gruesomely shot in the left orbital socket at the most recent card game, leading to his sudden demise. Experiencing a run of bad luck and poorly executed bluffs while playing No Limit Texas Hold‘em, Tom’s temper quickly rose and unpleasant words were exchanged with multiple fellow participants. Ultimately, he refused to apologize after making strong comments on the topic of the superiority of hamsters vs. dogs as house pets. Clearly, this offended multiple people in attendance. Things escalated rapidly, and after a physical altercation began, loaded guns were shot and a bullet traveled straight through Kohlfing’s left eye. Because of the number of people present at the time of his death, a confident determination of the shooter’s identity must be made so that a murderer can be prosecuted. As you may infer, this was not a casual get-together amongst friends looking to play Go Fish. With so many drastically underpaid teachers present in one place at the same time, this was a high stakes game with a little more than lunch money on the line.

Upon their arrival to the scene, police investigators narrowed the suspect field to the three candidates who were armed with guns and in the room at the time:

1. Joseph Flambers, an aspiring science teacher with a love of quantum mechanics who currently teaches music, was found carrying a .38 Special.
2. Lynne Reis, a Spanish teacher who with two pet dogs who spends her weekends volunteering at the Missouri Humane Society, was found with a .45 Automatic Colt Pistol (ACP).
3. Corinne Bilson, a geography teacher who was rumored to have dated Tom Kohlfing years ago, was found with a .357 Magnum.

All three guns had been fired that evening, with bullet holes spread throughout the walls of Mrs. Fishmann’s kitchen, where the poker game had taken place. Oddly enough, no bullets or shell casings was found at the crime scene. However, based on eye witness testimony, police officers can pinpoint where in the room Kohlfing was standing when he was shot. Furthermore, the ER doctor’s report indicates definitively that, based on entry and exit wound locations, the bullet entered his orbital socket and emerged from the back of Kohlfing’s head at an upward angle of approximately 120. The bullet left Kohlfing’s head 1.6325 m above the ground. The hole in the wall was centered 1.627 m above the ground and 2.75 m behind Kohlfing. Yes, as some of you may have gathered from the given heights, he was a very petite man.

Furthermore, multiple sources of DNA were obtained from the crime scene by forensic detectives. There was a tremendous amount of blood present from the victim, primarily in the form of gunshot or high force impact spatter. However, multiple DNA swabs were taken for testing from each of the 3 suspects. Other items of importance present or collected at the scene were many empty beer bottles; a pool of vomit on the floor next to a chair at the card game; both empty and partially filled drink glasses (many containing alcoholic beverages); traces of blood and skin cells not belonging to Tom Kohlfing on his hands and fingernails; and, of course, the 3 possible murder weapons. Each gun has already been tested for fingerprints by the forensic detectives, with the only prints present being those of the rightful owner.

Necessary Physics Background Information:

FBI Firearm Expert Wade Marcham has provided you with the following table showing estimated muzzle velocities based on the firearms confiscated from the suspects. Further, ballistics testing indicates that passing through Kohlfing's eye would slow each bullet down to 30% of its initial muzzle velocity. You may reference this information in your final report.

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| --- |
| FBI Muzzle Velocities |
| Firearm | Muzzle Velocity (m s-1) |
| .357 Magnum | 442 |
| .38 Special | 300 |
| .45 ACP FMJ | 250 |

Your Assignment:

 \*You must assist the police in identifying the shooter and provide a detailed justification in your report for Police Chief Triplett and District Attorney Selimovic.

\*This must include interpretation of evidence based on your knowledge of both physics and biology. \*Detailed physics calculations must be shown and explained.

\*All biological tests conducted must be clearly and accurately documented with an explanation of the analysis procedure and all results listed.

\*A detailed sketch of the crime scene should be drawn.

\*A plausible motive for the murder should also be determined and explained.

\*A brief reflection focusing on your groups’ strengths, weakness, and roles is necessary. This can include modifications your group made along the way or issues you had to overcome.

\*All of the above information, along with any other relevant data, observations, or material your group deems vital, should be present in the detailed summary you must provide.

 \*The final presentation can be in the form of PowerPoint, Prezi, poster board, etc. Each group will make a brief (about 5 minute) presentation at the conclusion.

