**Teacher Solution Page**

Source of Crime:  Poisoning by Ethylene Glycol (antifreeze) placed in the victim’s coffee by witness 3

Motive: Grant competition between several science teachers in San Antonio (including the victim and witness 3). Final Interview scheduled on the day of the crime (after school), but the victim was unable to attend due to poisoning.

Crime Scene Evidence:  Chemistry Lab.  Powders on shelves/lab tables.  (Teacher was setting up for a lab.)  Note  (threat).   Drink (coffee).   Fingerprints.

Evidence sent to lab (outside source):  powders (flame test), urine sample (flame test), saliva swab (pH test), mass spec printout, fingerprints, illicit substance confirming test

Red Herrings:

- Witness 4 appears to have a motive because she is annoyed by the victim’s chemical hoarding and left Vicodin in the teacher’s lounge.

- Both Student 4 and Tony had phones taken away by the victim, so could be perceived as having a motive.

- The white powder in the lab is a barium compound, which can be toxic, but was spilled from the lab being set up by the victim

- In the mass spec data, there are 2 compounds that have the correct molar mass (62 g/mol) but only one of them, ethylene glycol, could cause the symptoms described in the doctor’s report. (MgF2 has the correct molar mass, but is not a poison)

- The threatening note is intended to reinforce witness 3 as the perpetrator, but could be used as a red herring to increase the level of difficulty. If desired, student 4, Tony, or witness 4 could have the matching pen, or the pen could belong to a different witness, but have fingerprints for witness 3.

Note: This unit was designed to utilize teachers at our schools, so the **names** of the Witnesses, Students, and Victim should all be changed to reflect teachers at your school.

Likewise, the images of **fingerprints** are not included because they are intended to be actual fingerprints from teachers at your school. You can collect the fingerprints from willing teachers and see if 1 or 2 teachers are also willing to be fingerprinted by your students during the unit. We would limit the prints to thumb and index finger of the dominant hand to conserve time and resources.

In the **ink test** portion, choose 3 - 4 different pens and pre-mark the pen from the crime scene note on the filter paper (so students don’t see which pen was used for the note) Make sure that the pen from the threat matches the pen for Witness 3.

The **saliva swab** is intended to confirm that the victim did consume something acidic (coffee) earlier in the day. Swabs can be made by soaking Q-tips in a weak acid and storing in a plastic bag at the lab station.

In the **illicit substances confirming test** the crystals from the urine are meant to be calcium oxalate, which precipitates in the urine after ethylene glycol poisoning. For the actual lab, any white crystal will work as a stand-in, since they should test negative for illicit substances.

**Witness testimonies** could also be recorded in video form, or handed out in written form.

Assignment:

We intended for students to first observe the crime scene and make notes on their individual detective reports, then compare notes with their group members. Each group should read/view all witness testimonies and doctor’s preliminary report, then decide which tests they would like to perform. They should be required to perform a minimum of 4 of the 6 possible tests and record results in their individual reports. The final performance task is a one minute video made on the iPad app, Videolicious. Students should include:

* A description of the tests run by their Investigative Team and the results of these tests
* An overview of the crime and their proposed sequence of events
* A final conclusion on the guilty suspect, based upon the clues and evidence.

A rubric has been attached to evaluate the final product.