

Student Answer Key

The Case of the Patent Pending

Materials

Day 1: The Crime Scene Scenario

- Crime Scenario
- Cast Cards
- Detective Badge
- Lead Investigator's Report
- Wound Chart
- Suspect Organizational Chart - Predictions

Day 2: Testing the Motive

- Protective gloves, apron, and safety glasses
- 1 microtube labeled, Victim Sample
- 3 microtubes labeled, Tony, Octavia, and Anna
- 4 pieces of treated chromatography paper punched into flower shape
- Transparent Tape
- 4 toothpicks or glass capillary tubes
- Suspect Organizational Chart - Results



Image Source: <http://www.animationfactory.com>

Make a Prediction

Thinking critically requires consideration of all aspects of a situation. Whether you are deciding to purchase a PC or a MAC or determining the most likely suspect involved in a crime, observing, conducting tests, collecting data, and communicating your results is required. Based on the summary of events that transpired on April 1st, make an initial prediction about who you think is responsible for the death of our fictitious victim, Lizaree Abadakey.

Purpose

The purpose of this experiment is to use the skills of scientific inquiry to determine whodunit.

Safety Precautions

Wear protective safety gear including gloves, apron, and goggles while performing this experiment. It is important that your treated paper samples stay free from contaminated areas in order to preserve the integrity of the test results. Take care against touching the paper with your hands and place treated sample on a clean surface such as a paper towel.

Presentation of Crime Scenario

Day 1:

1. Your teacher will divide you into groups of four.
2. Once the groups have formed, your task will be to listen carefully to the fictitious crime scenario read by your teacher. You may want to take notes to help in your inquiry.

3. When the story is finished, your teacher will distribute a bag of 4 “Cast Cards” which contain the information you will need to make a prediction about the most likely suspect responsible for Lizaree’s death.
4. The roles that group members play will be randomly determined.
5. Once the roles have been identified, the Detective will have 15 minutes to “interview” each possible suspect. As the interviews are being conducted, the Detective must complete the “Lead Investigator’s Report” to be submitted to your teacher at the end of the class period along with the “Wound Chart” based on Lizaree’s condition upon police arrival to the crime scene. During this time, the other 2 suspects should take notes about the conversation as well. If at any time during the questioning period, the suspect cannot answer a question, s/he may ask the teacher for help.
6. When the interviews are complete, the group must determine “whodunit” based on the evidence collected. In order to help guide and communicate the group’s decision, a chart displaying each suspect and his/her possible motive will be generated.
7. At the conclusion of the class period, each group should have identified the suspect that is most likely responsible for Lizaree’s death and will have 2 minutes to present their decision to the class along with their justification and supporting evidence.
8. Each student group will be required to submit their Lead Investigator’s Report, Wound Chart, and Suspect Organizational Chart - Predictions at the conclusion of class.

Day 2: Testing Your Prediction

1. Yesterday you and your group exposed one suspect as your perpetrator. Today you will use a new forensic analysis tool to test your prediction.
2. You and your team members will report to an assigned lab station. You will be required to wear gloves, goggles, and aprons in order to reduce contamination of your paper diagnostic devices.
3. You will need your “Suspect Organizational Chart – Results” table in order to record your observations as they are obtained.
4. At your station there should be 4 microtubes labeled: Victim, Octavia, Tony, Anna. Each microtube contains a sample of liquid that was collected at the crime scene.
5. You will carry out the remainder of the experiment on a piece of clean paper towel to prevent contamination of your samples.
6. At your station, you should also have 4 pieces of treated chromatography paper that has been punched into flower shapes and 4 toothpicks that will be used for loading your samples onto the paper device.



This is your forensic tool!

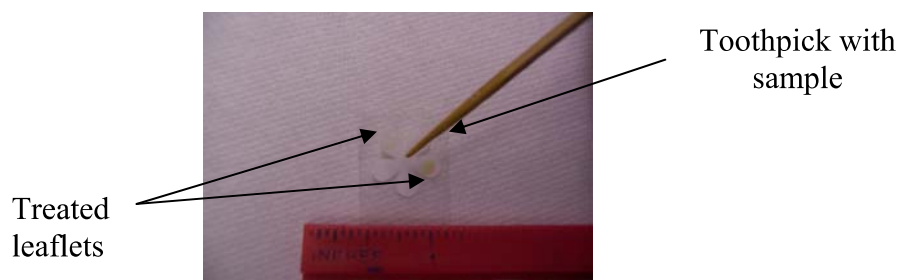
Paper Punch and Chromatography cut-outs

7. Orient your paper cut-out so that the leaflet that is yellowish is pointing to the left. This orientation ensures that this leaflet will properly test for the presence of “cyanide” while the light purple leaflet directly across from it will test for the presence of “creatine.”

NOTE: This is a simulation. The reagents used do not detect the presence of these substances. Alternative indicators have been used to treat the paper in an attempt to create a realistic test.

8. After orienting the paper cut-outs, secure them to a piece of transparency tape. Make sure that you are wearing your gloves to perform this task. Label each piece of tape with an appropriate abbreviation for the suspects names so they are not confused during your interpretation of results (i.e., Victim – V, Octavia – O, Tony – T, Anna – A).
9. Once the paper cut-outs (a.k.a., paper devices) have been prepared, obtain either a glass capillary tube or toothpick (depending on what you have available). Use this to transfer a sample of liquid from your microtube to the center loading point on your paper device. If you are using a toothpick, it may help to tap the tip to make it more blunt. Do NOT do this with the capillary tube. **NOTE: DO NOT REUSE LOADING INSTRUMENTS!** Once you have used your toothpick or glass capillary tube to load the sample, discard it! Capillary tubes should be discarded in the broken glass receptacle and toothpicks should be discarded in the regular waste container.

Loading the sample with a toothpick



10. A (+) test for the presence of “creatine” occurs when the color change of the treated leaflet is violet/purple. A (+) test for the presence of “cyanide” occurs when the color change of the treated leaflet is clue/purple. Record the color changes that you observed on each paper device on your “Suspect Organization Chart – Results” handout.
11. Dispose of your toothpicks, paper towel, and gloves in the general waste (if you used capillary tubes, dispose of these on the broken glass receptacle). Leave the microtubes at your station. Return your goggles and apron, and show your results to your teacher.
12. Your teacher will return your group’s “Suspect Organizational Chart – Predictions” handout in order for you to compare your predictions with your actual results.
13. Respond to the Conclusion Questions as a group.

Interpreting Results

1. Did your observations match your prediction?

If not, how did your observation differ from your prediction?

2. What part of this experiment served as the control?

The sample collected from the victim's apartment.

3. Do your observations leave you with any more questions? Do they enable you to make more predictions? If so, what are they?

Answers will vary. Some students may describe the limitations of the experiment as only a piece of evidence rather than a true determinant of guilt or innocence. Some students may also consider that the results are circumstantial and having no bearing on the true guilt of the suspect.

Applying the Results

4. Write a persuasive argument (as a defense attorney) for the innocence of the culprit. This will require you and your partners to identify loopholes in the technology as well as limitations to the experiment and the crime scenario in general.
5. Design a follow-up experiment based on your results. For example, if the content of the sample obtained from the victim's apartment matches the sample obtained at Anna's Health Club, does this mean the case is closed?

6. How is the scientific method being employed in this scenario? Your answer must address each of the steps displayed in the diagram below.

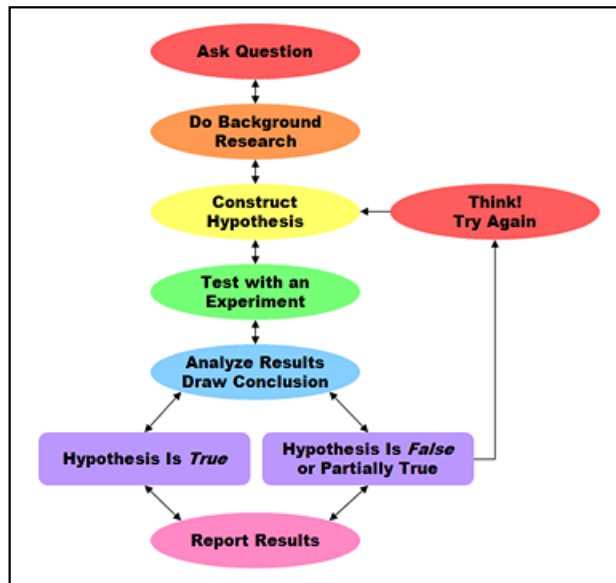


Image Source:

<http://www.eas.slu.edu/People/RBHerrmann/Courses/EASA193F07/>

Draw Conclusions

7. Example: Based on your results, can you say for certain that Tony is the culprit in this crime? Explain your answer.

Tony has been implicated as a potential suspect in this crime as a result of the forensic analysis performed. However, this does not mean for certain that Tony is the perpetrator of the crime. Other compelling evidence must be collected and analyzed before guilt can be determined.