Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

# Blood Typing: Crime Scene Investigation

**Purpose**

The purpose of this exercise is to demonstrate knowledge of specialized blood cells and the blood typing process.[[1]](#endnote-1)[[2]](#endnote-2)

**Procedure:**

 **Materials**

1. Blood Samples

*\*See Teacher’s Page*

1. 6 labeled bottles of Anti-A Serum
2. 6 labeled bottles of Anti – B Serum
3. 6 labeled bottles of Rh Serum
4. Biology Text book, with reference to the chapter on blood/blood typing

**![C:\Users\Angela\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\DRP2N1IJ\MCj04242300000[1].wmf]()Sequence of Steps**

1. Complete “Pre-lab” questions
2. Read the scenario below. Then, follow the instructions given by your teacher to complete the observation table and solve the crime.

**Crime Scenario:** You are a criminologist working for the Department of Justice crime lab for your county. You are called to the scene of a murder in town. The victim, John Doe, had apparently walked in on a burglary in progress. It is believed that the criminal, startled by the presence of the victim, attacked Mr. Doe. In his haste, the criminal cut his arm on the broken window that he had used to enter the apartment.

 A small piece of clothing stained with the criminal’s blood was taken from the scene of the crime. A weapon with a blood sample was also found at the scene. Three suspects have been identified who either knew the victim or were seen in the area before the body was discovered. Your task is to identify the blood type found on the weapon, to see if it indeed was used to kill Mr. Doe, and match the crime scene sample to one of the three suspects. Good luck Detective.

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 **I. Pre-lab Questions:**

1. What does a person’s blood type tell you? Be specific.

2. Complete the table below. Use your biology text for reference. Find the section on blood typing, and investigate the information relating to antigens and genotypes. Record this information below. Hypothesize the reactions with anti-serums. Clumping will indicate a (+) reaction. *For example, if a blood sample clumps when anti-serum A is added, and does not clump with anti-serum B, it is type A blood.*

Clumping = + (Positive)

No Clumping = - (Negative)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Blood Type | Antigens Present | Genotypes Possible | Reaction w/ Anti-A Serum  | Reaction w/ Anti-B Serum  |
| A |  |  |  |  |
| B |  |  |  |  |
| AB |  |  |  |  |
| O |  |  |  |  |

Rh Serum = Clumping = Rh+ Blood

**II. Lab Observations:**

Wait for directions from your instructor to proceed to a lab station and begin testing your sample.

**Table 1. Blood Agglutination (clumping) results**

If the blood sticks together (agglutinates) after an anti-serum is added, then the suspect has that blood type.

|  |  |
| --- | --- |
|  | **Observations** |
| Source  | Anti-A Serum  | Anti-B Serum  | Rh Serum | Blood Type |
| Crime Scene Sample |  |  |  |  |
| Weapon Sample |  |  |  |  |
| Victim – John Doe |  |  |  |  |
| Suspect #1 – John “The Boss” McLittle |  |  |  |  |
| Suspect #2 – Miss Demeanor  |  |  |  |  |
| Suspect #3 – J.R. Fitts |  |  |  |  |

**III. Analysis of results**

1. Which blood types will clump with the addition of Anti-A serum? Why?
2. Why can’t people with Type-O blood receive blood from any other type (A, B, or AB)?
3. Was the weapon found used to kill Mr. Doe? How do you know?
4. Based on the blood typing results, which of the four suspects most likely committed the burglary? Why?
5. Why was it necessary to type the victim’s blood?
6. Can you think of some limitations to using blood typing in a criminal investigation?

**Teacher’s Notes**

**Materials for 6 kits:**

2 cups milk 6 boxes of toothpicks

2 bottles of food coloring – red and green Vinegar

2 cups water (+ additional water for the serum bottles) 18 small dropper bottles

18 small cups (Dixie cup size) 6 small plastic storage containers

6 permanent markers Labels for bottles and containers

**Preparation**

1. Mix 2 cups of milk with 2 cups of water. Add enough red food coloring to get a bright red color and then add a few drops of green to make it a deeper red color which looks more realistic.
2. Label 6 dropper bottles to correspond with the three suspects, the victim, the weapon sample and the crime scene sample. Take time to label each of the 6 storage containers to correspond to the bottles of fake blood. Fill each bottle with the fake blood mixture. Save the extra “blood” in case a group spills their sample.
3. Label 6 dropper bottles with “Anti-A Serum”, label six others with “Anti-B Serum”, and label the final six “Anti-Rh”. Use the information in the chart below to fill the bottles with either vinegar or water. (Note that the contents differ depending on the suspect or sample!) You may want to code the bottles in a way that you can tell the contents easily, but it will not be obvious to the student.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Kit | Anti A | Anti B | Anti-Rh | Blood Type |
| Crime Scene Sample | Vinegar | Water | Vinegar | A+ |
| Weapon Sample | Water  | Water | Vinegar | 0+ |
| Victim – John Doe | Water | Water | Vinegar | 0+ |
| Suspect #1 – John “The Boss” McLittle | Vinegar | Water | Vinegar | A+ |
| Suspect #2 – Miss Demeanor  | Water | Vinegar | Water | B- |
| Suspect #3 – J.R. Fitts | Vinegar | Vinegar | Water | AB- |

1. Create the testing kits by placing the correct bottle of fake blood in each kit along with the correct serums, a permanent marker, 3 small cups, and a box of toothpicks in a small plastic storage container.

**Directions:**

1. Pass out copies of the student worksheet. Discuss the Crime Summary from the worksheet and go over the directions for the lab.
2. Provide one testing kit for each group of students and have then label the cups in the kit as directed. *NOTE: If you have time, you may want to set up six stations in your classroom and have the groups rotate to the stations to test each blood sample. If you don’t have the time to do this, have each group test one of the samples and share their results with the class.*
3. Allow time for the groups to complete the testing of their blood sample as outlined in the directions.

**Conclusion:**

Through this investigation, students should conclude that the crime scene sample matched suspect #1 (John “The Boss” McLittle) and the weapon sample matched the victim, John Doe.

1. Niesen, Lorilee (2008).Blood Typing, Lab. *Maxwell High School Agriculture Department*. [↑](#endnote-ref-1)
2. Trimpe, T (2006). Ernie's Exit. Retrieved July 24, 2009, from Science Spot Web site:

http://sciencespot.net/Media/FrnsScience/bloodtypinglab2wkst.pdf [↑](#endnote-ref-2)