Forensic Science
Blood Typing Basics

We will be determining blood types using Anti-A serums, Anti-B serums, and Anti-Rh serums. Use the chart to help you determine the blood type of each sample and its Rh factor (+ or -).

Agglutinins = Antibodies

<table>
<thead>
<tr>
<th>Reactions w/ Anti-A Serum</th>
<th>Reactions w/ Anti-B Serum</th>
<th>Blood Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agglutination (+)</td>
<td>No Agglutination (-)</td>
<td>A</td>
</tr>
<tr>
<td>No Agglutination (-)</td>
<td>Agglutination (+)</td>
<td>B</td>
</tr>
<tr>
<td>Agglutination (+)</td>
<td>Agglutination (+)</td>
<td>AB</td>
</tr>
<tr>
<td>No Agglutination (-)</td>
<td>No Agglutination (-)</td>
<td>O</td>
</tr>
</tbody>
</table>

Rh Serum = Clumping = Rh+ blood

Crime Summary

A small puddle of blood and a weapon was found near a garbage can. After examining the area, the CSI on the scene discovered a body in the garbage can and identified him as Earnest “One-Eyed” Earl. Earl had a wound to his chest that will be analyzed by the medical examiner.

The CSI tested blood samples from the puddle and weapon at the crime scene and determined that it was human blood, but he needs to know the blood type to help identify if it was from the victim or the person who murdered him. He has come up with three suspects that either knew the victim or were seen in the area before the body was discovered.

Follow the directions below to complete the lab. Remember to be careful to prevent cross-contamination of the blood samples!

Blood Samples – Follow the procedure below to test the four suspects’ blood samples.

Step 1: Label the three cups in your kit as Anti-A, Anti-B, and Anti-Rh.

Step 2: Place 20 drops of the blood sample in each cup.

Step 3: Place 10 drops of the anti-A serum in the A cup.

Step 4: Place 10 drops of the anti-B serum in the B cup.

Step 5: Place 10 drops of the anti-Rh serum in the Rh cup.

Step 6: Use three clean toothpicks to stir the serum into each sample for 30 seconds.

Step 7: Record your observations in the correct section on the back of the page and use the reaction chart at the top of this page to determine the blood type.

Step 8: Complete the other sections using information from your classmates.
**Results**
Record the results from each group in the space below. Use a + for a positive result (clumping) and a – for a negative result (no clumping).

<table>
<thead>
<tr>
<th>Suspect #1: Bobby “Baby” Brooks</th>
<th>Suspect #2 “Slim” Jim Snoot</th>
<th>Suspect #3 Barbie “Doll” Jones</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood Type: ___</td>
<td>Blood Type: ___</td>
<td>Blood Type: ___</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Victim Ernest “One-Eyed” Earl</th>
<th>Crime Scene Sample</th>
<th>Weapon Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood Type: ___</td>
<td>Blood Type: ___</td>
<td>Blood Type: ___</td>
</tr>
</tbody>
</table>

**Conclusion**
What do your results show?

What would you do next in the investigation?
Blood Typing Lab – Cheap Version

Teacher Notes:

Materials Needed for 6 Kits:
- 2 cups milk
- 2 bottles of food coloring – red and green
- 18 small dropper bottles
- 18 small cups (Dixie cup size)
- 6 permanent markers
- 6 boxes of toothpicks
- Vinegar
- 2 cups water (+ additional water for the serum bottles)
- 6 small plastic storage containers
- 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 drop of green to make it a deeper red color so that it looks more like real blood.

2 – Label six dropper bottles to correspond to the three suspects, the victim, the crime scene sample, and the sample from the weapon. You will also want to label each of the six 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’s sample gets spilled!

3 – Label six dropper bottles with “Anti-A Serum” labels, label six with “Anti-B Serum” labels, and label another six with “Anti-Rh” labels. Use the information in the chart below to fill the bottles with either vinegar or water. You may want to code the bottles in a way that you can tell the contents easily, but won’t be obvious to the students.

<table>
<thead>
<tr>
<th>Kit</th>
<th>Anti A</th>
<th>Anti B</th>
<th>Anti-Rh</th>
<th>Blood Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suspect #1</td>
<td>Vinegar</td>
<td>Water</td>
<td>Vinegar</td>
<td>A+</td>
</tr>
<tr>
<td>Suspect #2</td>
<td>Water</td>
<td>Vinegar</td>
<td>Water</td>
<td>B-</td>
</tr>
<tr>
<td>Suspect #3</td>
<td>Vinegar</td>
<td>Vinegar</td>
<td>Water</td>
<td>AB-</td>
</tr>
<tr>
<td>Victim</td>
<td>Water</td>
<td>Water</td>
<td>Vinegar</td>
<td>O+</td>
</tr>
<tr>
<td>Crime Scene</td>
<td>Vinegar</td>
<td>Water</td>
<td>Vinegar</td>
<td>A+</td>
</tr>
<tr>
<td>Weapon</td>
<td>Water</td>
<td>Water</td>
<td>Vinegar</td>
<td>O+</td>
</tr>
</tbody>
</table>

4 – 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.

4 – Discuss the results for each group and instruct students to complete the chart on their worksheet.

5 – Discuss the questions in the conclusion section.

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**Conclusion:**
The students should conclude that the crime scene sample matched suspect #1 (Baby Brooks) and the weapon sample matched the victim (Earl). Answers will vary as to what should be done next in the investigation. Lead the class in a discussion to identify possible scenarios that would lead to the results shown in their blood typing tests. For example, why would Baby Brooks’ blood type match the blood in the puddle at the crime scene instead of matching the victim’s blood?

*NOTE: After you are done with the lab, be sure to discard the fake blood mixture and rinse the bottles!*