

Simulated Blood Typing: Whodunit?

Table 1: ABO System

Blood Type	Antigens on Erythrocytes	Antibodies in Plasma
A	A	anti-B
B	B	anti-A
AB	A and B	none
O	none	anti-A and anti-B

Table 2: Rh System

Blood Type	Antigens on Erythrocytes	Antibodies in Plasma
Rh+	Rh	none
Rh-	none	anti-Rh

Blood typing is performed with an “antiserum” that contains antibodies. For example, Anti-A serum contains anti-A antibodies. These antibodies would cause any blood containing A antigens to clot. The table below summarizes all possible reactions, along with the conclusion that would be made:

Table 3: Testing Results

Anti-A added	Anti-B added	Anti-Rh added	Blood Type
clotting	no clotting	no clotting	A-
clotting	no clotting	clotting	A+
no clotting	clotting	no clotting	B-
no clotting	clotting	clotting	B+
clotting	clotting	no clotting	AB-
clotting	clotting	clotting	AB+
no clotting	no clotting	no clotting	O-
no clotting	no clotting	clotting	O+

IMPORTANT NOTES:

This lab uses simulated blood (so that there is no chance of disease transmission). The chemical reactions that are involved in trying to duplicate blood typing are rather complex. Instead of dark clotting, you will see the “blood” begin to become gel-like or cloudy. This will be considered clotting. It may take a few minutes for gelling to occur, so be patient and be sure to stir the mixtures completely.

The Crime:

You are called to investigate the scene of a murder. Mr. Cad A'Veer has been found dead in his home, surrounded by a pool of blood. The murderer evidently broke into the house through a glass door, and a bloody scrap of fabric is hanging on the broken glass. You take samples of the victim's blood and also of the blood from the scrap of fabric. The police tell you that they have four suspects:

- | | |
|-------------------|-----------------------|
| #1 - Mr. Owens | #3 - Ms. Van de Trois |
| #2 - Mrs. O'Toole | #4 - Mr. Fortwright |

You obtain a blood sample from each of these suspects. Your job is now to analyze the blood from each suspect and the victim, then try to figure out whose blood is on the fabric.

Materials Needed: (for each lab group)

- 6 blood typing trays (wash and dry after the lab is over)
- several stirring sticks (wash and dry after the lab is over)

Shared Materials:

- Vials of blood
- Vials of serum

Procedure:

- Use a wax pencil to label your 6 trays as:

C - for crime scene	1 - for suspect #1	3 - for suspect #3
V - for victim	2 - for suspect #2	4 - for suspect #4
- To determine the blood type on the "fabric scrap", place two drops of "crime scene blood" in each of the wells on the tray labeled **C**.
- Add 2 drops of anti-A serum in the A well of the tray.
- Add 2 drops of anti-B serum in the B well of the tray.
- Add 2 drops of anti-Rh serum in the Rh well of the tray.
- Use separate stirring sticks to stir each sample and allow them to sit. Wipe the stirring sticks clean. When you are able to determine the blood type from the crime scene (use Table 3), fill your results into the Data Table.
- Now, determine the blood type of the victim, using the tray labeled **V**. Add two drops of the victim's blood to each well on the tray. Then add 2 drops of each serum into the appropriate wells on the tray and stir well. Wait, then add your data to the data table.
- Continue, and find the blood type of each suspect in the same way that you tested the victim (step 7). Add this data to your table, then answer the questions.

Data Table:

Blood Source	Anti-A added	Anti-B added	Anti-Rh added	Blood Type
Cloth Scrap				
Victim				
Suspect #1				
Suspect #2				
Suspect #3				
Suspect #4				

Questions:

1. Did the blood on the cloth scrap belong to the victim?

How do you know?

2. Based on the blood typing, what is the name of the murderer?

3. The suspect that you named states that they could not possibly be the murderer. They say that they just had a blood transfusion and received type O- blood, so that must be their blood type. How do you respond to this denial?

4. Why was it necessary to type the victim's blood?

5. If the murderer needed a blood transfusion, which other suspects (if any) could donate blood to him? (Use a textbook for this information)

6. If the murderer chose to donate blood, which of the other suspects (if any) could receive blood from him?