

Blood Review Sheet

- Define the following: antigen, antibody, agglutinin, agglutination, erythrocyte, leukocyte, thrombocyte, satellites, spines, splashes, smears, point of origin, lines of convergence, hemoglobin
 Antigen – protein on RBC that determines blood type
 Antibody – proteins secreted by WBCs that bind to antigens
 Agglutination – clumping of blood
 Erythrocyte – Red blood cell
 Leukocyte – white blood cell
 Thrombocyte – platelet
 Satellite – secondary droplets that are totally separated from the main droplet
 Spikes – spiny extensions from the main blood droplet that are still attached
 Splashes – blood droplets originating from a non-90 degree angle; shaped like an exclamation point
 Smear – left by a bleeding person that touches or brushes against another surface
 Point of origin – 3D point in space from which blood originated
 Lines of convergence – lines drawn through the center of each blood drop that meet at a certain point (area of convergence)
 Hemoglobin – an iron containing protein in RBCs that carries oxygen
- What are the four blood types? What are the percentages of each in the US?
 A – 42%
 B-12%
 AB – 3%
 O-43%
- What is the Rh factor? How was it discovered and what percentage of the population has this?
 Another protein on RBCs
 Discovered working with Rhesus monkeys
 85%
- Describe what determines the different blood types on the cells. Who can donate to whom?
 Antigens determine blood type

RELATIONSHIPS BETWEEN BLOOD TYPES AND ANTIBODIES				
Blood Type	Antigens on Red Blood Cell	Can Donate Blood To	Antibodies in Serum	Can Receive Blood From
A	A	A, AB	Anti-B	A, O
B	B	B, AB	Anti-A	B, O
AB	A and B	AB	None	AB, O
O	None	A, B, AB, O	Anti-A and Anti-B	O

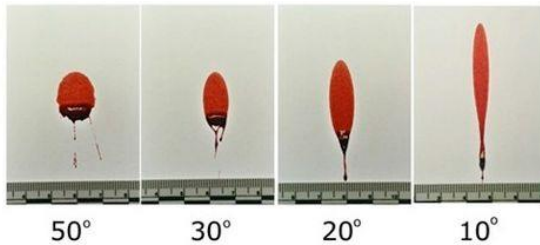
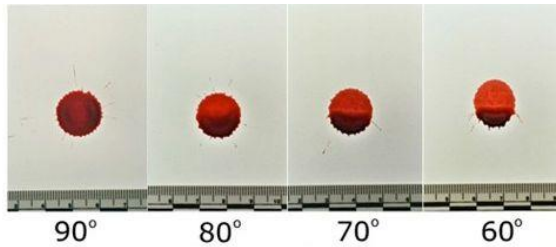
- Describe how blood typing is done and what the results look like for different blood types.
 Blood typing is done using an antigen-antibody reaction test.
 Example: If the blood clumps (agglutinates) with Anti-A serum, the blood contains the A antigen
- Describe how antibodies and antigens are involved in blood typing.
 See #5
- Describe how adhesion, cohesion, gravity and surface tension all affect the blood type.
 Adhesion – effect on blood's ability to stick to surfaces

Cohesion – blood sticks to itself – most of the blood stays in the main droplet

Gravity – pull the blood down

8. How does the tail of a blood drop help to determine the direction the blood moved?
Tail points in the direction of the blood's movement
9. Describe how the Kastle-Meyer test is performed and what the results look like.
Add two drops of ethyl alcohol to the end of the swab.
Add one drop of phenolphthalein to the end of the swab.
Add two drops of hydrogen peroxide to the end of the swab. **A pink color** indicates a positive result for blood.
10. In regards to blood evidence describe how it is class evidence and how it is individual evidence.
Class evidence – blood type (many people have the same type)
Individual – DNA can be extracted from white blood cells
11. What function does each of the following serve in the body: red blood cells, white blood cells, platelets, plasma? Also what percent of the blood do they make up? Which one has DNA?
RBCs – carry gases (oxygen and carbon dioxide) (45%)
WBCs – fight infections/foreign invaders (<1%)
Platelets – aid in blood clotting (<1%)
Plasma – fluid that suspends all of the cells, contains salts, hormones, proteins, etc. (55%)
12. How long has blood been studied?
1000s of years
13. Who is credited with discovering there are different blood types and what did this mean for medicine?
Karl Landsteiner – people needing transfusions could only get certain types of blood; other blood could cause clumping and lead to death
14. Describe how blood spatter will be different on different surfaces such as wood, tile, paper, and brick.
More smooth surfaces = less satellites/ spikes
More rough surfaces = more satellites/spikes
More porous = smaller drops
15. What can blood spatter tell an investigator about a crime scene?
Location/origin of blood spatter
Helps to recreate events – movement, cast off, arterial spurts, etc.
16. Describe how passive drops would look and how they are caused.
Caused by blood falling passively at a 90 degree angle
Equal width and length
17. Explain how luminol works and why.
Luminol is mixed with hydrogen peroxide. The reaction is sped up by the iron in hemoglobin (in RBCs). As the reaction progresses, the blood will glow for about 30 seconds.
18. How can blood typing be used for paternity testing? What do you need to know to determine if a man could be the father?
You can use Punnett squares to determine if a man could be a father of a child. It is best when you know the genotype of both parents and the child. Example:
A father is AB and a mother is type B. The child is type O. The man cannot be the father because the genotype of the child is ii and the genotype of the father is I^AI^B. The father would have to have the "i" allele to be the father of this child.

19. Describe and draw a picture of how blood drops would look at each of the following angles: 90, 70, 50, 30, 10



20. What are the steps that should be

followed if red stains are found at a crime scene?

1. Kastle –Meyer test to determine if a substance is blood
2. ELISA test – determine if the blood is human
3. Blood typing – antigen/antibody reaction test

21. Draw a picture of each of the following patterns: walking pattern, running pattern, low velocity impact, medium velocity impact, and high velocity impact.

See notes from demonstrations in class

22. If one parent is type AB and another parent is type B. What are the possible blood types of their children? What if one parent is type A and one is type B?

First Question:

If the type B parent is heterozygous, the possible blood types of their children: AB, B, A

If the type B parent is homozygous, the possible blood types of their children: AB, B

Second Question:

If each parent is homozygous, the possible blood types of their children: AB

If one parent is heterozygous: AB, A, B

If both parents are heterozygous: AB, A, B, O

23. Draw a picture and describe each of the following: smear, trail, transfer, pool, arterial.

See notes from class demonstrations

24. Calculate the probability of the following blood types recalling the percentages for Rh, A, B, AB and O and using 33% MM, 48% MN and 22% NN.

A+ MN

B-MM

$$(.42 \times .85 \times .48) \times 100\% = 17.14\%$$

$$(.12 \times .15 \times .33) \times 100\% = 0.59\%$$

25. Draw a picture and describe how a passive blood drop would look if it fell from the following heights onto paper and wood: 10cm, 30cm, 50cm, 100cm, 200cm.

