

Criminal Investigation Lab

Blood Components

Human Body Systems

Criminal Investigation Lab

Image 1: Crime Scene Investigation



9th Grade

3 Days

Summary

Students will be focusing on a criminal investigation that will lead them to understanding the different components of blood, the different diseases that are associated with blood and working in collaborative groups using their prior knowledge of the microscope. Students will be able to compare and contrast different blood slides from our suspects and our evidence in order to find our criminal.

Engineering Connection

Students will be focusing on analyzing different blood samples under a microscope. Within this lab they will have to identify the blood type and if they have any blood related disease in order to see if they are a match to the evidence. Students will be compiling their data together for each suspect and then coming up with a conclusion of which suspect is guilty.

Engineering Category =

Choose the category that best describes this lesson's amount/depth of engineering content:

1. Relating science and/or math concept(s) to engineering

Keywords

Coagulation, blood, plasma, red blood cells, white blood cells, platelets

Educational Standards

SC.912.L.14.34

Describe the composition and physiology of blood, including that of the plasma and the formed elements.

SC.912.L.14.35

Describe the steps in hemostasis, including the mechanism of coagulation.

SC.912.L.14.4

Compare and contrast structure and function of various types of microscopes.

Learning Objectives

After this lesson, students should be able to:

- Day 1: SWBAT understand the diseases associated with, basic functions and components of blood.
- Day 2: SWBAT analyze data from the crime scene using their prior knowledge of blood and microscope analysis.
- Day 3: SWBAT summarize and report data they have gathered based on their findings from the crime scene.

Introduction / Motivation (5E – Engage)

Ask the question “If you were investigating a crime scene, what key evidence would you look for?” Then explain to students that we will be investigating a crime scene to figure out who is guilty.

Lesson Background & Concepts for Teachers (5E – Explain)









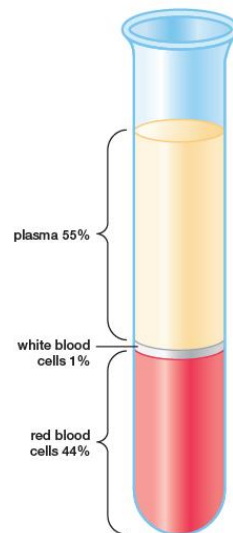
Step 1	Step 2	Step 3	Step 4
			
<p>Analyze your data from the crime scene.</p>	<p>Collaborate a plan with your group. Make hypothesis.</p>	<p>Analyze the evidence and suspect samples.</p>	<p>Summarize and share your results with the class.</p>

Image 2: Components of blood

Point of comparison	Red blood cells	White blood cells		Platelets
		Leucocytes	Lymphocytes	
Origin	red bone marrow	red bone marrow	spleen, lymph glands	red bone marrow, lungs
Cells present per mm ³ of blood (approx.)	5 500 000 (male) 4 500 000 (female)	6000	2000	250 000
Relative size	small (8 µm diameter)	largest (up to 25 µm)	large (10 µm)	smallest (2 µm)
Function	to carry oxygen and carbon dioxide to and from cells	to engulf foreign particles	to play a role in the formation of antibodies	to play a role in the clotting of blood
Life span	120 days	a few hours to a few days	unknown	7-8 days
				



Vocabulary / Definitions

Word	Definition
Sickle Cell Anemia	Lack of oxygen blood flow due to shape of red blood cells.
Hemophilia	Blood is unable to coagulate due to weak platelets.

Associated Activities (5E – Explore)

Students will be using a microscope to analyze different blood samples from each suspect. Students that would like to accept a challenge will also be analyzing other specimens such as hair, fingerprints and writing samples from each suspect.

Lesson Closure

On day three students will write a conclusion of their findings and data. They will prepare to share their data with the class explaining who is guilty and why others are not.

Assessment (5E – Evaluate)

Pre-Lesson Assessment

White boards individually used during do now.

Post-Introduction Assessment

Oral questioning throughout lab (documented).

Lesson Summary Assessment

Written summary submitted at the end of class

Homework

Short group presentation prepared at home

Lesson Extension Activities (5E – Extension)

Students who would like a challenge can incorporate other variables in their search for the criminal such as finger prints, hair, and writing samples for each suspect.

Contributors

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Supporting Program

USF: University of South Florida

RET Functional Materials Program

Classroom Testing Information

Students may need guidance with using the microscope and analyzing the blood sample. Students should have prior knowledge of using a microscope. You will want to group your students based on their prior work so students will work effectively together. After this unit students will be tested on their knowledge of blood related diseases and the jobs of each components of blood such as platelets are responsible for blood clotting.