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Forensic Detective Lab Activity

Aligned With All Published National Standards

IMGN 2508035

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Email sciencehelp@vwr.com
or call 800-962-2660 to get started.

overview

This lab will provide students with insight and hands-on experience with many elements of a real forensic investigation. As the students move through each module of this activity, they will perform a variety of techniques used by police officers, detectives, crime scene technicians, and forensic scientists. These exercises will allow students to acquire a deeper appreciation of the field of forensic science.

materials included:

- 1 jar of fingerprint powder
- 1 fingerprint brush
- 1 roll of fingerprint lifting tape
- 8 hand magnifiers
- 8 calipers
- 12 pipets
- 8 bottles of Ward's simulated drip and projected blood
- 1 bottle of Ward's simulated transfer blood
- 1 package of 100 index cards, 5" x 8"
- 1 bottle of 20% copper sulfate solution
- 1 dropping bottle, 15 mL
- 1 vial of powdered Luminol
- 1 spray bottle
- 2 vials of Suspect 1 blood
- 2 vials of Suspect 2 blood
- 2 vials of Suspect 3 blood
- 2 vials of Suspect 4 blood
- 1 bottle of simulated anti-A antiserum
- 1 bottle of simulated anti-B antiserum
- 1 bottle of simulated anti-Rh antiserum
- 48 blood typing trays
- 2 packages of toothpicks
- 1 piece of cloth netting
- 1 package of coverslips, 100
- 1 package of microscope slides, 72
- 12 plastic forceps
- 2 glass plates, 5" x 5"
- 10 glass plates, 8" x 8"
- 1 package of nails
- 1 roll of masking tape
- 8 foam sheets
- 50 zipper bags
- 1 roll of crime scene barrier tape, 50 ft.
- 5 evidence bags
- 5 adhesive evidence labels
- 15 numbered photo markers
- 8 photo rulers
- 8 tape measures
- 1 Ward's Blood Typing poster
- 1 Ward's Examining Forensic Science poster
- 100 sheets of graph paper
- 24 sheets of cardboard
- 50 sheets of black construction paper
- 1 roll of transparent tape
- 1 FACES™ Composite Software version 4.0
- 30 Take-Home Student I.D. Kits

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materials not provided:

- 5 computers (preferably with printers)
- Compound microscope
- Roll of deli paper or computer paper for blood spatter
- Wax pencil
- Scissors
- Distilled water
- Hammer
- Dust masks or ventilation hood (recommended)
- Digital camera (optional)

number of uses:

This lab activity is designed for 30 students or up to eight student set-ups.

Visit wardsci.com for replacement materials.

teacher's notes

- Ward's has designed this activity to allow for a great deal of flexibility in the classroom. It can be performed as you wish and concluded in a variety of different ways. We have divided this activity into modules. The way in which you present each module will depend upon the limiting factors in your classroom (e.g., time, space, computers, etc.). For instance, some teachers may decide to set up "stations" for each module and have their students rotate around the room, while others may decide to perform different modules on different days. The modules are not dependent on one another so you have the option of performing them in any order or omitting any if time is an issue. You can determine the set-up that will best suit your needs. To make for a much more positive overall experience, it is strongly recommended that you review this manual in advance of planning your lessons, to help with scheduling.

- Ward's has provided two crime scenarios and evidence descriptions that you can use to explain the evidence analyzed in this activity, but you could also choose to create your own scenario and crime scene. In addition, we have provided five photographs of possible suspects, but again, you may opt to use a photo of your choosing or have an individual enter the classroom and pose as the perpetrator of the crime.

- Extensive background information has been provided for each module. You may elect to use only a small portion of this material to suit your particular needs, or you may use all of it. The decision will heavily depend upon the level of your students.

- It should be noted that certain modules, such as Fingerprint Analysis, will require the students to share materials. In addition, the final module, DNA Fingerprinting, is a paper and pencil activity.

- To add to the students' overall crime scene investigation experience, Ward's has also included additional support materials including; two posters, crime scene barrier tape, photo markers, photo rulers/scales, and evidence bags.

- With the privacy and safety of your students in mind, Ward's has included 30 Take-Home Student I.D. Kits. Provide each student with one kit to take home to their parent or legal guardian. It should be explained that the purpose of this kit is to create a personal identification record that can be used in case of an emergency. We ask that you explain the importance of this kit and encourage the students to take advantage of the opportunity to use it.

- Remember, the more time, effort and creativity you put into the set-up of this activity, the more enjoyable and memorable it will be for the students. Good luck and have fun!

framework for K-12 science education © 2012

* The Dimension I practices listed below are called out as **bold** words throughout the activity.

DIMENSION 1 Science and Engineering Practices

×	Asking questions (for science) and defining problems (for engineering)	×	Use mathematics and computational thinking
×	Developing and using models	×	Constructing explanations (for science) and designing solutions (for engineering)
×	Planning and carrying out investigations	×	Engaging in argument from evidence
×	Analyzing and interpreting data	×	Obtaining, evaluating, and communicating information

DIMENSION 2 Cross Cutting Concepts

×	Patterns		Energy and matter: Flows, cycles, and conservation
×	Cause and effect: Mechanism and explanation	×	Structure and function
	Scale, proportion, and quantity		Stability and change
×	Systems and system models		

DIMENSION 3 Core Concepts

Discipline	Core Idea Focus
Life Science	LS1: From Molecules to Organisms: Structures and Properties
	LS3: Heredity: Inheritance and Variations of Traits

× Indicates standards covered in activity

next generation science standards © 2013

Middle School Standards Covered	High School Standards Covered
MS.LS1-1: Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells.	HS.LS1-1: Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells.
MS.LS1-2: Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function.	HS.LS1-2: Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.
	HS.LS3-1: Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring.
	HS.LS3-3: Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population.

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standards and learning objectives

national science education standards © 1996

Content Standards (K-12)			
×	Systems, order, and organization	×	Evolution and equilibrium
×	Evidence, models, and explanation	×	Form and Function
×	Constancy, change, and measurement		

Life Science Standards Middle School		Life Science Standards High School	
×	Structure and Function in Living Systems	×	The Cell
×	Reproduction and Heredity	×	Molecular Basis of Heredity
×	Diversity and Adaptations of Organisms		
Science and Technology Standards Middle School		Science and Technology Standards High School	
×	Understanding about Science and Technology	×	Understanding about Science and Technology

× Indicates standards covered in activity

benchmarks for science literacy (AAAS, © 1993)

1. The Nature of Science	1B: Scientific Inquiry
3. The Nature of Technology	3A: Technology and Science
	3B: Design and System
5. The Living Environment	5A: Diversity of Life
	5B: Heredity
	5F: Evolution of LIfe
6. The Human Organism	6A: Human Identity
	6C: Basic Functions
11.Common Themes	11A: Systems
	11B: Models

activity objectives:

- Learn methods involved in investigating and documenting a crime scene
- Become familiar with and apply a variety of forensic science techniques to examine and analyze physical evidence
- Exercise critical thinking and problem-solving skills to determine the likely perpetrator of a crime

time requirement:

The time it will take to complete the entire activity will vary depending on the set-up method chosen by the instructor. Minimally, you should allow at least four 50 minute lab periods.

lab specific safety:

- Gloves, goggles, and aprons should be worn at all times when performing this lab.
- Be sure to safely handle all chemicals and materials, and **exercise extreme care while working with glass samples.**
- Although Ward's simulated blood is non-toxic, it will stain clothing.
- The carbon powder used in the fingerprinting activity is made up of very fine particles that are easily airborne. It is recommended that the dusting of fingerprints be performed under a fume hood or with a dust mask. Use only minimal amounts of this powder to develop fingerprints.

general safety:

- The teacher should 1) be familiar with safety practices and regulations in his/her school (district and state) and 2) know what needs to be treated as hazardous waste and how to properly dispose of non-hazardous chemicals or biological material.
- Consider establishing a safety contract that students and their parents must read and sign. This is a good way to identify students with allergies (e.g., latex) so that you (and they) will be reminded of specific lab materials that may pose risks to individuals.
- Students should know where all emergency equipment (safety shower, eyewash station, fire extinguisher, fire blanket, first aid kit etc.) is located.
- Require students to remove all dangling jewelry and tie back long hair before they begin.
- Remind students to read all instructions, Safety Data Sheets (SDSs) before starting the lab activities, and to ask questions about safety and safe laboratory procedures.

at the end of the lab:

- Remind students to wash their hands thoroughly with soap and water before leaving the laboratory.
- All laboratory bench tops should be wiped down with a 10% bleach solution or disinfectant to ensure cleanliness.

teacher notes

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