Guide to Mrs. Lewis' Forensic Science packet:

- **Pg. 1-4 (front/back)**
  - Poisoner's handbook documentary worksheet packet
    - Watch youtube video (1 hour 53 min) using the link provided
    - Answer the associated questions in COMPLETE sentences
- **Pg. 5 (front/back)**
  - Historic cases project
    - Must pick one (your choice, not to be repeated by other classmates; email/remind msg. Mrs. Lewis your selection)
    - Follow the rubric to complete project; counts as PROJECT GRADE
    - Can choose to create poster/powerpoint/etc. for your presentation
  - **For extra credit!** You can choose another case (not otherwise chosen by your peers) and make a 2nd presentation as above. If you choose to do this, follow the steps listed above and in your rubric. This extra credit will replace your ***lowest quiz*** grade.
- **Pg. 6-9 (3 pages front/back, except 3rd page)**
  - Forensic science overview
    - Includes vocab/important terms and questions with a quiz (**quiz will count as quiz grade**)
    - Must be in legible writing and complete thoughts/sentences.
- **Pg. 10-11 (2 pages front/back, except 2nd page)**
  - "9 Secrets of Coroners and Medical Examiners"
    - Read 2 pg article and answer 10 questions

- **Pg. 12-13 (2 pages front/back)**
  - "Activity 11-4: Estimating Time of Death Using Insect, Algor, and Livor Mortis Evidence"
    - Answer questions to the best of your ability by reasoning/critical thinking. Use your textbook and the included data sheet as resources
- **Pg. 14-15 (1 page front/back)**
  - "Toxicology project" **(counts as a test/project grade)**
    - Pick your drug/toxin of choice (one per student; email/remind message Mrs. Lewis with selection)
    - Follow rubric and create poster/brochure/powerpoint presentation on your drug/toxin
- **Pg. 16**
  - Report Template—to be used with photography assignment below
- **Pg. 17**
  - Dept. of Forensic Science: Piedmont Classical High School Student Rap Sheet
    - Attach a photo of yourself (you can draw it like a caricature if you wish)
    - Fill out the rap sheet being as creative as you wish
- **Book work**
  - Read AND OUTLINE the following 3 chapters
    - Ch. 6 "Death Investigation"; do vocab words pg. 149 (11 words)
    - Ch. 11 "Drugs"; do vocab words pg. 286 (23 words)
    - Ch. 12 "Forensic Toxicology"; do vocab words pg. 316 (15 words)

- **Photography assignment:**
  - Use your cell phone camera and take mug shots of someone. You must have the following:
    - a full body shot from the person's front
    - a full body shot from the person's left side
    - a full body shot from the person's back side
    - a full body shot from the person's right side
    - close up of the face
    - close up of the hands (front and back)
    - any scars/tattoos/or other distinguishing characteristics (must show this in 3 photos=overall/full body shot, mid-range shot, and close-up shot)
    - have a ruler or ink pen beside the scar/tattoo/distinguishing characteristic in a 2nd close-up shot (to be clear, you need 2 close-up shots; one WITHOUT a scale/measuring device and one WITH a scale/measuring device)
  - overall guidelines
    - ensure your photos are clear and not blurry
    - ensure your photos eliminate unnecessary shadows (use flash if needed, but be careful not to overexpose the photo/make it blurry)
    - if the person has a tattoo or distinguishing mark in a private area, DO NOT, I repeat, DO NOT take a photo of it!
  - **Write a description of the person in PAST TENSE**
    - This means use your descriptive words; Example: "Mr. Crickmore had short, brown hair. He was wearing a large, green leprechaun hat, a red polo shirt, khaki

pants, and tennis shoes. He did not have any distinguishing marks or tattoos" ("... Uh....khakis....")

- Your description should be formatted in the report template style we recently discussed. **I am including this report template in your packet.** Start with the Carlton block information and you can make up a story about why you took the photos of the "suspect"
- Email me your mug shot photos and full report (if handwritten, write clearly and email me photos)

Resources:

Mrs. Lewis' email: jlewis@piedmontclassical.com

Mrs. Lewis' weebly: pchs-lewis.weebly.com

Remind information: download remind OR send @ff7hc8 to 81010

Edpuzzle: Forensics students please join edpuzzle using this link: https://edpuzzle.com/join/waghube or this code: waghube

I will soon begin utilizing an online platform such as zoom/google classroom/edPuzzle for tutoring/video assistance. Please email/send remind message if you don't have access to these resources due to limited internet.

Please check your student emails often! You will need your student email information to log on to google classroom and submit work.

e Poisoner's Handbook Documentary

Project grade!

- **Fill in your responses in a DIFFERENT color.**
- **Share with me your completed form by due date.**
- **Youtube link: https://www.youtube.com/watch?v=V2_2862CFxA&t=56s**

Background: Toxicology is a branch of chemistry that focuses on the adverse effects on chemicals on living organisms. An even narrower branch of toxicology is called "forensic toxicology," and it focuses on using what we know about toxicology to solve crimes. This field has only existed for about 100 years. Alexander Gettler has been called the "father of forensic toxicology in America". He was employed at the Office of Chief Medical Examiner of the City of New York between 1918 and 1959. His work not only included scientific discoveries that furthered the field of toxicology; it also had very important effects on society. His work led to big improvements in public health and safety, and also led to chemical evidence being accepted in court.

The movie *Poisoner's Handbook* is a historical documentary that covers several of the interesting cases Gettler worked on, as well as some of the effects on society at the time.

I hope that you enjoy the movie and that it gives you an idea of how understanding chemicals, at the level of atoms and bonds, can have a huge impact on society and daily life.

Answer the following questions as you watch:

1. Solving the murder of Fremont and Annie Jackson:
   a. What observations led Gettler to hypothesize that cyanide poisoning was the cause of death?

   b. Was there cyanide present in the Jacksons' stomachs? _____ How did Gettler know?

   c. Was there cyanide present in the Jacksons' lungs? _____ How did Gettler know?

   d. The jury decided to acquit the fumigator responsible for the cyanide poisoning of the Jacksons. Why wasn't Gettler's testimony about the cyanide in their lungs sufficient to convict them?

2. Solving the murder of Mrs. Creighton:
   - In the case of Fanny Creighton, how did Gettler determine that Mrs. Creighton was not murdered by arsenic poisoning?

3. Understanding methanol poisoning during Prohibition:
   - Ethanol, the alcohol in alcoholic beverages, has the chemical structure CH_3CH_2OH. Methanol, the alcohol made from distilling wood, has the structure CH_3OH. Why is methanol so much more toxic than ethanol?

4. Discovering that leaded gasoline was toxic:
   a. Gettler studied the body of a man who worked at a factory producing gasoline with tetraethyl lead added. How did Gettler determine there was lead in the man's brain?

   b. How was the concentration of the lead determined?

5. Solving Frederickson's death:
   - How did Norris know, just from looking at the body, that Frederickson had died from carbon monoxide poisoning?

6. Understanding denatured alcohol:
   a. What is "denatured" alcohol?

   b. Why is denatured alcohol used in industry instead of regular ethanol?

7. The case of women working at the watch factory:
   a. Several women who had worked with paint containing radium experienced anemia, bleeding, bone degeneration, and then died. At first, no one believed that radium could be the cause of the illness and death. Why not?

   b. Why does radium accumulate in bones?

8. Solving the Gross family's deaths:
   - How did Gettler determine that the chemical in Gross's cocoa was copper, not thallium?

The Poisoner's Handbook Open Note Quiz Forensic Science Name:_____

1. Before Charles Norris and Alexander Gettler, what were some of the problems surrounding deaths in New York City and the way they were investigated and tried in courts?

2. What did Norris and Gettler do to change the public perception of science and bring legitimacy to the field of Forensic Science in the United States?

3. Why did the U.S. enact the Prohibition of alcohol in the U.S., ***and*** why was the prohibition amendment (#18) finally repealed?

4. Describe an example from the video where Forensic Science was used to solve a case involving poisoning.

5. Explain three new things that you learned from the video.

6. What is something that surprised or interested you about the history of forensic toxicology?

The Poisoner's Handbook- Forensic Science Study Guide Name:_____

As you watch, be sure to take notes on the following topics. There will be a short quiz at the end of this video over these topics, and you may use your notes. I suggest just taking notes freestyle as you watch and then fill this in to be more organized later. Those of you who are absent for one or more days of the video will receive a transcript to read so that you are on track. No exemptions ☺

People to know about (Name, job/role, how they are important to the video/history, how they change over time, etc.)

Charles Norris

Alexander Gettler

Topics

Compare and contrast coroners and medical examiners in terms of requirements of the position, how they work, their knowledge of science, etc.

How did politics, courts, and the sciences evolve over time to get to our current level of forensic science? Give examples of how forensic science became more accepted.

How did the Depression change society in terms of forensic science, public policy, etc.?

Describe the following common toxicants as they are described in the video. (Symptoms, uses, problems, cases involved in, etc.)

Cyanide

Arsenic

Methanol

Lead

Carbon Monoxide

Denatured Alcohol

Radium

Thallium

Historic Cases Project

Assigned On: _____

Due Date: _____

Student(s): _____

Case: _____

Section	Content	Points Possible	Points Earned
Case Summary	Please explain the crime. Be sure to include a description of the date, time, and location of the crime and the actions, perceptions and dispositions of victims, witnesses, suspects and law enforcement personnel.	_____	_____
Evidence Description	Identify and describe key pieces of evidence. Analyze the value of each key piece of evidence. What is the significance of each piece of evidence?	_____	_____
Legal Aspects	Were victims rescued? What arrests were made? Was the crime solved? Detail the court proceedings. Did the suspect stand trial? If not, why not? If so, what was unique about the trial? How was the evidence presented during trial? What was the outcome of the trial?	_____	_____
Personal Analysis	What is your opinion of the case? Do you think that the evidence was handled appropriately? Explain your reasoning. If you disagree with the court proceedings or the case remains a mystery, write a potential chain of events that correlates with your analysis of the evidence.	_____	_____
Source Citations	All information is correctly researched and all sources are cited in the correct format.	_____	_____
Presentation	Project is complete, well written, and appropriately presented.	_____	_____
TOTAL		_____	_____

Historic Cases Project

Amanda Davies _____

BTK Killer _____

Casey Anthony _____

Colin Ross _____

Coral Eugene Watts _____

Elizabeth Smart _____

Georgi Markov _____

Hamm Kidnapping _____

Jack the Ripper _____

Jeffrey MacDonald _____

Jon Benet Ramsey _____

Laci Peterson _____

Ludwig Tessnow _____

Mark Winger _____

OJ Simpson _____

Richard Crafts _____

Ronald Cotton _____

St. V's Day Massacre _____

Ted Bundy _____

The Black Dahlia _____

The Coors Kidnapping _____

The Green River Killer _____

Lindbergh Kidnapping _____

The Marie LaFarge Case _____

Thelma Todd _____

The Night Stalker _____

The Sacco-Vanzetti Case _____

Same Sheppard Case _____

The Stielow Case _____

Tylenol Murders _____

Unabomber _____

Zodiac Killer _____

Name_____

Important Terms/ Concepts in Forensic Science Overview Review Worksheet

Forensic scientist

Criminology

Forensic pathology

Forensic odontology

Forensic toxicology

Forensic anthropology

Forensic serology

Forensic entomology

Forensic psychology

Forensic engineering

Forensic computer science

Forensic botany

DNA profiling

Medical examiner

Forensic geology

Ballistics

The Innocence Project

Direct evidence

Circumstantial evidence

Class evidence

Individual evidence

Locard's Exchange Principle

Trace evidence

Chain of custody

Alphonse Bertillon

Sir Francis Galton

Loops

Arches

Whorls

Latent fingerprints

Angle of impact

Area of convergence

Livor mortis

Algor mortis

Rigor mortis

Ballistics

Answer Completely.

1. What are the 5 categories deaths are classified into?
2. List at least 3 differences in the skull/skeleton of males when compared to females.
3. What are at least 3 things an examination of blood spatter can determine?
4. Who was the father of forensic toxicology?
5. Who was the father of criminal identification?
6. What was considered the father of fingerprint technology?
7. What is triangulation? Why is it used?
8. What are the 3 major fingerprint types?
9. Name some things included in a "rough" crime scene sketch?
10. What does the coroner do?

Forensic Science Overview Quiz **Name**_____

_____1. Criminology	A. Evidence that connects an individual or thing to a certain group
_____2. Forensic pathology	B. Use of plants, plant parts to investigate criminal cases
_____3. Forensic odontology	C. Father of fingerprint technology
_____4. Forensic toxicology	D. Stiffening of skeletal muscles after death
_____5. Forensic anthropology	E. "Hidden" fingerprints that require powder to make them visible
_____6. Forensic serology	F. Father of criminal identification
_____7. Forensic entomology	G. Scientific study of crime and criminals
_____8. Angle of impact	H. Use of chemistry to solve crimes
_____9. Forensic engineering	I. Paper trail showing custody and control of evidence
_____10. Area of convergence	J. Cooling of body after death
_____11. Forensic botany	K. The idea that you leave a physical trace when you touch something
_____12. Forensic geology	L. Using insects & their life cycles to determine time of death
_____13. Direct evidence	M. Pooling of blood in tissues after death
_____14. Circumstantial Evidence	N. Investigation of transportation accidents & materials failure
_____15. Class evidence	O. Focuses on determining cause of death via autopsy
_____16. Individual evidence	P. Evidence that identifies a particular person or thing
_____17. Locard's Exchange Principle	Q. Study of evidence related to minerals, oils, & other materials found in Earth
_____18. Trace evidence	R. Small amounts of physical or biological materials at crime scene
_____19. Chain of custody	S. Using skeletal analysis to identify remains
_____20. Alphonse Bertillon	T. Evidence that directly supports an alleged fact of the case
_____21. Sir Francis Galton	U. Using dental science/ teeth to identify bodies & solve crimes
_____22. Latent fingerprints	V. Indirect evidence used to imply a fact but not support it directly
_____23. Livor mortis	W. Using bodily fluids & blood to solve crimes
_____24. Algor mortis	X. Intersection of planes that indicates the general are of the source of blood's path
_____25. Rigor mortis	Y. Angle at which a blood drop strikes a target surface

Bonus→ What are the 5 categories that deaths are classified into?

A. B. C. D. E.

9 Secrets of Coroners and Medical Examiners

Many true crime aficionados are familiar with the popular portrayal of coroners and medical examiners and their daily interaction with the dead. In the real world, their essential task—confirming a death and figuring out what caused it—is far more involved than what you see on television. *Mental_floss* spoke with Graham Hetrick, coroner for Dauphin County, Pennsylvania and star of Investigation Discovery's show *The Coroner: I Speak for the Dead*, as well as several other medical examiners, to get some insights about their work on the autopsy table and elsewhere.

1. THERE CAN BE A BIG DIFFERENCE BETWEEN MEDICAL EXAMINERS AND CORONERS.

The coroner system dates to medieval England, when these officials, then called *crowners*, worked for the king investigating frauds, thefts, and deaths. These days, a coroner's main duties are to confirm and certify a death, and to determine whether an investigation is warranted. Prerequisites for coroners vary widely from state to state, with some states requiring that they be certified pathologists while others allow jurisdictions to elect laypeople to the position. Other states, particularly those with large urban centers, have adopted systems employing medical examiners—who are always physicians, never laypeople.

But while coroners in a few jurisdictions may hold little more than a high school diploma, many are highly qualified professionals. Hetrick has a particularly varied background. He is also a medical legal death investigator (an expert in examining the manner and cause of death), thanatologist (a specialist in the scientific study of death), forensics consultant, and funeral director, with advanced training in blood pattern analysis, crime scene management, and forensic sculpting. Hetrick says that while Pennsylvania employs mainly coroners, his system is a hybrid one in which he works closely with a forensic pathologist.

2. MEDICAL EXAMINERS ARE DOCTORS—BUT FOR THE DEAD.

Bruce Goldfarb, executive assistant to Baltimore's chief medical examiner, explains that while all of the doctors in his department are board-certified forensic pathologists, other cities have had medical examiners who are obstetricians or dentists. But no matter what, Goldfarb says, medical examiners are still "doctors doing doctor work. When we go to the doctor, they do a physical exam, maybe send you for a chest x-ray, order a urinalysis or blood tests, and then they figure out what, if anything, is wrong with you. Our doctors do the same thing, except the patient is dead and they're trying to figure out why." Unlike regular doctors, however, medical examiners don't generally have to deal with medical insurance or malpractice suits.

3. THEY MAY NEED TO CALL IN A BOTANIST.

Coroners and medical examiners collaborate closely with other experts, including forensic photographers, toxicologists, forensic anthropologists, and odontologists (dental experts). Hetrick compares his role as a coroner to that of an orchestra conductor, overseeing different instruments coming together to play "the music of the dead." He notes that specialists from fields that might seem unrelated to his work—such as entomologists and botanists—can be very helpful in determining time of death based on the life forms that have taken root in a corpse. He describes one case, profiled in episode 4 of *The Coroner*, in which he called in a botanist to examine a plant growing through the eye socket of a skull in order to pinpoint how long the body had been in that spot.

4. THEY ADVOCATE FOR THE DEAD.

When most people think of advocacy, they think of efforts to protect the rights of disenfranchised populations among the living. But people who have died under mysterious circumstances or as a result of violence need advocates too. Dr. Marianne Hamel, a New Jersey-based medical examiner and one of the creators of the project Death Under Glass, says of her work: "It helps to look at the job as advocacy for the dead—they are, in many ways, the most disenfranchised among us. They can't testify for themselves or directly tell a jury the story of their suffering. That's the job of a forensic pathologist." Hetrick expands on this outlook, seeing it as his duty to listen to the stories that the dead tell through their physical presence, including damage and decay to their bodies and their position in a crime scene. "I am a storyteller," he says, "but they are not my stories."

5. THEY HAVE TO BE VERY CAREFUL AT A CRIME SCENE.

In addition to being connected to a wide array of forensic and other sciences, the work of coroners and medical investigators is closely tied to legal investigations into specific deaths. Hetrick stresses that forensics is "science applied

to law," meaning that all physical evidence uncovered during a forensic investigation must hold up in court. "Otherwise," he says, "it's just opinion." In order for evidence gathered during a coroner's or medical examiner's investigation to hold up in court, the investigators must be thoroughly familiar with crime scene procedure and follow chain of evidence practices. Chain of evidence refers to proper collection and processing of crime scene evidence, including thorough, continuous documentation of who handled the evidence and when. Hetrick says that failure to correctly document handling of evidence affected the outcome of the O. J. Simpson case, making it impossible to convict Simpson in criminal court.

6. THEY ARE SLEUTHS.

The job of a coroner or medical examiner demands endless curiosity and a desire to extract the truth from every case. This process can take years, and many of these professionals describe being haunted by cold cases that were never solved. Naturally, persistence and a strong problem-solving aptitude are desirable attributes. Goldfarb says one of the most challenging types of cases is also one of the most common—somebody "found dead at home, no obvious injuries, no signs of foul play. ... It could be anything; drug intoxication, heart attack/stroke, head injury ... could be suicide, could be accident, could be homicide. Every possibility has to be considered and run down." Hamel adds that cases are not always what they seem at first, and that she may encounter a natural death that turns out to be a drug overdose, or a suicidal hanging that is actually an autoerotic asphyxiation.

7. THEY ARE NOT ALWAYS PORTRAYED ACCURATELY ON TELEVISION.

Hetrick says Investigation Discovery's show captures many important aspects of his profession, particularly the science behind it and the interactions of coroners with the rest of the investigation. Fictional portrayals of coroners and medical investigators, however, are not always so accurate. Hetrick says the typical television pathologist, laboring in a laboratory in isolation, often strikes him as "kind of disturbed." Goldfarb says that in real life, investigations usually do not wrap up as quickly as they seem to on television. Plus, homicides—which represent about 4 to 5 percent of the cases the Baltimore OCME investigates—are overrepresented. Hamel agrees that television is prone to bend the truth in the name of drama. "I don't carry a gun, I've never interrogated a live suspect, and," she says, "I don't perform autopsies in the middle of the night under a single, bare, swinging light bulb."

8. THEY WORK WITH THE LIVING, TOO.

In addition to their interactions with law enforcement and forensics specialists, a big part of coroners' and medical examiners' jobs entails communicating with grieving family members. Hamel emphasizes the need to remain even-tempered and compassionate toward family members who may become understandably overwrought or angry. Goldfarb, who has a background in psychiatry and crisis intervention, concurs. "One of the challenges of the job is constantly keeping in mind that for me this is an ordinary Monday, but the people I speak with on the phone are having one of the worst days of their life," he says. Hamel adds that, contrary to the stereotype of the shy, solitary forensic pathologist, people in her field are often called on to testify before a jury or to lecture death investigators or police trainees—so it helps to be outgoing.

9. DEATH INFORMS THEIR OUTLOOK ON LIFE.

Hetrick emphasizes that one of the main differences between *The Coroner: I Speak for the Dead* and other forensic investigation shows is its emphasis on what the dead have to teach the living. "The reason I'm doing the show," he says, "is because of what the dead show us about how we live and how we should live." For Hetrick, this means examining both the psychology of those who commit murders and what their actions say about society, as well as the impact that deaths have on living people. He describes his interactions with the family of the victim portrayed in the show's first episode—a woman named Iris who was killed while trying to build a better life for herself—as emotional, but says it was gratifying to see Iris's daughter motivated to pursue her dreams in part because of the untimely death of her mother. On a more personal level, Hetrick says the constant exposure to death prompts him to constantly reevaluate his own life, and to avoid taking anything for granted. "It's a very thin line [between life and death], believe me," he says. "A lot of people on that autopsy table thought today was just another day."

Questions:

1. What is the main difference between Medical Examiners and Coroners?

2. What is a Legal Death Investigator?

3. What is a thanatologist?

4. How are medical examiners just "doctors doing doctor work"?

5. Why would medical examiners need to call in specialists in other fields of forensics?

6. How are medical examiners an "advocate for the dead?"

7. Why must medical examiners be careful at a crime scene as well?

8. What are some differences between the way medical examiners really are and how they are portrayed on TV?

9. How do medical examiners also work with the living?

10. What does Herick mean when he says that "Death informs their outlook on life"?

ACTIVITY 11-4: ESTIMATING TIME OF DEATH USING INSECT, ALGOR, AND LIVOR MORTIS EVIDENCE

Time After Death	Event	Appearance	Circumstances
2-6 hrs.	Rigor Begins	Body becomes stiff and stiff-ness moves down the body	Stiffness begins with the eyelids and jaw muscles after about 2 hours, then the center of the body stiffens, then arms and legs
12 hrs	Rigor Complete	Peak rigor is exhibited	Entire body is rigid
15-36 hrs.	Slow loss of rigor	Loss of rigor in small muscles first followed by larger muscles	Rigor lost first in head and neck and last in bigger leg muscles
36-48 hrs.	Rigor totally disappears	Muscles become relaxed	Many variables may extend rigor beyond the normal 36 hours.

Factors Affecting Rigor	Event	Effect	Circumstances
Temperature	Cold temp	Inhibits rigor	Slower onset and slower progression of rigor
	Warm Temp	Accelerates rigor	Faster onset and faster progression or rigor
Activity before Death	Aerobic exercise	Accelerates rigor	Lack of oxygen to muscle, the buildup of lactic acid and higher body temp accelerates rigor.
	Sleep	Slow rigor	Muscles fully oxygenated will exhibit rigor more slowly
Body Weight	Obese	Slows rigor	Fat stores oxygen
	Thin	Accelerates Rigor	Body loses oxygen quickly and body heats faster

Stage	Size (mm)	Color	When first appears	Duration in phase	Characteristics
Egg	2	White	Soon after death	8 hrs	Found in moist warm areas of the body, mouth, eyes, ears, anus
Instar 1	5	White	1.8 days	20 hrs	Black mouth hooks visible- thin body- one spiracle slit near anus
Instar 2	10	White	2.5 days	15-20 hrs	Black mouth hooks, dark crop seen on anterior dorsal side, actively feeding, 2 spiracle slits near anus
Instar 3	17	White	4-5 days	36-56 hrs	Black mouth hooks, covered in fat deposits, 3 spiracle slits near anus
Pre-Pupa	9		8-12 days	86-180 hrs	Larva migrate away from body to dry area
Early and late Pupa	9	Light brown changing to dark brown	18-24 days	6-12 days	Immobile, changes to dark brown, filled air "balloon"
Adult	varies	Green or Black	21-24 days	Several Weeks	Incapable of flight for first few hours

Also note: ALGOR MORTIS- for the first 12 hours, the body loses 0.78 C (1.4 F) per hour. After 12 hours, the body loses about 0.39 C (0.7 F) per hour.

Questions:

a. A naked, male corpse was found at 8 a.m. on Tuesday, July 9. The air temperature was already 26.7°C (81°F). The body exhibited some stiffness in the face and eyelids and had a body temperature of 34.4°C (93.9°F). Livor mortis was not evident.

   a. Approximately how long ago did the man die? SHOW WORK

   b. Justify your answer.

   c. Would clothing on the body have made a difference in determining actual time of death? Why or why not?

2. At noon, a female corpse was found partially submerged on the shore of a lake. The air temperature was 26.7°C (81°F), and the water temperature was about 15.6°C (61°F). Rigor mortis was not evident, and the body's temperature was 15.6°C. Livor mortis showed a noticeable reddening on the victim's back that did not disappear when pressed. Bacterial activity was not significantly increased, and the lungs were filled with water.

   a. Approximately how long ago did the woman die? SHOW WORK

   b. Justify your answer.

3. The body felt cool to the touch. The thermometer gave a reading of 70°F. No rigor mortis was evident, but permanent livor mortis had set in, with blood pooling along the back. There was no noticeable increase in bloating or bacterial activity in the digestive system and no putrefaction. The man had been dead for over four days. How is that possible? (answer should be about a paragraph)

4. The dead body contained evidence of blowfly infestation. The larvae were collected and reared in a lab in an environment similar to the conditions surrounding the dead body. Adult flies mated and laid eggs. Data was collected, noting the time required to progress from one stage to the other, and recorded in the Data Table below.

Life Cycle of Insects Collected from Dead Body		
Stage	**Accumulated Time Since Egg Was Laid (Hours)**	**Accumulated Time Since Egg Was Laid (Days)**
Egg	Egg laid minutes after death	0
Larva stage 1	24	1
Larva stage 2	60	2.5
Larva stage 3	96–120	4–5
Pupa	192–288	8–12
Adult	432–576	18–24

a. Record the estimated time since death if the insects recovered from the dead body were in each of the stages below:
egg; larva 1; larva 2; larva 3; pupa; adult.

b. Record the estimated time since death if insects were in the following stages: Some eggs and some larva stage 1; some adults and some pupae; some larva found in stage 2 and stage 3.

5. A dead body of an elderly gentleman was discovered in an abandoned building. Blowfly pupae were found on the body. A missing person's report was filed for an elderly gentleman who had wandered away from home just two days before. The body found was similar in age, height, and weight to the missing person. Could this possibly be the same person as the person described in the missing person's report? Explain your answer.

6. The police received a report about a body found in the woods behind the local shopping center. The forensic investigator collected 5 different types of living insects on the man's body. It's important to stress that investigators found all 5 insects alive on the body at the same time. The insects were sent to the forensic entomology lab, where they were raised under similar conditions to those found around the dead body. The following chart describes the life cycles of each of the five different types of insects found on the dead body. How long has the man been dead? Justify your answer.

						Day				
Insect	1	2	3	4	5	6	7	8	9	10
Blowfly	1	1	1	1	1	1	1	1	1	0
Species A	0	0	0	0	1	1	1	1	1	1
Species B	0	0	0	0	0	0	1	1	1	0
Species C	0	0	0	0	0	0	0	0	1	1
Species D	0	0	0	0	0	1	1	1	1	1

0 = no evidence of fly species 1 = evidence of egg, larva (maggot) or pupa

ACTIVITY 11-4
ESTIMATING THE TIME OF DEATH USING INSECT, ALGOR, AND LIVOR MORTIS EVIDENCE

Toxicology Project Assigned 3/18/2020

Create a PowerPoint, poster, or tri-fold brochure on a poison or drug. Your project medium must include the following information:

- Common name of toxin
- Scientific name
- Class of toxin
- Median fatal dose for humans (LD_{50})
- Effects on the human body
- Legal uses
- Penalties for use outside of the legal uses for those over 21 years of age
- Pictures of the forms the substance is available in (pills, injection, powders, etc.)/methods of use
- Picture of the chemical structure
- References - a minimum of three valid references needed

Element	Fully present	Partially present	Not present	Score
Name	5	Xxx	0	
Scientific name	5	Xxx	0	
Class of toxin	5	Xxx	0	
Median lethal dose (LD_{50})	5	Xxx	0	
Effects	5	2	0	
Legal uses	5	Xxx	0	
Penalties for illegal uses	5	2	0	
Forms it is available in (picture(s)) and method of use	5	2	0	
Picture of chemical structure	5	Xxx	0	
References	30	Xxx	0	
Color	15	Xxx	0	
Neatness	10	2	0	
TOTAL	Xxx	Xxx	xxx	/100

Notes:

- References are to be in MLA format. A free online citation generator such as Easybib.com are recommended. Wikipedia is not a valid reference and will not be credited as such. Search engines such as Google or Yahoo are not references, and therefore, will not be credited.
- Size of project (before folding if you do the tri-fold brochure) is not to exceed 8.5" x 11" - a standard size of a piece of computer paper
- Your name is to be on the lower right corner of your project (front or back); no name, no credit

The following is a list of drugs to be chosen by students (each student chooses one, no repeats).

Drug	**Assigned student**
Laughing gas	
Krokodil	
N, N-dimethyltryptamine	
MDMA	
Xanax	
Percocet	
Crack cocaine	
Anabolic steroids	
Methamphetamine	
Bath salts	
Naloxone	
Oxycodone	
Rohyphnol	
Carfentinl	
Fentanyl	
Methaqualone	
Ketamine	
LSD	
Opium	
Peyote and mescaline	
Heroin	
'shrooms	
Cocaine	
Salvi divinorum	
Marijuana (synthetic/not synthetic)	

CASE NUMBER:

CRIME TYPE:

DISTRICT:

PHOTOGRAPHS—DIGITAL/NONE

LATENT PROCESSING—YES/NO

WEATHER:

ON ..... AT .... HOURS, I WAS DISPATCHED BY POLICE COMMUNICATIONS TO RESPOND TO ....., IN REFERENCE TO A ..... UPON MY ARRIVAL AT 0100 HOURS, I MET WITH OFFICER ... , WHO ADVISED ....._PHOTOGRAPHS AND PROCESSING.... WERE REQUESTED.

I OBSERVED

PHOTOGRAPHS WERE TAKEN TO DOCUMENT THE SCENE AS IT APPEARED UPON MY ARRIVAL AND AS NEEDED THROUGHOUT PROCESSING. PHOTOGRAPHS OF .... WERE TAKEN WITH AND WITHOUT A MEASURING DEVICE.

LATENT PROCESSING WAS CONDUCTED USING OBLIQUE LIGHTING AND/OR SILVER/BLACK FINGERPRINT POWDER. FRICTION RIDGES WERE DEVELOPED, LIFTED, AND PLACED ON LATENT FINGERPRINT CARDS FROM THE FOLLOWING AREAS: .....

CARD 1 OF ...:

EVIDENCE WAS COLLECTED AND TURNED IN TO THE DISTRICT THREE SUBSTATION LOCKER .... AT ..... HOURS ON ....

END OF REPORT.

JWL/1356

DEPARTMENT OF FORENSIC SCIENCE

PIEDMONT CLASSICAL HIGH SCHOOL

STUDENT RAP SHEET

<table>
<tr><td rowspan="3">STAPLE PHOTO HERE</td><td colspan="3">NAME</td></tr>
<tr><td>DOB

____/____/____</td><td>AGE</td><td>SEX</td></tr>
<tr><td colspan="3">KNOWN SUMMER ACTIVITES</td></tr>
<tr><td colspan="2">CHAPTER MOST EXCITED TO STUDY</td><td colspan="2">MOST INTERESTING TRAIT</td></tr>
<tr><td colspan="2">WHAT I KNOW ABOUT FORENSICS</td><td colspan="2">REQUESTED LAST MEAL</td></tr>
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