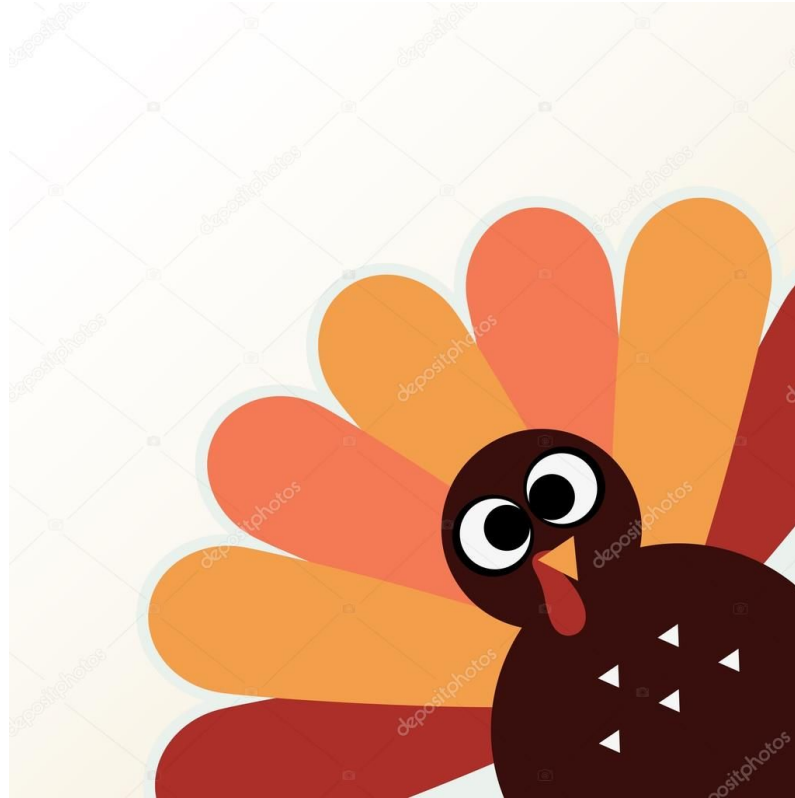


Kraemer Middle School Scrimmage

November 4, 2017



“The Freaky Fowl Files”

Crime Busters

Case #003

Evil Dr. Skellington's Zombie Turkeys

Evil Dr. Skellington has been experimenting on turkeys using Crispr-Cas9 with the hopes that he can decimate his genetically modified turkeys to the rest of the world. These turkeys, after being genetically modified, will not be able to be roasted for the upcoming Thanksgiving and Christmas day feasts and when exposed to heat, will turn into zombie turkeys, and hence will ruin the holiday season for all (mwahahahaha!).

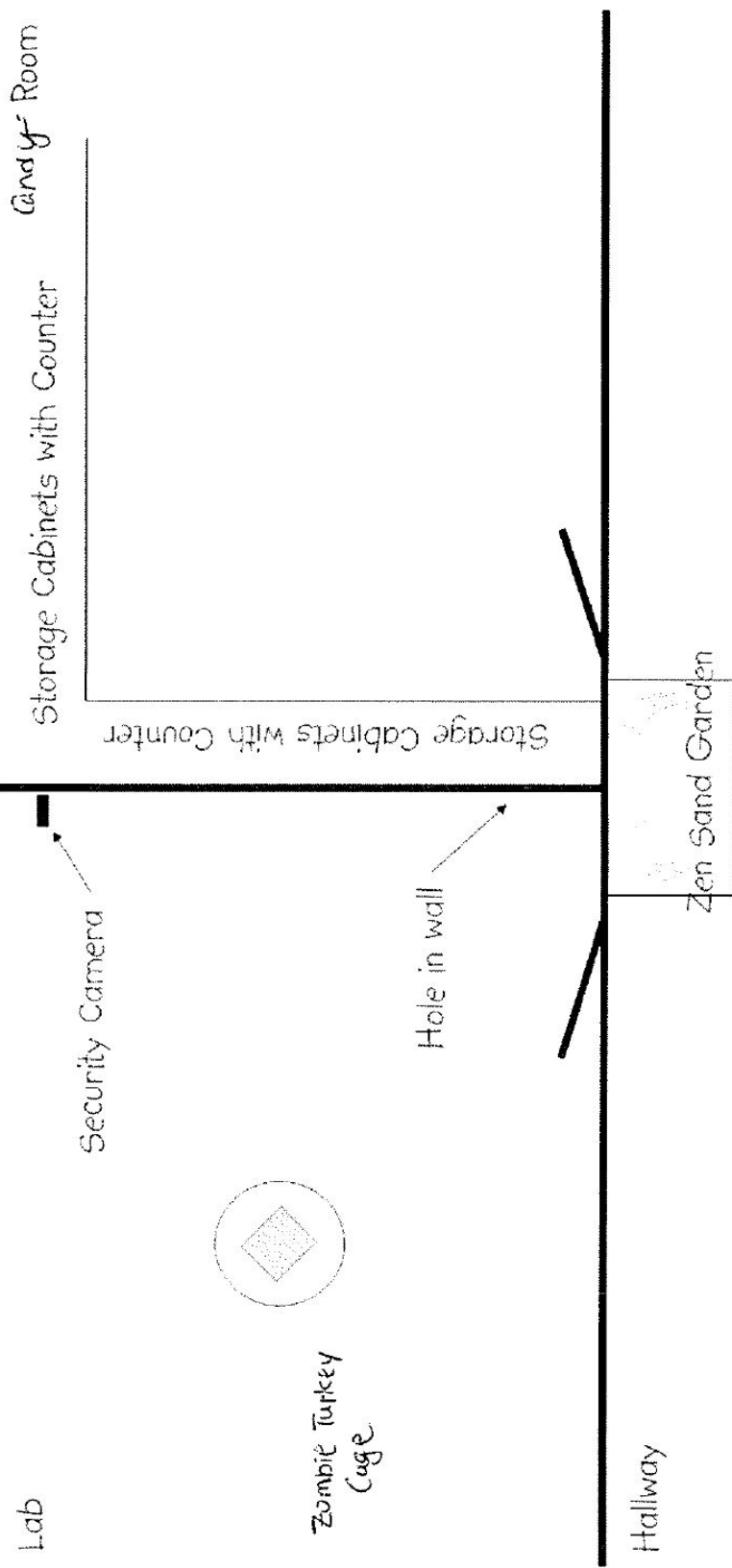
The final prototype of Dr. Skellington's zombie turkey is still in its protective cage in his private lab, door to the cage, with its numeric touch pad lock and eye scanner, is still closed. There is a rather large hole in the side wall from the Candy Room next door. In the Candy Room, the metal cabinet with leftover candies from Halloween has a hole sawn through its aluminum back and the wall behind the cabinet has been broken through - into Dr. Skellington's Lab! The lab security camera, one of Dr. Skellington's electronic bats, located directly above the hole in the wall, had a piece of gum stuck on its lenses.

Security tapes from the other electronic bats in the hall have also been reviewed by the Sheriff of Halloween Town. They show Mr. Snail, the night custodian, leaving Dr. Skellington's Lab at 6:15 PM, entering the Candy Room (and stealing some of the Almond Joys), and leaving the Break Room at 7:10PM. When interviewed, Mr. Snail explained that he had completed his nightly cleaning of both the lab and the Candy Room. This included emptying the trash, dusting all floors and counters as well as wiping down the candy windows and all the chocolate door and drawer handles. He was adamant that the lab and the break room were both spotless when he left them. The Candy Room door is never locked, which probably explains why so much candy goes missing whenever the little goblins, witches, and skeletons come and play at Dr. Skellington's place.

The security footage from showed an empty hall until 2:07 AM when two of Dr. Skellington's minions were seen running down the hall away from the electronic bat recording. The electronic bat outside the building showed four minions running out at 2:11AM. At 2:16, the four minions were apprehended.

Since gum was found on the lens of the security camera in the lab, check swabs were taken from each of the suspect minions. DNA plots are provided.

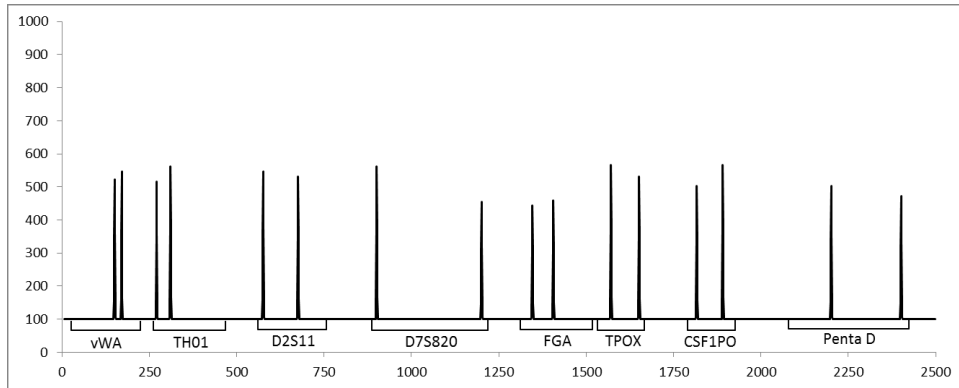
Crime Scene Sketch



THE SUSPECT MINIONS

Kevin: Trusted Chief Minion

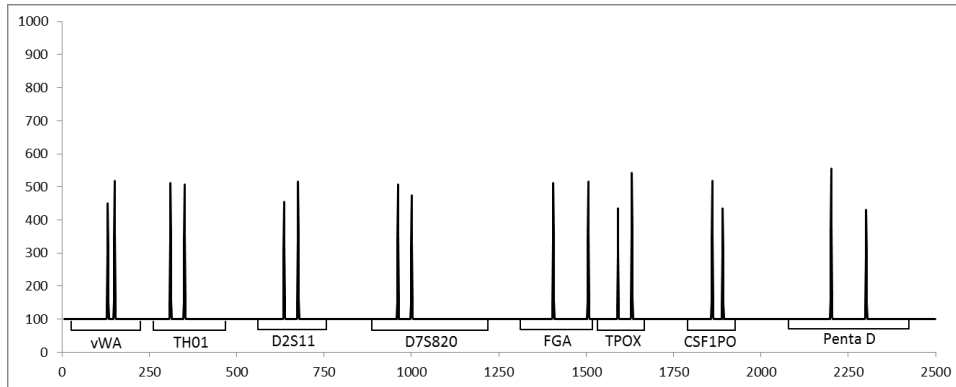
- Pet: parakeet
- Dressed in his usual "all blue;" blue jeans and blue t-shirt.
- Right handed



THE SUSPECT MINIONS (cont)

Stuart: Kevin's Brother

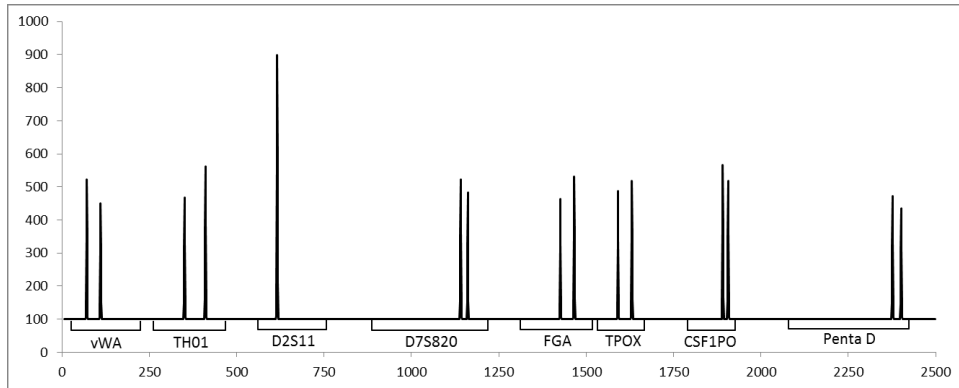
- Pet: works at Canine Rescue n spare time
- Always wears traditional silks
- Right handed



THE SUSPECT MINIONS (cont)

Bob: Minion Team Clown

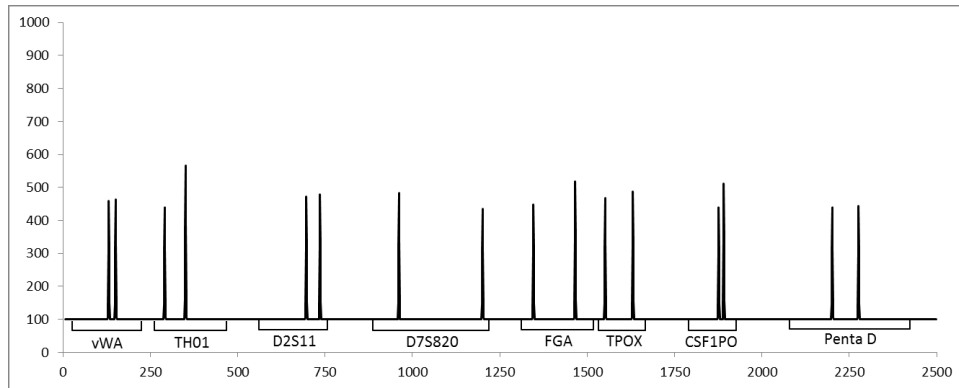
- Assigned Job is Stables
- Always wears wrinkle-free polyester blends
- Right handed



THE SUSPECT MINIONS (cont)

Jerry: "The Thinker"

- Pet: hates all animals
- Allergic to natural fibers
- Left handed



The Exhibit List

Exhibit	Notes
A	Powder: Break Room Floor
B	Powder: Break Room Floor
C	Powder: Break Room Counter (over hole)
D	Powder: Lab Floor (by hole)
E	Powder: Smudge on still locked display case
F	Powder: Kevin's fingernails
G	Powder: Under Stuart's class ring
H	Powder: Stuart's fingernails
I	Powder: Stitching on Stuart's shoes
J	Powder: Sole of Stuart's shoes
K	Powder: Bob's fingernails
L	Powder: Stitching of Bob's shoes
M	Powder: Sole of Bob's shoes
N	Powder: Jerry's fingernails
O	Powder: Stitching of Jerry's shoes
P	Powder: Sole of Jerry's shoes
Q	Metal: Stuart's pant cuff
R	Metal: Bob's glove
S	Metal: Jerry's pant leg
T	Fiber: Edge of Break Room door
U	Fiber: Edge of hole in wall
V	Fiber: Break Room door latch
W	Plastic: In Kevin's pocket protector
X	Plastic: Bottom of Stuart's backpack
Y	Plastic: Outer pouch of Bob's messenger bag
Z	Plastic: Outer compartment of Jerry's backpack
S1	Hair: Break Room floor near hole in wall
S2	Hair: On pedestal by still locked display case
S3	Hair: Lab floor near pedestal
C1	Chromostrip: extract from note by pedestal
C2	Chromostrip: extract from crumpled map in Zen Sand Garden

A thru Z:
Physical evidence

S1 thru C2:
Evidence presented
in document

Note:
Any evidence from
shoes may (or may
not) be mixtures.

Part 1A - Qualitative Analysis- Solids

Note: All questions refer to the complete list of allowed solids for this event.

Note: Exhibits taken from shoes may (or may not) be mixtures.

Identify Exhibits A through P and give the basis for your identification. (i.e. On what specific chemical reaction(s) or observations(s) is the identification based.)

1. Which powder has the empirical formula $C_3H_4O_3$?
 2. Which powder would be called limestone by a geologist?
 3. Which powder when mixed with hydrochloric acid will make salt water?
-

Part 1B - Qualitative Analysis- Metals

Note: All questions refer to the complete list of allowed metals for this event.

Identify Exhibits Q through S and give the basis for your identification. (i.e. On what specific chemical reaction(s) or observations(s) is the identification based.)

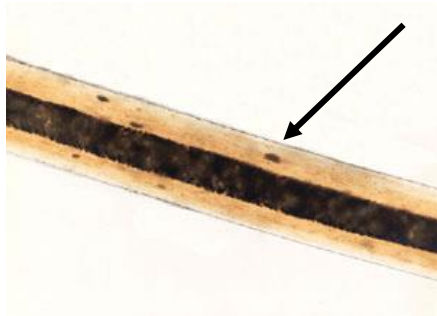
1. Which of the metals listed is commonly mixed with other metals to inhibit rusting?
 2. Five of the six "allowed metals for this event" should exist in small amounts in a well-balanced diet. Which metal is not one of these five?
-

Part 2A - Hair

Note: All questions refer to the complete list of allowed hair types for this event.

Identify Exhibits S1 through S3 (slides provided at your station) and give the basis for your identification. (i.e. On what specific chemical reaction(s) or observations(s) is the identification based.)

1. What is the medullary index threshold for human hair?
2. Is the threshold referenced in #2 a minimum or maximum?
3. Name the component indicated in the micrograph (of a hair) shown below.



4. Is the hair shown in the micrograph below cat, dog, or human?



Part 2B - Fibers

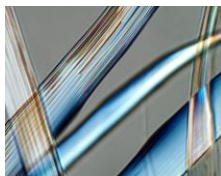
Note: All questions refer to the complete list of allowed fiber types for this event.

Identify Exhibits T through V and give the basis for your identification. (i.e. On what specific chemical reaction(s) or observations(s) is the identification based.)

1. A microscopic view of a fiber is provided below. Is this fiber animal, synthetic, or vegetable?
2. A microscopic view of a fiber is provided below. Is this fiber animal, synthetic, or vegetable?
3. A microscopic view of a fiber is provided below. Is this fiber animal, synthetic, or vegetable?



Question 1



Question 2



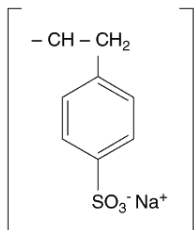
Question 3

Part 2C - Plastics

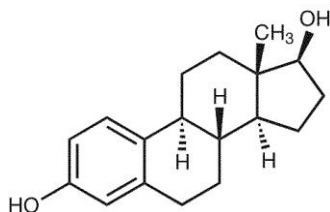
Note: All questions refer to the complete list of allowed plastics for this event.

Identify Exhibits W through Z and give the basis for your identification. (i.e. On what specific chemical reaction(s) or observations(s) is the identification based.)

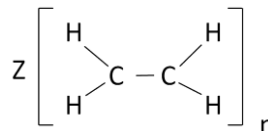
1. Of the structural formula shown below, which best represents PVC?



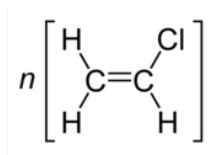
(A)



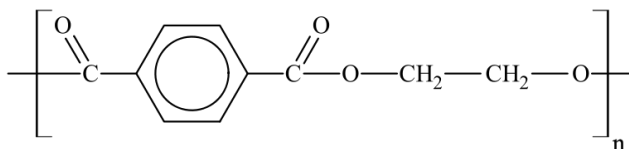
(B)



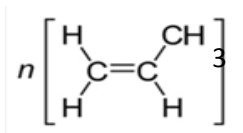
(C)



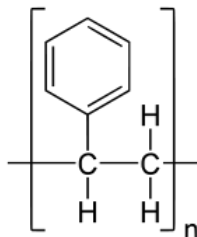
(D)



(E)



(F)



(G)

2. What country was the first to switch completely to polymer banknotes?

Part 3 – Chromatography

A chromostrip of the ink extracted from the crumpled note by the pedestal which held the combination to the display case door lock is provided here as Exhibit C1.



Exhibit C1

A chromostrip of the ink extracted from the crumpled map found in the hall by the Zen Sand Garden is provided here as Exhibit C2.

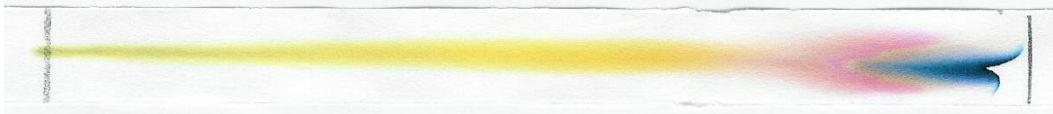


Exhibit C2

Pens / Markers from each Minion have been tagged as evidence and are provided at your station. Run appropriate chromostrips from the pens and determine what matches, if any, exist.

1. Who's pen, if any, matches Exhibit C1?
2. Who's pen, if any, matches Exhibit C2?

DO NOT use the evidence pens for personal writing. Such use will be deemed "destruction of evidence" and cause for disqualification from this event.

Part 4A - Fingerprints

1. Exhibit FP1 was lifted from the outside door knob of the Break Room and is shown at right. To whom does it belong?

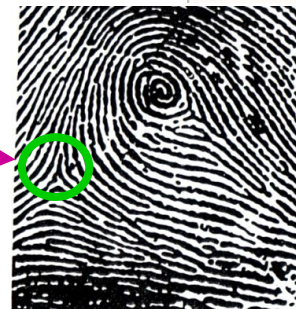


2. Exhibit FP2 was lifted from the combination key pad on the still locked display case and is shown at right. To whom does it belong?



3. What is the NCIC classification of Kevin's right thumb

4. What characteristic is circled here?



Part 4B – Shoe Prints



Photo SP1. Shoe print from the hall garden just outside the Break Room.



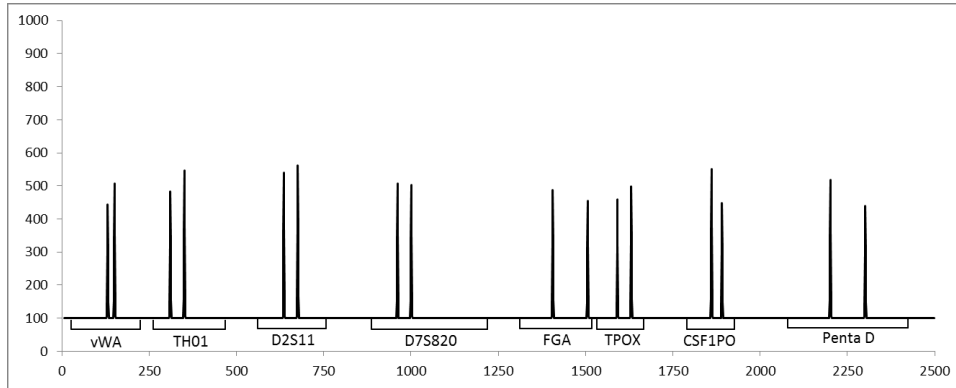
Photo SP2. Shoe prints from the Zen Sand Garden outside the Office window.

1. Who most likely left the shoe print shown in Photo SP1?
2. Who most likely left the shoe prints shown in Photo SP2?
3. Examine the shoe print at right. Was the wearer most likely standing, walking or running?
4. Support your answer to #3.

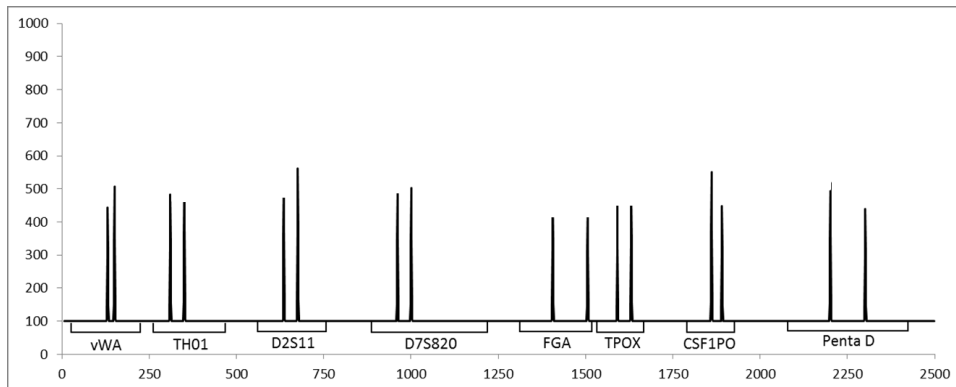


Part 4C – DNA

A DNA profile from the root bulb of Exhibit S3 is given below as Exhibit DNA1.



A DNA profile from the gum stuck on the security camera lens is given below as Exhibit DNA2.



1. To whom, if anyone, is Exhibit DNA1 a match?
2. To whom, if anyone, is Exhibit DNA2 a match?
3. What does the acronym PCR stand for in DNA analysis?
4. There are four (4) nucleotides that comprise DNA. Name these nucleotides as base pairings in double stranded DNA.
5. Name the second stage of the PCR cycle where the temperature is lowered to 55 degrees Celsius.
6. PCR analysis of DNA cannot do which of the following:
 - a. Define family relationships
 - b. Identify how long DNA has been in a location
 - c. Identify who was at a crime scene
 - d. Discover genetic based diseases

Part 5 – Analysis of the Crime

1. What was each minion's involvement (or non-involvement) in this event? Support your statements of involvement.
2. Cite one cluster of evidence which provided no (or minimal) incriminating evidence. Support your answer; be specific.
3. What other evidence should have been gathered and why?
4. Offer a possible motive.