

For Office Use Only:
Score: _____ /330
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Start Time: _____

End Time: _____

2014-2015 Science Olympiad

Forensics Tryout Exam



Exploring the World of Science

FMSO Forensics Tryout Test 2014-2015

Who Killed Damian?



Detective _____

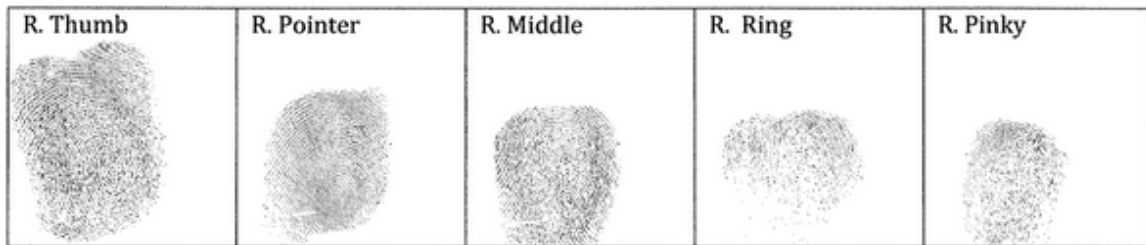
Who Killed Damian?

One day, when Shirley wanted to work on Rocks and Minerals, she couldn't find the Rocks binder. She asked Allie, but Allie said she didn't know. "Oh noes!" said Shirley. But before Allie started hyperventilating with panic, Will remembered he'd seen it in the SO room an hour ago. So Shirley and Allie took a journey down to the SO room. However, when they opened the door they were greeted with a gruesome sight. Damian's unmoving body was slumped over the worktable. "He's dead!" screamed Allie. Hearing Allie's scream, the rest of the team came running and began searching the room for clues. They found an unknown powder on the worktable (G), two strange hairs on Damian's clothes (O and P) and fibers (M) stuck to the back of his chair. There was also a note sealed in an envelope with the message: "Never again." The DNA of the saliva sealing the envelope was quickly extracted and run through gel electrophoresis, yielding the DNA sample labeled Crime. Fingerprints on the note were also lifted. Possible suspects of the crime were immediately interviewed. The three suspects, Molly Bucklin, Kia Wang, and James Song, all relinquished powders and fibers from their body. Their DNA samples were run through the gel electrophoresis machine (labeled M, K, and J) and their fingerprints were taken and provided on their information sheet. Point values are in []. Good luck Detective!

SUSPECT INFORMATION SHEET

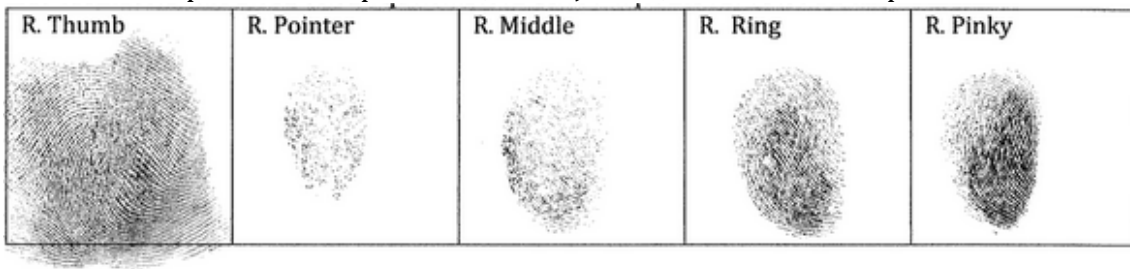
Molly /Eyes: Brown/Hair: Brown/Skin: Brown/Hobby: Yogurt/
Pets: Doge/Blood type: A+

Molly is a Caucasian female who enjoys Harry Potter and playing with her doge. She is generally a good student, yet consistently gets Fs in geography due to mishaps such as identifying Alaska as next to Hawaii. She typically wears 100% cotton Hanes t-shirts and sports shorts. She has a fanatic liking for coffee and often goes to coffee shops with her friend Allie. However, perhaps owing to her frequent late-night partying she often gets sick and uses a lot of cough syrup. She and Damian often blackmailed each other with embarrassing photos, such as the one above. Molly was in possession of powders A, B, and C, fibers H and I, and her DNA sample was labeled M.



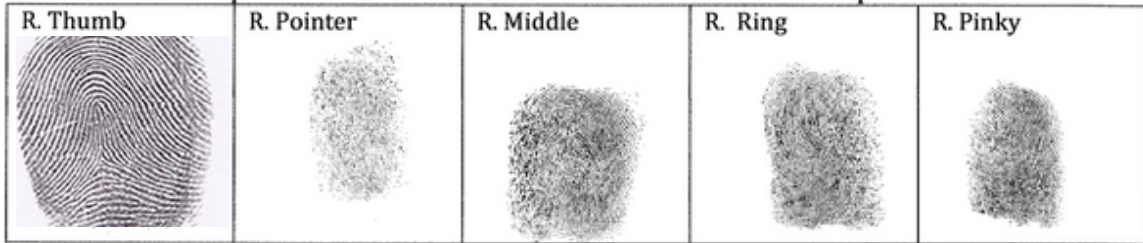
Kia /Eyes: Orange/Hair: Black/Skin: Green/Hobby: Starcraft/Pets: None/
Blood type: B-

Kia is an Asian male who is fiercely protective of his fountain pens and has difficulties telling right from left. Being class president, he only dresses in the best and is often seen with an expensive cashmere wool sweater and a silk scarf. His executive duties leave him no time for worrying about his grades, which usually reflect his early-onset senioritis. His favorite foods are pickles and cucumbers, which he usually munches between classes. Kia is also a Frisbee champion and has copyrighted the phrase, "don't worry about it". Kia was in possession of powder D, fibers J and K, and his DNA sample was labeled K.



James /Eyes: Indigo/Hair: Strawberry Blonde/Skin: Purple/Hobby: Sporcle and Zen Gardens/Pets: None/Blood type: AB+/

James is an Asian male who seems like the perfect student, but secretly may or may not be a pot dealer, as he possesses a lot of fertilizer at home and is often seen in sketchy places such as the girls' bathroom. He usually wears Polos to school. His favorite foods are dumplings and spring rolls from that one Chinese restaurant in town. James is also an avid League of Legends player. He was recently infuriated at Damian for locking his LoL account. James was in possession of powder F, fiber L, and his DNA sample was labeled J.



EVIDENCE SHEET

Powders[45]: Please identify. [5] each.

A: _____ (Molly)
B: _____ (Molly)
C: _____ (Molly)
D: _____ (Kia)
E: _____ (James)
F: _____ (James)
G1: _____ (Crime Scene)
G2: _____ (Crime Scene)

1. Which person/people had the same powder as G1? [10] _____
2. Which person/people had the same powder as G1? [10] _____

Fibers [40]: Please Identify [5 each]

H: _____ (Molly)
I: _____ (Molly)
J: _____ (Kia)
K: _____ (Kia)
L: _____ (James)
M: _____ (Crime Scene)

1. Which person/people had the same fiber as M? [10] _____

Hair [20]:

1. To who does hair sample N point to? Why? [10] _____

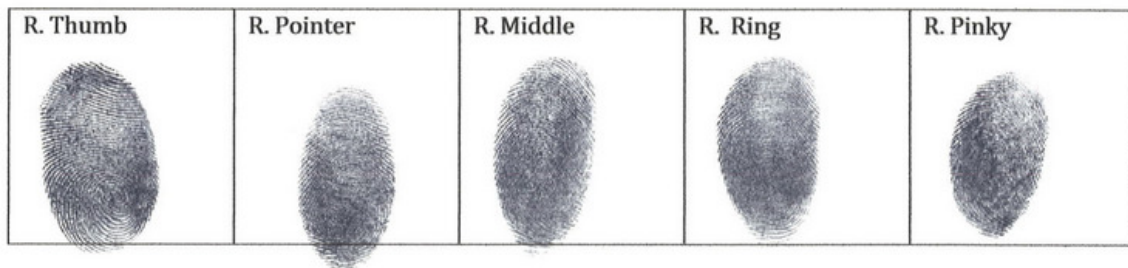
2. To who does hair sample O point to? Why? [10] _____

DNA[10]: Here are the results of the Gel Electrophoresis:



1. Who's DNA belonged to the coke bottle? [10] _____

Fingerprints [35]: These are the fingerprints on the note.



1. The fingerprints found on the note are the fingerprints of whom? [5]

2. Molly's Right thumb is which NCIC classification? _____. [10]

3. Kia's Right thumb is which NCIC classification? _____. [10]

4. James' Right thumb is which NCIC classification? _____. [10]

For 2,3, and 4: Be as specific as you can.

Crime Analysis [215]:

An hour later, the team was shocked when Damian walked into the room, very much alive. Some called him a ghost. Other insisted he was a zombie. The truth? He had only been knocked unconscious. However, Damian was unable to identify his attacker and had no memory of the incident, so the question remains the same: Whodunit?

1. Why does Molly have Powder C? [15]
2. Why does Kia have Powder D? [15]
3. Why does James have Powder F? [15]
4. Who is the least likely suspect? [5] Why?[15]
5. Who is the most likely suspect? [10] Why? [40]
6. Tell me a secret. [100]

Supplemental Questions (65):

For 1,2 and 3: Name the plastic and write its chemical formula.

1. I am used in shrink wrap, grocery bags, and squeezable bottles. I am denser than vegetable oil but less dense than water and 46% isopropyl alcohol. When subjected to a flame test, I burn quickly and produce white smoke. (5)

2. I am used in electronic components and CDs. I burn slowly and am self-extinguishing. I am denser than 25% NaCl but less dense than saturated NaCl. (5)

3. I am used in pipes and wire insulation. When subjected to a flame test I spark and char. I am denser than saturated NaCl as well as PETE. (5)

4. Name the layers of human hair from the inside out. (10)

5. What does PCR stand for and what is this process used for? (10)

6. Name and describe the three steps of PCR and for each, give estimates for the temperature involved. (30)