

Science Olympiad
Division B

CRIME BUSTERS

Mesa Robles Invitational
January 30, 2016



Names _____

Team Name _____

Team Number B-____

Station # _____

Envyng the Fnatic

THE SCENE

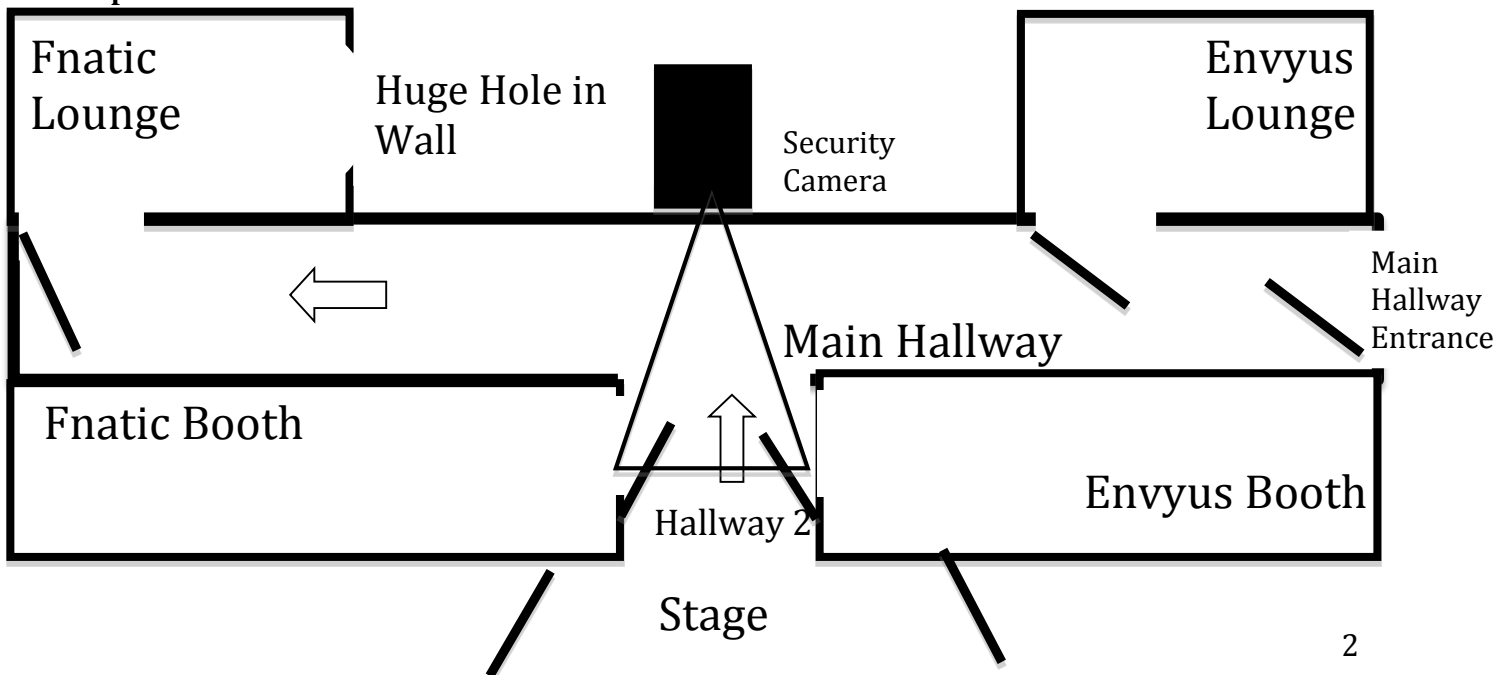
It's ESL One Hacienda Heights 2016, one of the Dance Dance Revolution competitions that are going to happen this season. Everyone knows that the champion team last year was Fnatic, who defeated EnvyUS in the grand finals. The night prior to this year's finals, a rematch between Envyus and Fnatic, a group of people broke into the arena and sabotaged the Fnatic team's booth, stealing Fnatic's signature BLING BLING SHOES, throwing Fnatics gear all over the floor, as well as leaving everything in chaos.

At about 9:00 PM the janitor was recorded on the surveillance camera walking from the stage/booth area towards the main hallway locking the Fnatic lounge and Envyus lounge.

A video camera in the main hall recorded at approximately 10:00 PM, an individual wearing an Envyus sweatshirt walking through the hallway towards the Fnatic Lounge, and about 15 minutes later, 2 individuals were seen sprinting through the hall away from the Fnatic Lounge. A huge hole was found in the room, along with a bunch of the team's items strewn all around the room. Evidence was collected from the room as well as around the hole in the wall, and investigators have concluded that the hole was created from the outside

At about 12:00 PM a sticky note was stuck onto the lens of the camera and a huge commotion was heard coming from the Fnatic booth about 20 minutes later. The window in the booth was smashed open, and a small thread of fiber, most likely from a suspect was found on a glass shard. Investigators believe the suspect(s) fled through the window and out of the arena. A fingerprint was lifted from the note, as well as a collection of evidence from both the booth and the Fnatic lounge.

Individuals involved with the Envyus team along with Envyus team members were rounded up for investigation. Their fingerprints were collected, along with pens that were found on them. A profile of each suspect will be provided on the next page along with information regarding where each piece of evidence was found. Good Luck Detectives!!!





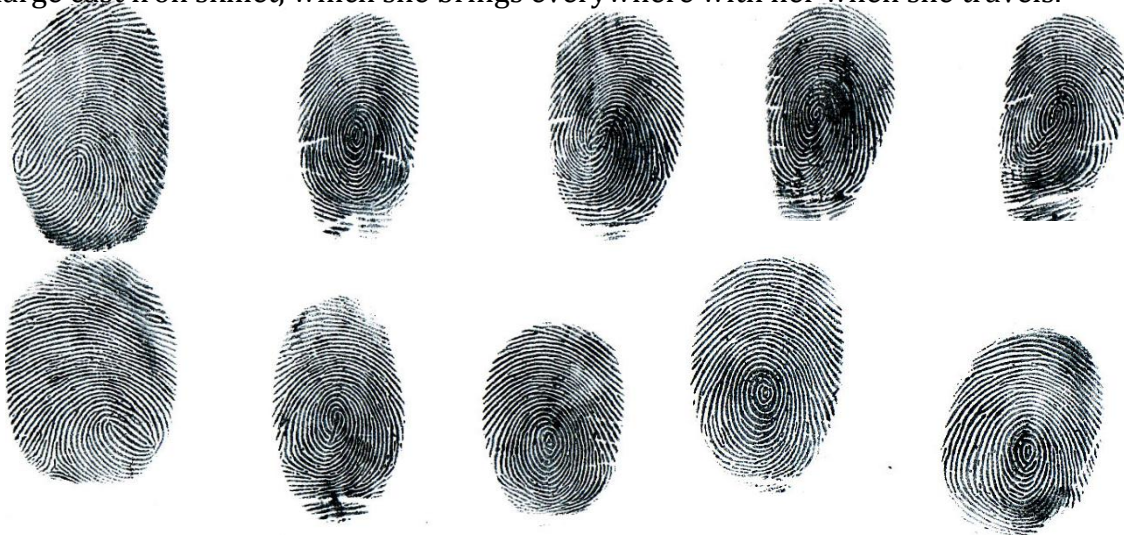
Presents a footprint, as well as the direction it is pointing towards.

All chemicals found in footprints or on the shoes of or the clothing of suspects may be mixtures.

Tube / Slide	Location
Tube 1	Liquid Collected from footprint in hallway 2 (footprint going towards main hallway)
Tube 2	Specs of metal found inside Fnatic lounge.
Tube 3	Substance found in hole in the wall
Tube 4	Substance found in Fnatic Lounge
Tube 5	Substance found in Fnatic Lounge
Tube 6	Substance found in Fnatic Lounge
Tube 7	Substance found in Fnatic booth
Tube 8	Substance found in Fnatic booth
Tube 9	Substance found in Fnatic booth
Tube 10	Substance found in Fnatic booth
Tube 11	Substance found on Kupcake's shirt
Tube 12	Substance found on Kupcake's shoe
Tube 13	Substance found on Kunneeth's shoe
Tube 14	Substance found on Blazeit's shoe
Tube 15	Substance found on Alyson's shoe
Hair 1	Found on note, stuck to camera
Hair 2	Found on the outside of hole in wall
Hair 3	Found inside the Fnatic Lounge
Fiber 1	Found on Glass shard of Fnatic booth window
Fiber 2	Found on the inside door handle of Fnatic lounge

Suspect Profiles:

Alyson Krary Pine: Alyson is the financial officer of Envyus, and the girlfriend of Blazeit Von Wonder. Following Envyus’s loss to Fnatic, there was a huge drop in Envyus merchandise sales, and with this drop Alyson’s paycheck took a major hit, while she had to work even harder to maintain the team’s financial issue. Along with her boyfriend, Alyson also dislikes Fnatic, because of the financial issues that their victory caused for Envyus, and the work that it created for her. She was seen earlier in the day, enjoying the nice California sun at the beach, until she got heavily sunburned and had to look for a “home remedy” to treat the burn. Alyson does not own any pets, and she really likes the comfort of wearing linen dresses. Alyson also really enjoys drinking lemonade and eating fruit. She also owns a large cast iron skillet, which she brings everywhere with her when she travels.



Kunneth Tree: He is the head coach of the Envyus Dance Dance Revolution team, who had been coaching the team for the past 3 years. Following some minor altercations with other staff members, Kunneth is on the line of getting fired, and he believes that winning ESL one Hacienda Heights 2016 would help him keep his job, and restore some of his reputation. He also already has some bad blood against Fnatic, since they beat Envyus last year. His alibi is that he was in his hotel room making some cookies to reward the team after the competition. He owns a cat and a dog which both shed a lot, and he is always seen wearing a suit, which he claims to have bought from Europe. He uses an aluminum clipboard to keep notes on how his team members are performing.



Blazeit von Wonder: He is the Hip-Hop dance specialist on Envyus and is best known by Envyus fans as “the issue.” He apparently has a very competitive and sometimes violent attitude towards competition, and on multiple accounts has gotten into fights with other competitors. He was almost disqualified at last year’s competition, following a verbal fight with Fnatic’s team captain, and has since then despised Fnatic extremely. His alibi was that he was out at some dance club near the beach autographing fans’ shoes since the afternoon. He personally does not own a dog, but he loves to pet any dog he sees, and is usually seen sporting a nice and comfy nylon track suit. He likes to wear and carry around a real bronze medal, that he won at his first ever Dance Dance Revolution competition.



Kupcake due Donguy : She is this year’s Envyus Dance Dance Revolution team captain. She has been recently heard expressing her confidence on how Envyus will win this year, and how she would quit DDR entirely if they were to lose. Her alibi, is that she was in her hotel room, doing her pre-competition ritual, of watching Sherlock, and eating some homemade vanilla ice cream. She owns 2 dogs, but is extremely allergic to cats and she enjoys wearing very nice and breathable cotton t-shirts along with leggings. She has been recently trying out a brand new pair of dance shoes which utilize magnesium for the shoes sole.



Suspects Shoe Prints:

Alyson Krary Pine:



Kunneth Tree:



Blazet Von Wonder:



Kupcake due Donguy:



Part A – Qualitative Analysis

Identify the chemicals/substances inside tubes 1-10 and provide an explanation to your answer (how you identified or why you think it's a specific substance). Identify the contents of tubes 11-15, substances found on the shoes of suspects may be mixtures.

Questions:

1. When reacting with HCl which of the allowed chemicals, reacts with HCl to create Salt? (1 point)
2. What is the empirical formula and the scientific name for Baking soda? (2 points)
3. List two uses for sodium acetate. (2 points)

Part B – Polymer Testing / Natural and Man-made Substances

Identify the hairs H1, H2, and H3 using the microscopes provided. Classify the hairs as Human, Cat, or Dog hair, providing a basis or explanation to your answer.

Identify the type of fibers for F1 and F2 (synthetic, animal, or vegetable), by using a burn test with the candle provided, or by any other safe means. (Unsafe lab procedures will result in penalties or even disqualification). Provide an explanation or basis as to how to come to your answer.

Questions:

1. What was the first ever synthetic fiber created? (1 point)
2. What is a Medullary Index Threshold, and give the Medullary Index Threshold for Human Hair (2 points)
3. What is the full name for polymer **PMMA**, and what is its density?

Part C – Paper Chromatography

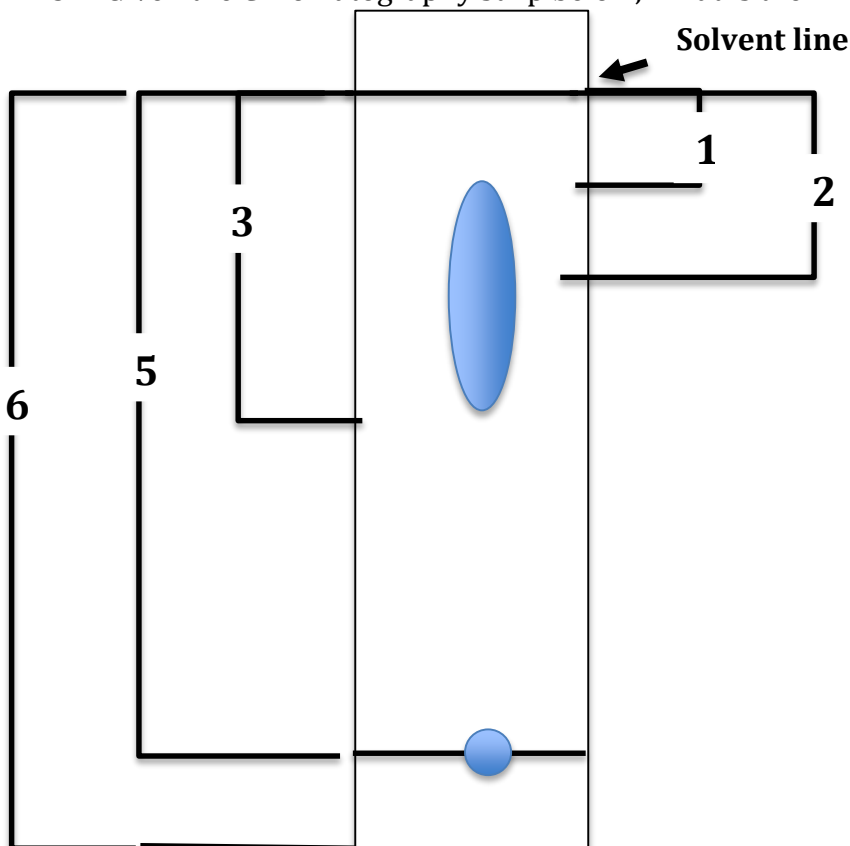
Complete chromatography tests for each of the suspect's pens, and when completed staple them to the provided paper. (1 point for each completed chromatogram)

The Note stuck to the camera states:

“You made me look foolish, Now I shall do the same”

Questions/ ID

- Whose pen was used to write the note stuck to the security camera? (4 points)
- During chromatography, if the ink of a pen does not move when placed into a solvent, then the ink's dye... (choose all that apply) (1 point)
 - Has a higher density than the solvent.
 - Has a different polarity than the solvent.
 - Has a lower density than the solvent.
 - Has the same polarity as the solvent Solvent Front
 - Is too concentrated.
 - Has a higher molarity than the solvent
- Given the Chromatography strip below, What is the RF of the Dot traveled.



- A.) 3/5 B.) 2/5 C.) 3/6 D.) 2/6 E.) 4/5 F.) 5/6

Part D – Crime Scene Physical Evidence

Answer the following questions regarding fingerprints, and footprints. Any identification or relating a print to a suspect is 4 points, other questions are worth 1 point.

- A.) This fingerprint was found inside the Fnatic Lounge. Who does it belong to? (4)



- B.) This fingerprint was lifted from the note stuck on the camera. Who does it belong to? (4)



- C.) This fingerprint was lifted from the Main Hallway doorhandle. Who does it belong to? (4)



D.) This footprint was discovered in the main hallway just before the Fnatic Lounge. Who does it belong to? (4)



- 1.) What is the NCIC classification of fingerprint A (1)
- 2.) How many deltas do Whorl's have? (1)
- 3.) What are minutiae? (1)
- 4.) What classification system does the US and other English speaking countries use, to classify fingerprints? (1)

Part E – Analysis

Based on the evidence that you analyzed, and the information given to you, answer the following questions, which pertain to the crime.

- 1.) Based on your evidence, who created the hole in the Fnatic Lounge, and who was the person who entered the Fnatic Lounge through the main hallway? Support your argument with evidence and reason. (12 points max/ 3 points for correctly identifying who did what)
- 2.) Based on your evidence, who wrote the note that was stuck to the camera, and who stuck the note to the camera? Support your argument with evidence and reason. (12 points max/ 3 points for correctly identifying who did what) (The same suspect could have done both)
- 3.) Based on your evidence, which individual(s) broke into, and trashed the Fnatic booth? Support your argument with evidence and reason. (12 points max/6 points for correctly identifying which individual(s) broke into the Fnatic lounge)
- 4.) Using evidence provide an explanation as to why you believe some suspects didn't commit any crime/ or if all suspects committed a crime, answer with (everyone committed a crime, and list what each person did) (7 points total)

5.) If any evidence could have been collected, or if any evidence could have been tested further, to better prove or disprove one of your claims what would it be? And Why? (7 points)

Crime Busters – Answer Sheet

School Name:	DO NOT WRITE IN THIS COLUMN
Team Number: B-_____	Penalties:
Student Names:	Raw Score:
Station #:	Rank:

Part A – Qualitative Analysis (ID = 5 points and Basis = 1 point / Questions = Vary) Total: 100 Points

Identity		How did you identify?/Basis
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
#	IDENTIFY ONLY	
11		
12		
13		
14		
15		

Part A - Cont.	
1	
2	
3	

Part C - Paper Chromatography (ID of suspect = 4 points, Questions = 1 point, 1 point for each completed and attached strip) Total : 10 points	
1	
2	
3	

Part B - Polymer Testing/ Natural and Man-made Substances (ID = 2 points, Basis = 1 point, Questions = vary) Total: 20 points		
Classification	Basis	
H1		
H2		
H3		
F1		
F2		
1		
2		
3		

Part D - Crime Scene Physical Evidence (ID= 4 points; Questions = 1 point) Total: 20 points	
1	
2	
3	
4	
5	
6	
7	
8	

Part E – Analysis Total : 50 points ((#) represents points for that question)	
1 (12)	
2 (12)	
3 (12)	
4 (7)	
5 (7)	

Team Number: B-_____

Mesa Robles Invitational 1/30/16

ATTACH CHROMATOGRAPHY STRIPS HERE
