

Forensics TEST

Clements High School

Names: _____, _____

Calling all stellar forensic teams!

Trophies for the Clements 2019 Invitational have been stolen, with 50 minutes remaining until the awards ceremony! Upon investigation, it turns out that Hearty Hart, the science olympiad sponsor and trophy-watcher, was “sleeping on the job” after a long night of dealing with pre-invitational antics. As he woke, he discovered a barren room, devoid of all the glistening trophies which had once inhabited the room.

We have gathered some suspect profiles for you to analyze and crack before the start of the awards ceremony:

1. Uptown Usanga: (previous science olympiad sponsor)

Interview: “What? Trophies were stolen? You see, this is what happens as soon as you don’t have me, the best sponsor, watching over you all! This turn of events is too unfortunate... Well, I’ve been very sick with a horrible cold and cough, so I definitely do not have the energy to be dealing with your antics!”

Possible Motives: Possibly wants shiny trophies to entertain her newborn child, perhaps some hidden vengeance towards the science olympiad team...

Physicalities:



- African american
- Loves to go to the gym, gym attire is what she wears on a near daily basis
- Loves to consume energy drinks to fuel her workouts
- Has a mild case of athlete's foot, very insecure about this fact.
- B+ blood
- Loves to meal prep, has characteristic containers for her food

2. Big Bad Wolfe: (the school’s band director)

Interview: “That’s quite unfortunate. It seems that now you’ll have more time to practice your instrument!”

Possible Motives: long standing feud with the school’s science olympiad organization, wishes more people cared about the band program

Physicalities:



- Caucasian

- Wears fuzzy, mildly coarse sweater on top of normal t shirts, also wears jeans
- Loves to “enjoy a cup of steaming coffee on a chilly day”
- Loves face masks and essential body bath salts, but seem to be ineffective for her complexion
- O+ blood

3. Hearty Hart: (current science olympiad sponsor)

Interview: “We need to find the trophies soon! ”

Possible Motives: is currently disappointed with the team’s lack of motivation, possibly wants to distract the team so that he has more time to grade his physics tests

Physicalities:



- Korean
- Wears jeans on a daily basis
- Eats Salt and vinegar chips everyday for lunch along with a glass of cold frothy milk, currently in love with eating mooncakes
- class room is always in a state of disarray, complains about needing to replace his overused chalkboard
- Recently went to buy bulk order of swim noodles along with the new glue order, motives are unclear, perhaps a pool party.
- AB - blood

4. Stealthy Stephan: (current scioly president)

Interview: “Whoever did this needs to pay. I was too busy during invitational prep, no way that I had even a spare minute to steal trophies.”

Possible Motives: Possibly wants shiny trophies to himself to put on display in his house with his other trophies

Physicalities:



- Mexican
- Loves to wear joggers
- Unexpectedly soft hearted, has a garden of succulents growing on his porch, tends to them every day, also is currently attempting to make the perfect chocolate souffle.
- AB+ blood

Powders--- [___/99pts]

1. Fill in the information regarding the powders found at the crime scene.

Powder	Identify [5pts each]	Chemical formula of the powder [1pt each]	Name ONE character that this powder could implicate. (suspects, victim, all or none) [3 pts each]
1			
2			
3			
4			
5			
6			
7			
8			
9			

2. Name two common uses for all prime numbered powders.

3. Draw the chemical structure for sucrose.

4. T/F: All disaccharides are reducing sugars.
 5. What element is considered a contaminant in many components and colors a flame during flame tests, what color does it taint the flame with?
 6. Describe how and why we can observe flame colors in a flame test. [3 pts]
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7. What is the formula for the precipitate formed by Epsom salts and sodium hydroxide?

Polymers--- [_____/49pts]

#	Characteristics	Polymer Name [3pts each]	Monomer formula [1pt each]	Relation to which suspect/s? [2pts each]
1	yellow flame, does not ignite/self-extinguishes; little/no smoke; plastic drips; does not char, soot, shrivels with heat. Pungent odor			
2	Fast burn, clean drips flame, white smoke. Not very glossy surface, scratches easily. Density 0.92g/cm ³			
3	Yellow flame, burns quickly, plastic drips, illuminating gas odor (naphtha), dense black smoke w/ soot			

4	Fast burn, clean drips flame, white smoke. Not very glossy surface, scratches easily. Density 0.95g/cm ³			
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1. Describe the differences between thermosets and thermoplastics.

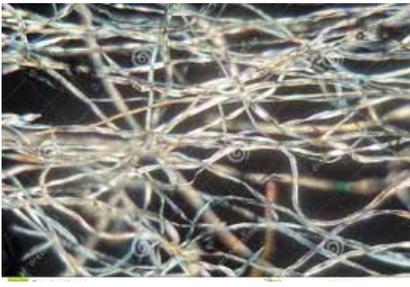
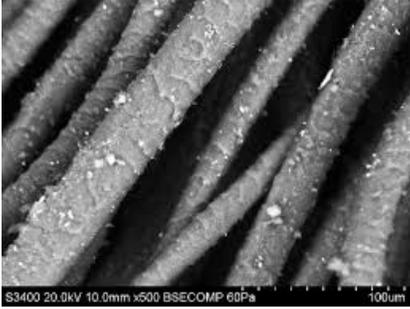
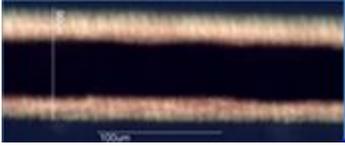
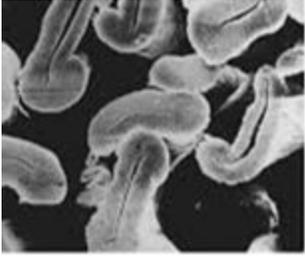
2. The plastic sample floats in water and rubbing alcohol, but not in oil. What is it? (2pts)

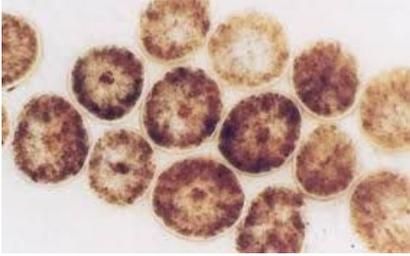
3. Give the SPI (resin code for PVC, PS, PETE, LDPE, HDPE, and PP and give an example of each use.

Fibers/Hairs --- []/

Specimens 1,2,3,6 were found at the crime scene.

	Image	Fiber/Hair (2pts each)	If fiber, specify kind of fiber (vegetable, synthetic, animal); if

			hair write "N/A" (1pt each)
1			
2	 <p>S3400 20.0kV 10.0mm x500 BSECOMP 60Pa 100um</p>		
3			
4			
5			

6			
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1. Describe why cotton develops its convolutions, and name the process that reduces these convolutions.

2. T/F: The gender, but not age, can be found through microscopic examination of an individual's hair.

3. What does the "6-6" designation mean in nylon 6-6 ?

4. What was the first synthetic fiber?

Fingerprints ---

1. What does AFIS stand for?

2. How are friction ridges formed?

3. Who was the first person to be criminally convicted based on fingerprint evidence?[BONUS3]

4. Fingerprint 3 from below was found on a notecard, what development method should we use to best see/uncover this fingerprint?

5. What is the layer of skin situated just above the dermis?

6. What is the study of fingerprint identification called? (2pts)

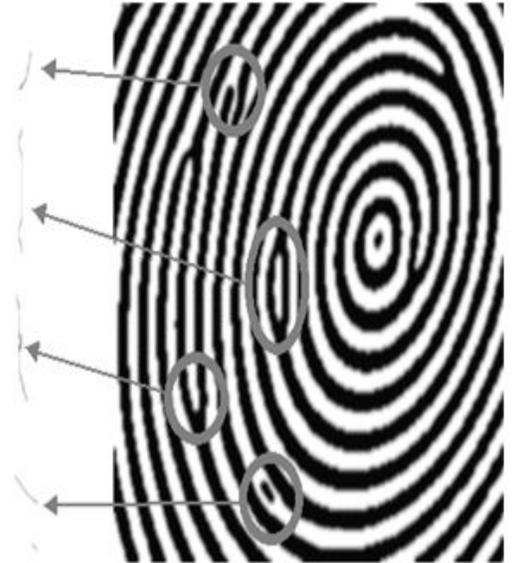
7. Identify the minutiae. (2pts per minutiae)

a. _____

b. _____

c. _____

d. _____



8. The following fingerprint was found at the crime scene. Who do you think this



implicates?

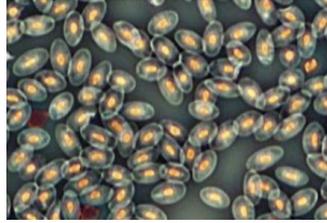
9. What component of a fingerprint does ninhydrin react with to develop a print? (1pt)

Entomology ---

1. What is ADH?
2. What is algor mortis?
3. What are the stages of decomposition?

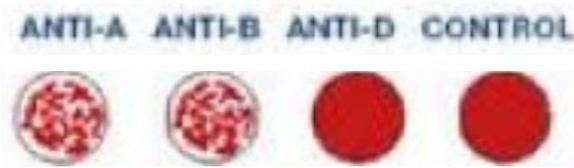
4. Which insects are the first after 24 hrs to come in contact with the carrion? (circle one.)
- a. Blowflies
 - b. Beetles
 - c. Moths
 - d. Fleshflies
- 5.

Blood ---



1. What kind of blood smear is this?
2. What is erythroblastosis fetalis?
3. What is luminol? Why is it used in investigations?
4. A blood spatter hits the ground, making a spatter that is 5.3cm long and 2.43 cm wide. Calculate the angle that it hit the ground. Show your work.
5. What is blood's universal donor?
6. How are blood types determined?

7. This is the blood that was found at the scene. From this, who do you think this sample was derived from?



DNA ---

1. When was DNA fingerprinting invented? By whom?
2. What is PCR? Name and briefly describe its steps.
3. When was DNA fingerprinting commercialized?
4. There were originally 5 original sequences of DNA, after 3 cycles, how many copies have been made total? Show your work.
5. What does VNTR stand for?
6. How many molecules of DNA would be produced after 5 cycles of PCR? Show your work.
7. How many STR loci has the FBI chosen to serve as the standard for CODIS?
8. What is one difference between STR analysis and RFLP analysis?
9. What is the difference between VNTR's and STR's?
- 10.

