

# Crime Busters

## Ladera Vista Invitational

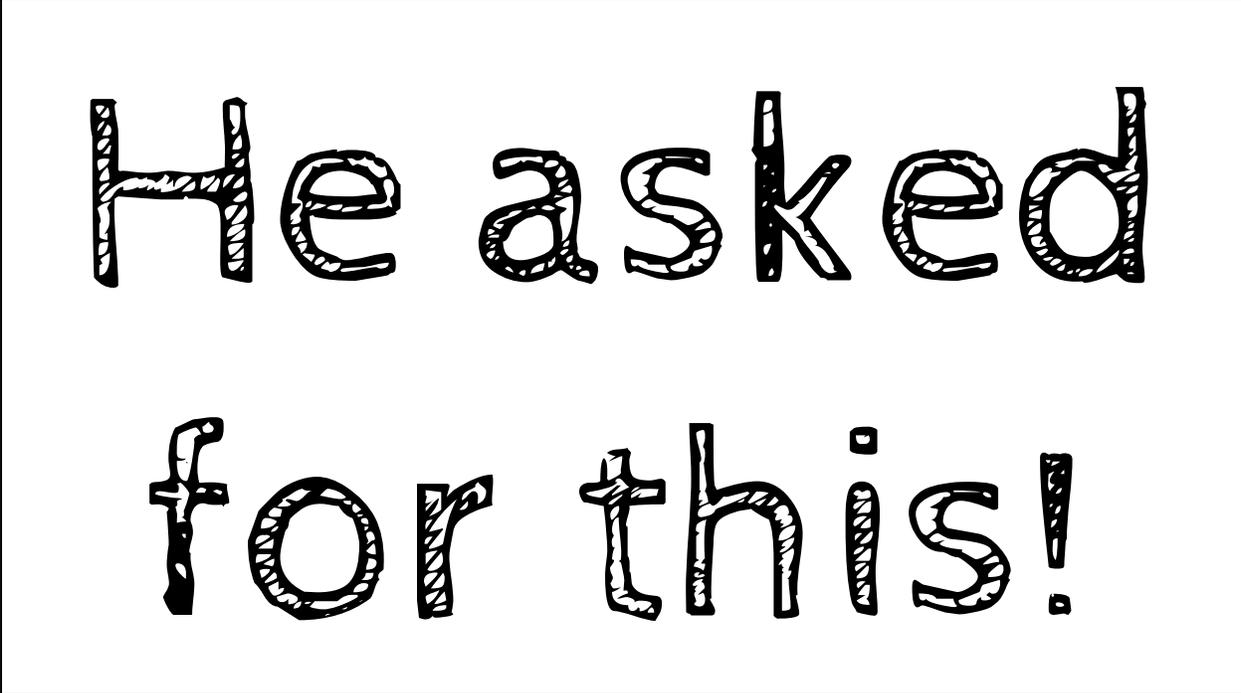
### Answer Key

Names: \_\_\_\_\_  
\_\_\_\_\_

Team Number: \_\_\_\_\_

School: \_\_\_\_\_

'Twas a dark, gloomy night, but the night was still young. John Mitch, Michelle James, Jane Strange, and Luke Strung were friends since grade school. They decided to have a party to celebrate how long they have been friends. They invited everyone they know. They played games and ate A LOT of food. Suddenly they hear a loud scream. They found John Mitch lying in a pool of blood. By his foot, there was a piece of paper. Jane strange picked it up and it read:



He asked  
for this!

When the police came to the scene, they discovered that the perpetrator left some white residue behind. It looked like some powders, fibers, and fingerprints. The police were able to narrow it to three suspects Michelle, Jane, and Luke. The three suspects were all at the party that night. It's up to you to find out who the murder is by using the evidence from the crime scene. Good luck!

Evidence found at the scene:

10 unknowns

Ink sample from the paper

3 fingerprints

Suspects:

**Michelle James:**

Michelle is 39 years old, she likes to bake. She has a sweet tooth for cakes. At the party, all she ate were the cakes. There were traces of flour, baking soda, and sugar on her. She was wearing a cotton sweater with Pen A in her pocket. She lives in a house with 3 dogs. The police found one dog hairs attached to her sweater. John Mitch was her ex-boyfriend in high school.

Fingerprints:



Thumb

Index Finger

Middle Finger

Ring Finger

Pinky

**Jane Strange:**

Jane is 38 years old, and she likes to surf. She was wearing a long sleeve shirt and polyester yoga pants to the party. She used Pen B to write the invitations. Her hair had traces of salt, sand, and her hair was still damp. In high school Jane had some beef with John because John broke up with her best friend back then, Michelle.

Fingerprints:



Thumb

Index Finger

Middle Finger

Ring Finger

Pinky

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## Ladera Vista Invitational

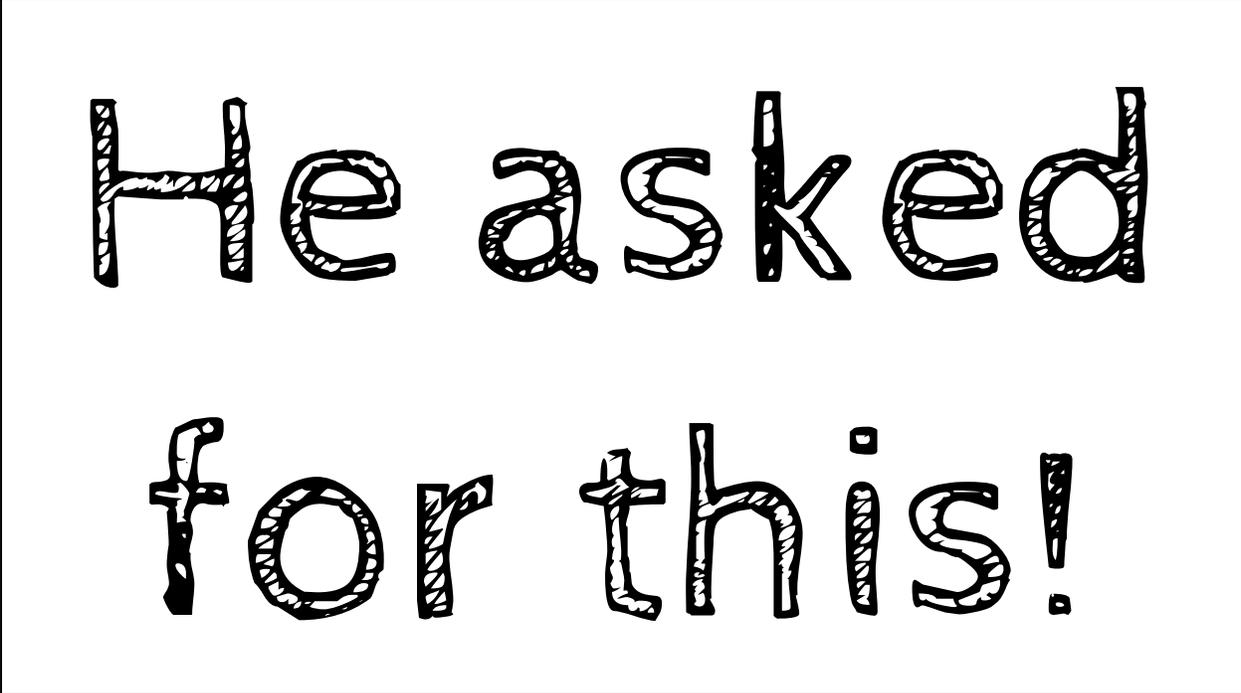
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Team Number: \_\_\_\_\_

School: \_\_\_\_\_

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Suspects:

**Michelle James:**

Michelle is 39 years old, she likes to bake. She has a sweet tooth for cakes. At the party, all she ate were the cakes. There were traces of flour, baking soda, and sugar on her. She was wearing a cotton sweater with Pen A in her pocket. She lives in a house with 3 dogs. The police found one dog hairs attached to her sweater. John Mitch was her ex-boyfriend in high school.

Fingerprints:



Thumb

Index Finger

Middle Finger

Ring Finger

Pinky

**Jane Strung:**

Jane is 38 years old, and she likes to surf. She was wearing a long sleeve shirt and polyester yoga pants to the party. She used Pen B to write the invitations. Her hair had traces of salt, sand, and her hair was still damp. In high school Jane had some beef with John because John broke up with her best friend back then, Michelle.

Fingerprints:



Thumb

Index Finger

Middle Finger

Ring Finger

Pinky

**Luke Strange:**

Luke is 37 years old and he like to play sports. He was wearing gym shorts, and a tank top. He brought his duffle bag to the party because he just came from the gym. Luke only drinks lemon powerade. He sweats a lot and uses a wool towel to wipe his sweat. He works at an animal shelter. Luke was John’s best friend in highschool when they had a falling out because they fought over a girl.

Fingerprints:



**Part A: Qualitative Analysis**

Unknown	2 ways you got the unknown	Who does this implicate?
1. Cornstarch/ baking soda	Answers may vary	Michelle James
2. Salt		Jane Strung/Luke Strange
3. Sand		Jane Strung
4. Sugar/ Flour		Michelle James
5. Lemon juice		Luke Strange
6. Water		Jane Strung
7. Cotton		Michelle James
8. Wool		Luke Strange
9. Cat hair		Luke Strange
10 Dog hair		Michelle James

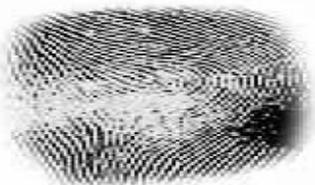
**Part B: Chromatography**

Tape Chromatography paper that matches the one with the crime scene pen.

1. Who does this implicate?

**Michelle James**

**Part C: Fingerprints**

Fingerprint at crime scene	What type is this?	Who does this implicate?
	<b><u>Tented arch</u></b>	<b><u>Michelle James</u></b>
	<b><u>Radial Loop</u></b>	<b><u>Michelle James</u></b>
	<b><u>Ulnar Loop</u></b>	<b><u>Luke Strange</u></b>

## **Part D: Short Answer**

1. What are two common uses for Unknown #2?

ANSWERS MAY VARY

2. What is the Chemical Formula for Unknown #4?

Flour: n/a

Sugar: C<sub>12</sub> H<sub>22</sub> O<sub>11</sub>

3. What is the Chemical Formula for Unknown #1?

Cornstarch: C<sub>27</sub>H<sub>48</sub>O<sub>20</sub>

Baking Soda: NaHCO<sub>3</sub>

4. Which liquid is the most basic?

Ammonia

5. Which liquid is the most acidic?

Lemon juice

6. Name 2 common things PETE is used for.

Answers can vary

7. Name the plastics that sink in water.

PETE, PVC, PS

8. Name the plastics that float in water.

HDPE, LDPE, PP

9. What is R<sub>f</sub> stand for and mean?

Retardation factor: the fraction of an analyte in the mobile phase of a chromatographic system

**Part E: Analysis**

Please use this page and the back page if needed to write you analysis.

Michelle James