

Name: _____



CSI SFC - THE CASE OF THE BAKEOFF MURDER MYSTERY



Purpose:

- In this lab, you will compare the properties of four known materials with two samples of “evidence.”
- Although your materials and equipment are less complex than those used by the CSI forensic chemists, your overall method will be similar to the methods they use.

Pre-lab questions:

1. What type of property looks only at the **appearance or behavior** of the material? _____
2. What type of property will a chemist use to see how the material will **react**? _____
3. What type of change will keep the material’s appearance **the same**? _____
4. What type of change will **create a new substance**? _____

It was the finals of the Bakeoff and there were only three contestants left after the grueling Bundt Cake round. The three finalists included:

- 1) Six-time defending champion Betty Crocker, a grandmotherly woman who always baked fresh cookies for the judges.



- 2) Row Dee, a rotund, surly, slightly balding mama’s boy with dainty hands, shifty eyes and the smell of licorice and sauerkraut.



- 3) Martha Stewart, a bitter ex-con that always left a whiff of potpourri in the air.



On the morning of the second day, the body of Betty Crocker was discovered. Next to her body were two piles of white powder, **one near her head and one by her feet**. On the kitchen counter there were containers of baking soda, salt, cornstarch, and baby powder haphazardly strewn around. Upon investigation, the other two finalists were interrogated and body-swabbed (clothing/shoes) for evidence, and are currently the prime suspects in the case. A mysterious powder was detected on each of their shoes, similar to the piles recovered next to the corpse of Mrs. Crocker.

COMMERCIAL BREAK: HUM THE THEME FROM “JEOPARDY”

Now, you must conduct a chemical analysis of the unknown powder mixtures found near the dead body and on the shoes of the suspects.

Step 3: Now that you have identified and determined the physical and chemical properties of the four materials, you need to calculate the number of possible combinations of the 4 powders.

Use these abbreviations: Salt (S), Baking Soda (BS), Cornstarch (CS), and Baby Powder (BP).

List combinations with 2 powders	List combinations with 3 powders	List combinations with 4 powders	TOTAL # combinations
		BS + S + BP + CS	

Step 4: You must now test the unknown powder mixtures to determine their physical and chemical properties

- Using the spot plate, put a pea size blob of mixture in beaker A in each reservoir.
- Add 1-2 drops of water to one blob and record any observations on the following table.
- Add 1-2 drops of vinegar to the second blob and record your observations in the table.
- Finally, add 1-2 drops of iodine solution to the final blob and record observations.
- CAREFULLY WASH and DRY** the spot plate – cross-contamination from sloppy lab clean-up will result in false conclusions.
- Repeat the process for the other 3 mixtures in beakers B, C, D.
- BE SPECIFIC – USE YOUR SENSES ... these observations will determine your success in solving this crime.**

Beakers	Combinations	Water	Vinegar	Iodine	Smell	Feel
A	Powder Found Near Victim's Head					
B	Powder Found Near Victim's Feet					
C	Powder from Row Dee's shoes					
D	Powder from Martha Stewart's shoes					

Now you must take on the task of identifying the unknown material that was found on the floor and on the shoes of the two suspects. Once you identify that material, you can compare it to the powder taken from the shoes of Martha Stewart and Row Dee.

Step 5: Conclusions: Answer the questions based on your evidence from the table.

6) Were you able to determine a match from the crime scene (powder from a floor sample and powder from a suspect's shoes)? EXPLAIN HOW YOU DETERMINED YOUR ANSWER!!

7) Was there cornstarch in following the mixtures? {Yes/No}

Powder by **Victim's Head** _____

Powder by **Feet** _____

Powder on **Row Dee's shoes** _____

Powder on **Martha's shoes** _____

How did you determine this? _____

8) Finish the story on a **separate piece of paper.**

- Starting at the COMMERCIAL BREAK, you will assume the role of the detective Vinnie Rotini, in solving this heinous crime against cake lovers of the world.
 - Describe the chemical and physical properties of the individual substances.
 - Tell about the identity of the mysterious powders taken as evidence.
 - How you determined who was guilty.
 - What was the motive for the crime and how the crime took place.
 - How the guilty person should be punished.



- Be creative
- Stories must be 2-3 paragraphs in length. A GOOD paragraph has at least 5 sentences; which includes a topic sentence!

Lab and story due: _____