

**Label all unknowns by their number below. Competitors do not have to give full names to earn points. For instance, "Huey" and "Springsteen" are both permissible for #12.**

**Powders, Liquids, and Metals (35pts)**

1. Cornstarch (2pts)
2. Baking soda/sugar (2pts each)
3. Vitamin C (2pts)
4. Gelatin (2pts)
5. Alka-seltzer (2pts)
6. Calcium carbonate (2pts)
7. Cornstarch (2pts)
8. Hydrogen peroxide (2pts)
9. Ammonia (2pts)
10. Aluminum (2pts)
11. Zinc (2pts)
12. Huey Springsteen (1pt)
13. Huey Springsteen (1pt)
14. Taylor Goulding (1pt)
15. Jay McCartney (1pt)
16. Taylor Goulding (1pt)
17. Taylor Goulding (1pt)
18. Huey Springsteen (1pt)
19. Nicki West (1pt)
20. Nicki West (1pt)
21. Jay McCartney (1pt)
22. Bruno Ronson (1pt)

32. Nicki West (1pt)
33. Bruno Ronson and Taylor Goulding (.5pts each)
34. Nicki West (1pt)

**DNA, Soil, and Chromatography (10pts)**

35. Taylor Goulding (2pts)
36. Clay (2pts)
37. No one (is from the brick) (2pts)
38. Taylor Goulding (2pts)

All five chromatograms are attached to page 3 of answer sheet (2pts)

**Short Answer (12pts)**

39.  $\text{NaHCO}_3$  (2pts)
40. Ammonia (2pts)
41. Retention factor (2pts)
42. Polymerase chain reaction (2pts)
43. Denaturation, annealing, extension (2pts)
44. SR (2pts)

**Plastics, Fibers, and Hairs (12pts)**

23. HDPE (1pt)
24. PP (1pt)
25. PVC (1pt)
26. Animal [Wool] (1pt)
27. Vegetable/Plant [Cotton] (1pt)
28. Cat hair (1pt)
29. Bruno Ronson and Jay McCartney (.5pt each)
30. Taylor Goulding (1pt)
31. Bruno Ronson (1pt)

## Crime Scene Analysis (21pts)

**Taylor Goulding** is a strong suspect. She is implicated by the Vitamin C (.5pt), Alka-seltzer (.5pt), and calcium carbonate (.5pt), as she commonly administers all three. PP (.5pt) was found at the crime scene, which implicates her because medicine bottles are made from PP. The vegetable fiber (.5pt) found implicates her because her uniform is made of cotton. The DNA (.5pt) found matches hers. Her pen was used to write the note (.5pt). Taylor has no apparent motive (.5pt). However, Taylor had not visited Marley's for over two months, so the evidence found for her would not be expected to be found there (1pt).

**Bruno Ronson** is a plausible suspect. The zinc (.5pt) found at the crime scene implicates him because zinc is used in paint and electrical equipment. The HDPE (.5pt) and PVC (.5pt) implicate him because they are both used to make pipes. The vegetable fiber (.5pt) may implicate him because his uniform is made of cotton. Ronson claims that Marley's takes up lot space that belongs to his store (.5pt). However, Ronson "routinely comes over to Marley's", so any evidence found for him would be expected to be found at the crime scene (.5pt).

**Nicki West** is a plausible suspect. The ammonia (.5pt) implicates her because it is used in cleaning. The hydrogen peroxide (.5pt) implicates her because she uses it to clean cuts. The cat hair (.5pt) implicates her because she is the only suspect who has cats. The animal hair (.5pt) implicates her because she wears a wool sweater to work. Nicki has asked for a pay raise from Marley, but he refuses (.5pt). Nicki works at Marley's, so her evidence is not conclusive (.5pt).

**Huey Springsteen** is a weak suspect. The cornstarch (.5pt), baking soda (.5pt), and sugar (.5pt) implicate him because he is a cook. Huey has talked of buying an electric guitar to Marley (.5pt). However, no other evidence was found on him, and he visits Marley quite often (.5pt).

**Jay McCartney** is a weak suspect. The gelatin (.5pt) implicates him as he makes gelatin quite often. The aluminum (.5pt) and HDPE (.5pt) found both implicate him because they are used in car manufacturing. He claims the prices at Marley's are too high (.5pt). However, he has very little evidence, and he is a routine visitor to Marley's (.5pt).

Taylor Goulding is most likely to have committed the crime (5pts). She has more evidence than anyone else, and is the only suspect whose evidence would not be expected to be at the crime scene.