Name _____ Date: _____
Partner(s): _____

DRUG ANALYSIS

Introduction:
It is essential that drug samples obtained from suspects are identified conclusively. Positive identification of a drug requires matching the unknown sample with a known sample of the drug. In this activity, students will prepare known samples of the drug to be tested (positive control) and a blank sample containing no drug (negative control). The positive and negative controls will be used for drug comparison and identification. The "drug" we will be testing is Bertinol®, a dangerous and addicting drug that, over time, destroys the liver and intestines. The test for the identification of a drug employs a chemical indicator that changes color in the presence of the drug.

Scenario:

Because of a recent incident involving the sale of the illegal drug Bertinol to high school students, a "drug dog" was used to detect drugs in the lockers of four suspects. The police dog did detect the presence of white powders in the lockers of the four suspects. Did this white powder contain the drug Bertinol? The drugs were confiscated and sealed in a plastic vial. The evidence vials were sent to the lab for positive identification. Your task is to perform a drug test using a chemical indicator for the drug Bertinol. You will need to report your findings to the police. If any of the white powders test positive for Bertinol, the police will have reason to bring in the suspect(s) for further questioning.

Safety Precautions:
All materials used in this activity are harmless, but it is essential to maintain appropriate techniques in handling all samples. **1.Wear your goggles while working with chemicals. 2.Wash your hands & skin if you come in contact with any chemicals. 3. Never ingest or inhale any chemical substance. 4. Treat all samples as if they were actual samples of the drug and maintain the chain of custody. 5. Dispose of all materials in the manner described by your instructor.**

Vocabulary:

- Positive control A known sample of the material tested with the chemical indicator used to show a reaction of the known material.
- Negative control (blank) A sample that does not contain the drug to be tested and should therefore yield a negative test.

Materials:

- 1 chemical testing well tray
- positive control vials containing the drug Bertinol
- negative control vials containing a white powder that does not contain Bertinol
- 4 evidence vials containing white powder residues obtained from each of the 4 suspects
- White piece of paper
- 6 flat wooden stirrers
- 50 mL ethyl alcohol (or rubbing alcohol)
- Dropper bottle of Bertinol drug testing solution

Part A: Creating the Positive and Negative Controls

1. Place a white piece of paper under your well tray for labeling purposes.
2. Label one well for the Positive Control and one for the Negative Control.
3. Place a drop of rubbing alcohol into each well.
4. Using the broad, flat side of a wooden stirrer, remove a pinhead-sized amount of Bertinol from the vial labeled Positive Control. Add this pinhead-sized amount of Bertinol to the well labeled Positive Control.
5. Using the broad, flat side of a new wooden stirrer, remove a pinhead-sized amount of the white powder from the vial labeled Negative Control. Add this pinhead-sized amount of white powder to the well labeled Negative Control.
6. Add three drops of Bertinol drug testing solution to the Negative Control well.
7. Add three drops of Bertinol drug testing solution to the Positive Control well.
8. Observe and record any color changes in the Data Table.
9. Save these well results for comparison with the suspects' samples in Procedure B.

Part B: Comparing Samples

1. Label four other wells on the same tray as follows: 1, 2, 3, and 4 (for the evidence found in the four Suspect's lockers)
2. Place a drop of rubbing alcohol into each well.
3. Using a clean, new wooden stirrer, transfer a pinhead-sized amount of the white powder from Evidence Vial #1 to your well labeled Suspect 1. Leave the wooden stirrer with the Suspect 1 well. It will be used later for stirring.
4. Repeat the above procedure for each of the other Evidence Vials (*ex. Suspects 2, 3 and 4*).
5. Leave the wooden stirrers with the suspect wells to stir the contents until dissolved. *(*Be careful not to mix up the wooden stirrers!*)
6. Add three drops of Bertinol drug testing solution to each of the four wells and stir with the individual wooden stirrers.
7. Observe any color changes. Record your results in the Data Table below.
8. Compare the wells with the Positive Control and Negative Control well results. *Do any of the evidence powders obtained from the four suspects contain the drug Bertinol?*
9. Answer the analysis questions and follow the clean-up procedures.

Data Table: Drug Analysis

Sample	Color of Solution
Positive Control	
Negative Control	
Suspect 1	
Suspect 2	
Suspect 3	
Suspect 4	

Questions:

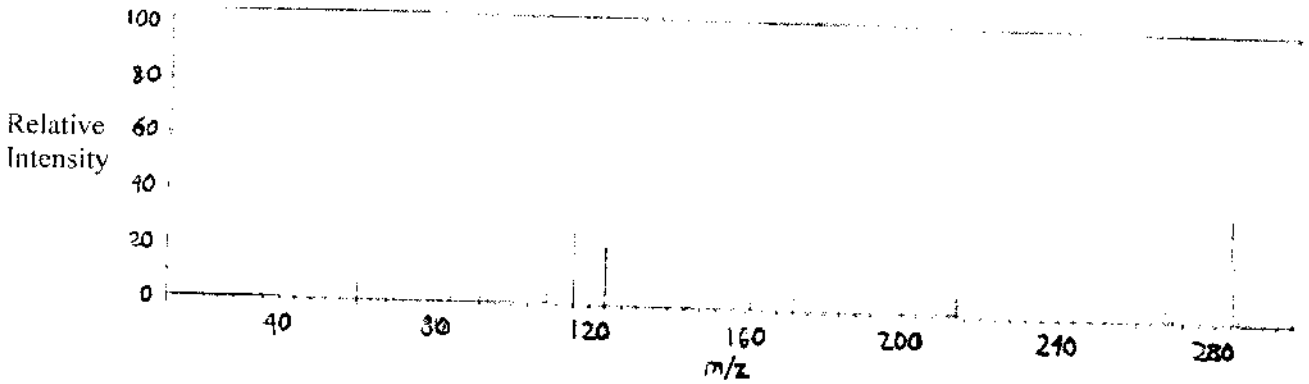
1. Explain the role of the positive and negative controls.

2. Did any of the four suspect white powders test positive for the presence of the drug? Explain how you know.

3. When all students in a class compared their results, they found all but one group had identical results. Determine three possible sources of error in technique that might have produced the difference in results.

4. A student noted that when class results were compared, not every group had the same shade of color in their vials. What might account for the differences in color intensity?

5. A Forensic Toxicologist gets a positive color for the presumptive color test. Using a mass spectrometry to confirm, the following mass spectra was produced:



- Use the know mass spectra below and identify what your drug sample above actually is:

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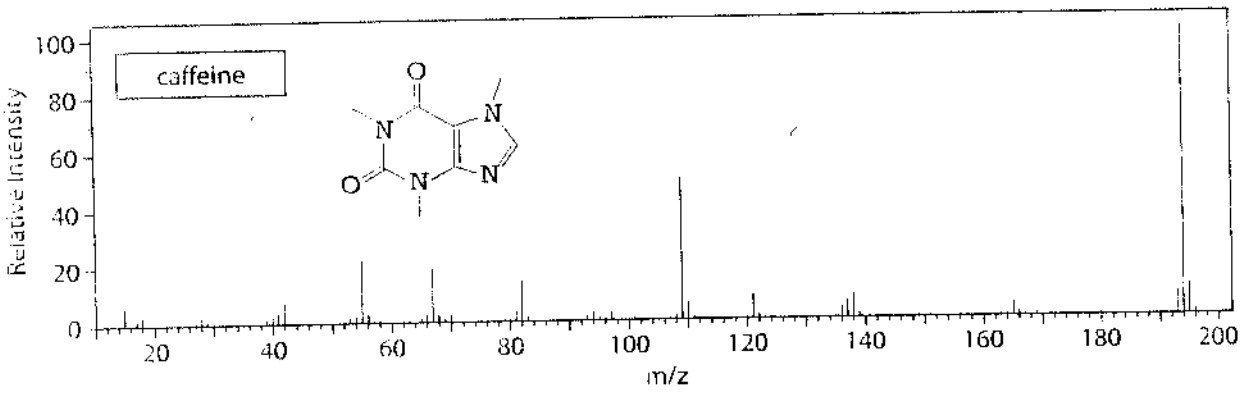
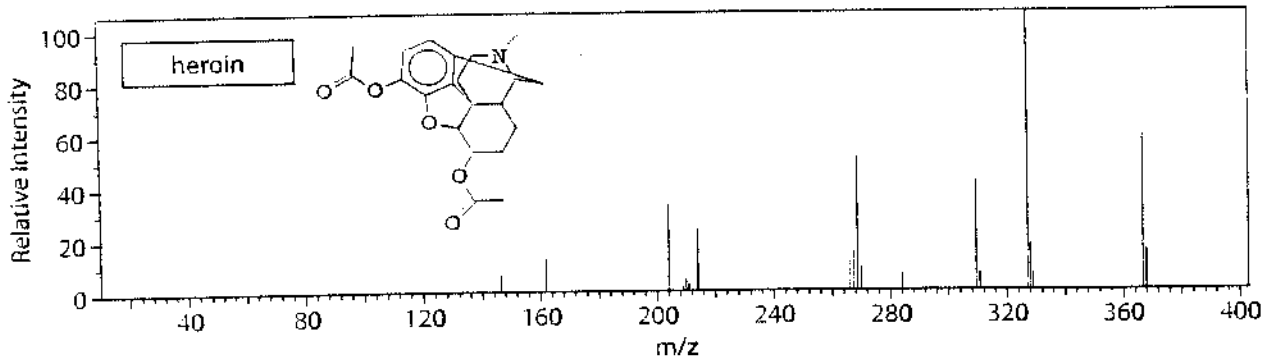
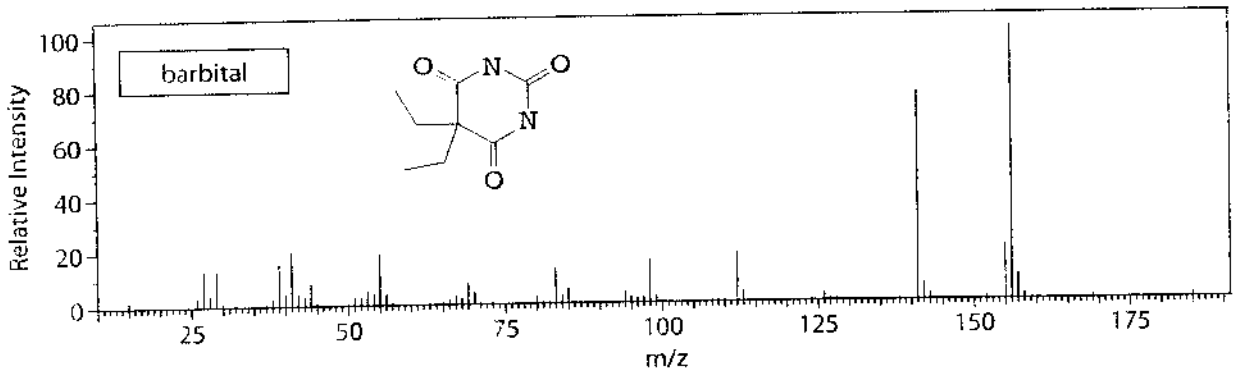
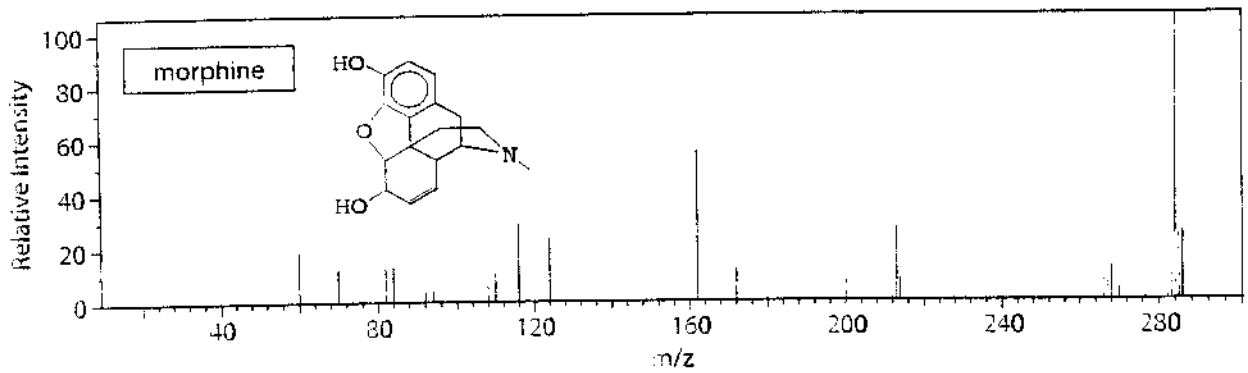
APPENDIX E

Mass Spectra









Source: www.aist.go.jp/RIODB/SDBS