

Name _____

Honors Chemistry

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The Strange Case of Mole Airlines Flight 1023**Scene of the Crash**

At 6:02 a.m. you and your team of medical examiners are called to the scene of a plane crash. You find evidence of a pre-crash explosion. At the site of the explosion a material has been found. Subsequent chemical analysis shows: C 37.01%, H 2.22%, N 18.5%, O 42.27%. The mangled passengers are found in and around the crash. They must be identified by the substances found in their belongings or in their bodies, since they are not recognizable and their dental records are not available. Upon further investigation one passenger was suspected of having been murdered before the crash: the time of death was approximated at one hour prior to the crash

Table 1. Percent Composition Data of the Compounds Found in or with the Passengers' Bodies

Passenger	Compound Analysis (%)				Location
	C	H	N	O	
1	72.15	7.08	4.68	16.03	Pockets (2000 tablets)
2	67.31	6.98	4.62	21.10	Blood
3	60.00	4.48	---	35.53	Pocket
	63.56	6.00	9.27	21.17	Pocket
4	63.15	5.30	---	31.55	Face
	46.66	4.48	31.1	17.76	Stomach
5	57.14	6.16	9.52	27.18	Pockets
6	75.42	6.63	8.38	9.57	Blood
	37.01	2.22	18.5	42.27	Pockets
7	80.48	7.45	9.39	2.68	Pockets
	81.58	8.90	9.52	---	Pockets
8	15.87	2.22	18.15	63.41	Blood and pockets

Table 2. Possible Compounds

Identity	Formula	Notes
Codeine	$C_{18}H_{21}NO_3$	Pain-killer, prescription-controlled
Cocaine	$C_{17}H_{21}NO_4$	Narcotic, illegal
Aspirin	$C_9H_8O_4$	Pain-killer
Aspartame	$C_{14}H_{18}N_2O_5$	Artificial sweetener
Vanilla	$C_8H_8O_3$	Flavoring
Trinitrotoluene	$C_7H_5N_3O_6$	Explosive (TNT- dynamite)
Nitroglycerine	$C_3H_5N_3O_9$	Explosive, heart medication
Curane	$C_{40}H_{44}N_4O$	Poison
Thiobromine	$C_7H_8N_4O_2$	Chocolate (flavoring)
Strychnine	$C_{21}H_{22}N_2O_2$	Rat poison
Dimetacrine	$C_{10}H_{13}N$	Prescription drug, antidepressant
Acetaminophen	$C_8H_9NO_2$	Pain-killer (Tylenol)

Table 3. Personal Data

Passengers and Crew	Notes
Armando Sallavanti	Has a heart condition
Tony Scarnato	Pharmacist
Deborah Killino	Baker
Erin Spikes	Teacher, addicted to sugar free soda
Marcellus Willis	Professional athlete, just suspended for drug violations
Paula Flowers	Environmental engineer, severely depressed
Anthony Zambetti	Suspected drug dealer
Benji Domiano	Suspected leader of a terrorist organization

Your Job:

1. Use the percent composition data in Table 1 to determine formulas for the compounds found with or in passengers. Match these formulas with the identity of each compound listed in Table 2.
2. Use the personal data in Table 3 to make a probable identification of each passenger. Record the identifications on the Worksheet. The solution to the puzzle in every case the one that the evidence points to by logical deduction.
3. Using the Worksheet below, figure out who was murdered and who is the most probable murderer.

Passenger	Most Probable Identity
1	
2	
3	
4	
5	
6	
7	
8	
<p>_____ was murdered by _____</p>	