

The Case of the Mislabeled Chemicals Name \_\_\_\_\_

Block \_\_\_\_\_ Date \_\_\_\_\_

The shipment of chemicals you have been waiting for all week has just arrived to the receiving warehouse at your company. You walk down to verify the shipment, humming the T-Swift song you heard on the radio this morning, as a crazed man suddenly bursts through the double doors in front of you. "That will teach 'em. Yes, yes, that will teach them alright." He cackles as he runs by you, looking over his shoulder at you as he goes by. Wasn't that Jerry from accounting? You think to yourself as you continue towards the receiving room.



Once in the receiving room, you notice all of the warehouse workers are standing around the package that just arrived with obvious concern on their faces. "Well, these are worthless now." Says one of the workers. "No way of knowing what's what." Says another.

Jerry, in response to being ridiculed for wearing zuba pants and a One Direction t-shirt on casual Friday, has removed all of the labels from your chemical shipment and replaced them with riddles. It is up to you to determine which chemical is which using your knowledge of molar conversions. Once you have identified the compound present in the sample, determine the proper chemical name that should be placed back on the chemical's container. You can work with your lab associate to solve this dilemma, but no one else since they do not have knowledge of the chemicals you were using for your experiments.



**Directions:** All Jerry has left are clues as to how many moles, molecules, or atoms are present in your samples. It will be up to you and your lab partner to figure out what chemical each sample is composed of using your knowledge of molar conversions. Do not consult other lab workers, as they are using different chemicals and cannot help you figure out which of the chemicals in your shipment is which. Be sure to use at least **2 decimal places** for your molar masses!



**Shipment #1 for Abbott Pharmaceuticals:**

Shipment contains  $\text{Fe}(\text{NO}_3)_3$ ,  $\text{Na}_2\text{CO}_3$ ,  $\text{MnCl}_2$ , and  $\text{K}_2\text{SO}_4$

**Unknown Chemical #1**

- 1) ***Jerry's note: This sample contains  $5.07 \times 10^{21}$  molecules. Too bad you'll never know what kind!***

***Sample weight = 1.06 g***

**Chemical Name** \_\_\_\_\_

- 2) ***Jerry's note: This sample contains 0.0159 moles. If only you knew what it was, Bahahaha!***

***Sample weight = 1.69 g***

***Chemical Name*** \_\_\_\_\_

- 3) ***Jerry's note: This sample contains  $1.90 \times 10^{22}$  oxygen atoms. That really narrows it down!***

***Sample weight = 0.850 g***

***Chemical Name*** \_\_\_\_\_

- 4) ***Jerry's note: This sample contains  $4.80 \times 10^{21}$  molecules. But of what?! Hahaha... cough...cough...ahahahaha!***

***Sample weight = 1.39 g***

***Chemical Name*** \_\_\_\_\_

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**Shipment #2 for Fluka Pharmaceuticals:**

Shipment contains  $\text{AlCl}_3$ ,  $\text{KNO}_3$ ,  $\text{Pb}(\text{NO}_3)_2$ , and  $\text{Ca}(\text{OH})_2$

**Unknown Chemical #1**

- 1) ***Jerry's note: This sample contains  $8.61 \times 10^{21}$  molecules. Too bad you'll never know what kind!***

***Sample weight = 1.06 g***

**Chemical Name** \_\_\_\_\_

- 2) ***Jerry's note: This sample contains 0.0167 moles. If only you knew what it was, Bahahaha!***

***Sample weight = 1.69 g***

***Chemical Name*** \_\_\_\_\_

- 3) ***Jerry's note: This sample contains  $9.27 \times 10^{21}$  oxygen atoms. That really narrows it down!***

***Sample weight = 0.850 g***

***Chemical Name*** \_\_\_\_\_

- 4) *Jerry's note: This sample contains  $6.28 \times 10^{21}$  molecules. But of what?! Hahaha... cough...cough...ahahahahaha!*

*Sample weight = 1.39 g*

*Chemical Name* \_\_\_\_\_



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**Shipment #3 for Sigma Aldrich Pharmaceuticals:**

Shipment contains NaCl, MnCl<sub>2</sub>, Al(NO<sub>3</sub>)<sub>3</sub>, and MgSO<sub>4</sub>

**Unknown Chemical #1**

- 1) ***Jerry's note: This sample contains  $5.30 \times 10^{21}$  molecules. Too bad you'll never know what kind!***

***Sample weight = 1.06 g***

**Chemical Name** \_\_\_\_\_

- 2) ***Jerry's note: This sample contains 0.0289 moles. If only you knew what it was, Bahahaha!***

***Sample weight = 1.69 g***

***Chemical Name*** \_\_\_\_\_

- 3) ***Jerry's note: This sample contains  $2.16 \times 10^{22}$  oxygen atoms. That really narrows it down!***

***Sample weight = 0.850 g***

***Chemical Name*** \_\_\_\_\_

4) ***Jerry's note: This sample contains  $6.65 \times 10^{21}$  molecules. But of what?! Hahaha... cough...cough...ahahahahaha!***

***Sample weight = 1.39 g***

***Chemical Name \_\_\_\_\_***

**Key #1**

- 1)  $\text{MnCl}_2$
- 2)  $\text{Na}_2\text{CO}_3$
- 3)  $\text{Fe}(\text{NO}_3)_3$
- 4)  $\text{K}_2\text{SO}_4$

**Key #2**

- 1)  $\text{Ca}(\text{OH})_2$
- 2)  $\text{KNO}_3$
- 3)  $\text{AlCl}_3$
- 4)  $\text{Pb}(\text{NO}_3)_2$

**Key #3**

- 1)  $\text{MgSO}_4$
- 2)  $\text{NaCl}$
- 3)  $\text{Al}(\text{NO}_3)_3$
- 4)  $\text{MnCl}_2$

