Jarah a Concentrate on the Solution

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- CHARRY

1010 Now have been appointed as one of the managers in charge of your job is

school farm. This job takes the place of one of your elective classes this year. Your job is to monitor, manage, and supply the nutrients needed to produce a high-quality vegetable crop. Vegetables from your school farm are sold each week at your local farmers market to raise money for school field trips, clubs, and sports. Your teacher has submitted soil samples to the lab and results show various nutrient deficiencies. You have been instructed to analyze the following information to show your teacher that you are ready to tackle the responsibilities of your new job and are prepared to develop a solution to your nutrient deficiency problems.

Our Challenge

Nutrient deficiency: Phosphorus

Supplemental nutrient amount needed: 40 ppm

Step 1

Look at the possible fertilizer compounds on the chart. Select two compounds that you think would supplement the nutrients you need.

Find the molecular mass of each of your chosen fertilizer compounds. Do this by adding the individual atomic weights for each element. (Show your work)

Molecular mass \$ * 97. 964*

Compound Phosphonic Compound Monopotassium Acid-H₃PO₄ Phosphate KH_2 PO₄ Phosphote KH_2 PO₄ Phosphose 1.008 \times 3 = 3.024 30.058 \times 1 = 30.098 1.008 \times 2 = 2.016 Phos 30.974 \times 1 = 30.974 \times 1 = 30.974 \times 15.999 \times 4 = 63.976

Molecular mass * 1276. 084*

Concentrate on the Solution (continued)

Step 4
You have a great opportunity for a summer job at a local farm. Your potential boss wants you to demonstrate your skills for communicating clear instructions to employees who may be working as your assistants. Your teacher suggests that you write up a detailed description of how you solved the nutrient deficiency problem for the school farm. Your answer should defend your choice of fertilizer compound and provide an explanation of how to prepare the fertilizer solution. Directions should be easily followed by an entry level employee who has very little knowledge of fertilizer components and preparation.

Congratulations, your experience working on the school farm has earned you an interview for a summer job with a local farm. Answer the following questions to prepare for the interview:

1. The farm has two different fertilizers in the barn. One is K_2SO_4 and the other is KCI. The two fertilizers cost the same per ton, but we want to be conscious of costs by using the fertilizer with the highest percentage of potassium, since we won't have to apply as much. Which fertilizer should we use? Show your calculations.

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Concentrate on the Solution

5. Distribute the Concentrate on the Solution worksheet to each student and organize the class into groups of two or three. Assign groups one of the following nutrient deficiencies and the supplemental nutrient amount needed. For example, one group may be assigned phosphorus and the supplemental nutrient amount needed is 40 ppm.

Missing Nutrient Step 1

Nutrient Each of these represents an element	Supplemental Nutrient Amount needed	
Nitrogen (N)	230 ppm	
Phosphorus (P)	40 ppm	
Potassium (K)	315 ppm	
Magnesium (Mg)	42 ppm	
Calcium (Ca)	175 ppm	

6. Students may choose to apply one of the following fertilizer compounds: Use a document projector to display this chart to the class. Have students use a periodic table of the elements from their textbooks or project one on the board. Explain to students that each subscript represents the number of atoms of each element in the fertilizer compound.

Fertilizer Compound	Name		
KH₂PO₄	Monopotassium Phosphate		
H ₃ PO ₄	Phosphoric Acid		
KNO ₃	Potassium Nitrate		
K₂SO₄	Potassium Sulfate		
Ca(NO ₃) ₂	Calcium Nitrate		
CaCl ₂	Calcium Chloride		
MgSO_4	Magnesium Sulfate		
NH ₄ NO ₃	Ammonium Nitrate		
K₂MgO₃S₂	Potassium Magnesium Sulfate		

Fertilizers

that contain
missing Nutnients

Step 2