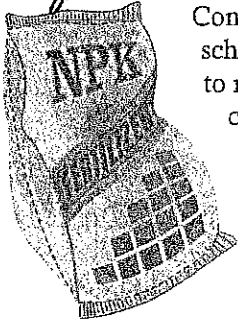


Sarah Carpenter
 I ♥ U, Mommy
 -Charity

Concentrate on the Solution

Name: Sarah Gladney



Congratulations! You have been appointed as one of the managers in charge of your 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)

Compound Phosphoric Acid
 H_3PO_4

Compound Monopotassium Phosphate
 KH_2PO_4

Hydrogen
 Phos
 Oxy

$$\begin{aligned}
 1.008 \times 3 &= 3.024 \\
 30.974 \times 1 &= 30.974 \\
 15.999 \times 4 &= 63.996 \\
 \hline
 &97.994
 \end{aligned}$$

$$\begin{aligned}
 30.098 \times 1 &= 30.098 \\
 1.008 \times 2 &= 2.016 \\
 30.974 \times 1 &= 30.974 \\
 15.999 \times 4 &= 63.996
 \end{aligned}$$

Molecular mass ~~97.994~~ * 97.964 *

Molecular mass ~~127.084~~ * 127.084 *

Group	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
Period	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
1	H 1.008																	He 4.0026	
2	Li 6.941	Be 9.0122																F 18.998	Ne 20.180
3	Na 22.990	Mg 24.305	Sc 44.956															Cl 35.45	Ar 39.948
4	K 39.098	Ca 40.078	Ti 47.88	V 50.942	Cr 51.996	Mn 54.938	Fe 55.845	Co 58.933	Ni 58.693	Cu 63.546	Zn 65.38	Ga 69.723	Ge 72.63	As 74.922	Se 78.96	Br 79.904	Kr 83.798		
5	Rb 85.468	Sr 87.62	Y 88.906	Zr 91.224	Nb 92.906	Tc 98.906	Ru 101.07	Rh 102.91	Pd 106.42	Ag 107.87	Cd 112.41	In 114.82	Sn 118.71	Sb 121.76	Te 127.60	I 126.90	Xe 131.29		
6	Cs 132.905	Ba 137.33	Lu 174.967	Hf 178.49	Ta 180.95	W 183.84	Os 190.23	Ir 192.22	Pt 195.08	Au 196.97	Hg 200.59	Tl 204.38	Pb 207.2	Bi 208.98	Po 208.98	At 208.98	Rn 222.02		
7	Fr 223.021	Ra 226.025	Lr 260.10	Rf 261.10	Db 262.10	Sg 263.10	Hs 264.10	Mt 265.10	Ds 266.10	Rg 267.10	Cn 268.10	Uut 269.10	Fl 270.10	Uup 271.10	Lv 272.10	Uus 273.10	Uuo 274.10		

*Lanthanoids	La 138.905	Ce 140.12	Pr 140.907	Nd 144.24	Pm 144.913	Sm 150.36	Eu 151.964	Gd 157.25	Tb 158.925	Dy 162.50	Ho 164.930	Er 167.259	Tm 168.930	Yb 173.054
**Actinoids	Ac 227.03	Th 232.037	Pa 231.036	U 238.029	Np 237.048	Pu 244.041	Am 243.061	Cm 247.070	Bk 247.070	Cf 251.083	Es 252.083	Fm 257.10	Md 258.10	No 259.10

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.*

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

Missing Nutrient
Step 1

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
KH_2PO_4	Monopotassium Phosphate
H_3PO_4	Phosphoric Acid
KNO_3	Potassium Nitrate
K_2SO_4	Potassium Sulfate
$\text{Ca}(\text{NO}_3)_2$	Calcium Nitrate
CaCl_2	Calcium Chloride
MgSO_4	Magnesium Sulfate
NH_4NO_3	Ammonium Nitrate
$\text{K}_2\text{MgO}_8\text{S}_2$	Potassium Magnesium Sulfate

Fertilizers
that contain
missing Nutrients
Step 2