Macintosh HD:private:var:folders:tq:g7b5qchx4nz134dg4n5l152j_xwxcp:T:TemporaryItems:design stem logo final.pdfMacintosh HD:private:var:folders:tq:g7b5qchx4nz134dg4n5l152j_xwxcp:T:TemporaryItems:design stem logo final.pdf**Worksheet 7: What compounds do we need to grow plants?**

In this activity, we use the worksheet from the previous lesson and determine how many grams/milligrams of each compound is needed to meet the common concentration requirement.

1. Build an excel worksheet and embed functions in a worksheet.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Solution volume | 1 |  |  | |  | |  | | |  |  |
| **Salt** | **KNO3** | **Ca(NO3)2•4H2O** | | **Mg(NO3)2** | | **K2SO4** | | **MgSO4.7H2O** | **KH2PO4** | | Total ppm |
| mg of salt | x |  | |  | | y | |  | z | |
| ppm of individual elements | | | | | | | | | | |
| K | a |  | |  | | b | |  | c | | d |
| Ca |  |  | |  | |  | |  |  | |  |
| Mg |  |  | |  | |  | |  |  | |  |
| N |  |  | |  | |  | |  |  | |  |
| S |  |  | |  | |  | |  |  | |  |
| P |  |  | |  | |  | |  |  | |  |

* 1. Write an equation for potassium concentration per x (unknown) milligrams KNO3 per liter in ppm.
  2. Repeat for potassium concentration per y (unknown) grams K2SO4 per liter in ppm.
  3. Repeat the calculation for z (unknown) grams KH2PO4 per liter.
  4. Enter the sum of all ppm concentration for (d).

1. Repeat the calculation for Ca, Mg, N, S, and P.
2. The table below shows common concentration for six macronutrients. Adjust the amount of each compound to make the total concentration of each element within the range of typical concentration.

|  |  |
| --- | --- |
| Macronutrients | Common concentration (ppm) |
| Nitrogen | 100-250 |
| Phosphorus | 30-50 |
| Potassium | 100-300 |
| Calcium | 80-140 |
| Magnesium | 50-70 |
| Sulfur | 50-120 |

1. Copy and paste the table to build a new table that show the amount of each compounds for a different amount of water.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | |  | |  | |  | | |  | | |  | | | |  | |  |
| New volume | | 2 | |  | |  | | |  | | |  | | | |  | |
| **Salt** | | **KNO3** | | **Ca(NO3)2•4H2O** | | | | **Mg(NO3)2** | | | **K2SO4** | | | **MgSO4.7H2O** | **KH2PO4** | | |
| mg of salt | |  | |  | | | |  | | |  | | |  |  | | |