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 6: How do we calculate ppm of each element in a solution?**

In this activity, we will calculate the ppm concentration for each element in a solution where 1 gram of each ionic compound is dissolved. This will help us determine how many grams or milligrams of each compound should be added to the solution. In the previous class, we learned the ionic compounds that plants need. To make the task manageable, we will use six macronutrients only: potassium, calcium, magnesium, nitrogen, sulfur, and phosphorus.

Table 1 shows the ionic compounds for macronutrients, their molar masses and solubility values. Copy the content for each cell from the previous day. The first one has been done for you.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Metals  (Positive ions) | Nonmetals (Polyatomic negative ions) | | | | | | | | |
| *Nitrate (NO3-)* | | | *Sulfate (SO42-)* | | | *Phosphate (H2PO4-)* | | |
| Formula | Molar mass | Solubility\* | Formula | Molar mass | Solubility | Formula | Molar mass | Solubility |
| *Potassium (K+)* | KNO3 | 101.10g/mol | 316g/L |  |  |  |  |  |  |
| *Calcium (Ca2+)* |  |  |  |  |  |  |  |  |  |
| *Magnesium (Mg2+)* |  |  |  |  |  |  |  |  |  |

Note: Calcium sulfate, calcium phosphate, and magnesium phosphate are not included due to their low solubility in water.

1. Assume that you dissolve 1 gram Potassium Nitrate (KNO3) in 1 L water.
   1. What is the concentration of potassium nitrate in g/L?
   2. How many grams of potassium is in 1 gram KNO3?
   3. What is the concentration of potassium in g/L?
   4. What is the concentration of potassium in ppm (mg/L)?
2. What is the concentration of potassium in ppm if 1 gram Potassium sulfate (K2SO4) is dissolved in 1L of water?
3. What is the concentration of potassium in ppm if 1 gram Potassium phosphate (KH2PO4) is dissolved in 1L of water?
4. What is the total concentration of potassium in ppm if 1 gram of KNO3, K2SO4, and KH2PO4 are added to 1 L water?
5. 1 gram of KNO3,Ca(NO3)2, Mg(NO3)2 are dissolved in 1 L water.
   1. What is the concentration of nitrogen in ppm if 1 gram of KNO3 is dissolved in 1L of water?
   2. What is the concentration of nitrogen in ppm if 1 gram of Ca(NO3)2 is dissolved in 1L of water?
   3. What is the concentration of nitrogen in ppm if 1 gram of Mg(NO3)2 is dissolved in 1L of water?
   4. What is the total concentration of nitrogen in ppm if 1 gram of KNO3, Ca(NO3)2, Mg(NO3)2 are added to 1 L water?