**Concentration PhET Simulation Lab**

Directions:

* You will be exploring saturation as related to solvents and solutes.
* To keep the shakes consistent, begin with the shaker either completely left or completely right. While holding the shaker, move it completely to the other side and then back. If you begin on the left, drag it to the right and then back to the left. That equals one shake.
* Make sure to place the concentration measurer in the solvent so you can measure the concentration.
* Saturation simply means the solvent can hold no more solute.

To complete the following tables, leave the amount of solvent at ½ L and add the given number of solute shakes. Please note when saturation was achieved in the concentration column. If you needed more shakes than the number given, please note this. Likewise, note if you needed fewer shakes than the number given.

**Solute Used: Drink Mix**

|  |  |  |
| --- | --- | --- |
| Amount of Solute (in shakes, approx.) | Concentration (mol/L) | Color |
| 1 |  |  |
| 5 |  |  |
| 15 |  |  |
| 30 |  |  |

**Solute Used: Potassium Chromate**

|  |  |  |
| --- | --- | --- |
| Amount of Solute (in shakes, approx.) | Concentration (mol/L) | Color |
| 1 |  |  |
| 4 |  |  |
| 8 |  |  |
| 16 |  |  |

**Solute Used: Nickel (II) Chloride**

|  |  |  |
| --- | --- | --- |
| Amount of Solute (in shakes, approx.) | Concentration (mol/L) | Color |
| 1 |  |  |
| 7 |  |  |
| 14 |  |  |
| 28 |  |  |

**Solute Used: Potassium Permanganate**

|  |  |  |
| --- | --- | --- |
| Amount of Solute (in shakes, approx.) | Concentration (mol/L) | Color |
| 1 |  |  |
| 2 |  |  |
| 3 |  |  |

**Solute Used: Sodium Chloride**

|  |  |  |
| --- | --- | --- |
| Amount of Solute (in shakes, approx.) | Concentration (mol/L) | Color |
| 1 |  |  |
| 10 |  |  |
| 20 |  |  |
| 30 |  |  |

Now let’s see how evaporation affects concentration. Add 10 shakes of solute to ½ L of solvent. If the solute you add saturates the solvent before you reach ten shakes, simply record the number of shakes added and the word saturation. Evaporate the solvent until you reach saturation. 1 L is equal to 10/10…you just need to count the lines to report L measure when you find saturation. If the level of solvent is between two lines…then consider 1 L to be 20/20.

Complete the following table with your results:

|  |  |
| --- | --- |
| Solute | Saturation (X/10 L or X/20 L) |
| Cobalt (II) Nitrate |  |
| Cobalt (II) Chloride |  |
| Potassium Chromate |  |
| Potassium Dichromate |  |
| Copper (II) Sulfate |  |
| Drink Mix |  |
| Potassium Permanganate |  |
| Sodium Chloride (table salt) |  |
| Nickel (II) Chloride |  |

Choose one of the solutes. Add more solute until you have 1L. Shake in as much solute as you have to in order to achieve saturation. Now, begin evaporation, paying attention to the bottom of the chamber. What do you observe? Why?

What if we were able to change the temperature of the solvent? How would that affect saturation? Make sure to include at least two possibilities (i.e. if heat were added…or if heat were taken away/cooled…)