Solutions and Concentration Notes

# What is a solution?

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** mixture of **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** and **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

* **Solute:** substance **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
  + Often a **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* **Solvent:** substance in which the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
  + Usually a **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Homogeneous mixture**

* A mixture where you **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**between the different substances involved in the mixture

**Aqueous solution**

* Aqua = **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* A solution where **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** is the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Example**

I take a spoonful of Nesquik powder and mix it into my milk to make chocolate milk.

* What is the solute? **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* What is the solvent? **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* What is the solution? **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

# Concentration

**What is concentration?**

The amount of substance within a given volume

|  |
| --- |
|  |

C:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

m:\_\_\_\_\_\_\_\_\_\_\_ of solute

V: \_\_\_\_\_\_\_\_\_\_\_\_\_ of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**More or less concentrated?**

m=2g

V=1L

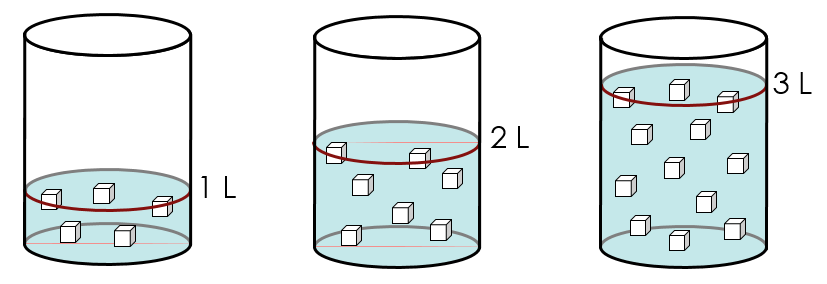
m=8g

V=4L

**Example**

**The water from which of the following containers would taste the sweetest?**

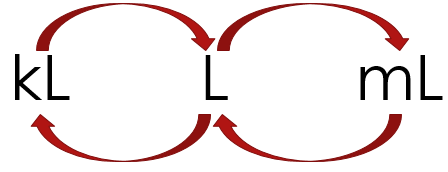
**The water from which container would taste the least sweet?**

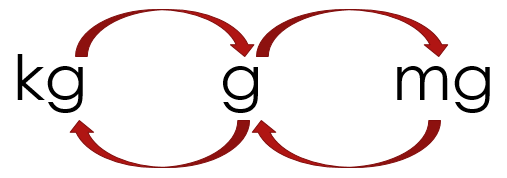


**Practice Problem**

Ian is feeling a little under the weather and decides to make himself some tea. To make it a little more appealing he decides to add 15g of sugar to his teapot which contains 1.5L of tea. What is the concentration of his sweetened tea in g/L?

# Converting Units





**Practice Problems**

Jenna made herself 50ml of Kool-Aid by dissolving 2.5g of the powder into water. What is the concentration of the Kool-Aid in g/L?

## Rearranging the Equations

**Example**

Emma wants to make 125ml of a 8g/L saline solution. How much salt will she need to use?

What is the maximum volume that Cory can make of an 80g/L solution of chocolate milk if he only has 23g of Nesquik powder?

## Concentration in Percent (%)

What is percentage?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What percent of the squares are grey?

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We can also measure concentrations in % (m/V)

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| --- |
|  |

What is the % concentration?

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**Practice Problems**

1. What is the % concentration of sugar in a 355ml can of Coca-Cola?
2. What is the % concentration of sugar in a 591ml bottle of Gatorade?
3. What is the maximum volume that Will can make of an 8% solution of chocolate milk if he uses 24g of Nesquik powder?

# Concentration in ppm

**What is ppm?**

Stands for “\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_”

* How \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Practice**

If a 2L sample of lake water contains 0.5g of phosphates, what is the concentration of phosphate in ppm?

The salinity of the Baltic sea is about 7000ppm. If I took a 250ml sample of sea water, how much salt would it contain?

# Converting Units

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Unit | g/L | % | ppm | mg/L |
| Example | 25g/L | 25% | 25ppm | 25mg/L |
| Using g and ml |  |  |  |  |

**Practice**

Convert the following into percent concentration

|  |  |  |  |
| --- | --- | --- | --- |
| 150g/L | 25ppm | 37g/400ml | 14mg/L |
|  |  |  |  |

Convert the following into g/L

|  |  |  |  |
| --- | --- | --- | --- |
| 12% | 28ppm | 30g/500ml | 24mg/L |
|  |  |  |  |

Convert the following into ppm

|  |  |  |  |
| --- | --- | --- | --- |
| 33% | 129g/L | 30g/750ml | 0.6mg/L |
|  |  |  |  |

Place the following concentrations in order from least to most concentrated:

|  |  |  |  |
| --- | --- | --- | --- |
| 1. 0.4% | 1. 10g/L | 1. 35ppm | 1. 150mg/L |
|  |  |  |  |

# Dilutions

**What is dilution?**

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* When you are diluting a substance the amount of **\_\_\_\_\_\_\_\_\_\_\_\_\_** remains the **\_\_\_\_\_\_\_\_\_\_\_**
* The volume of **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* Therefore the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**