MAT 0026 and BSC 1086 Module

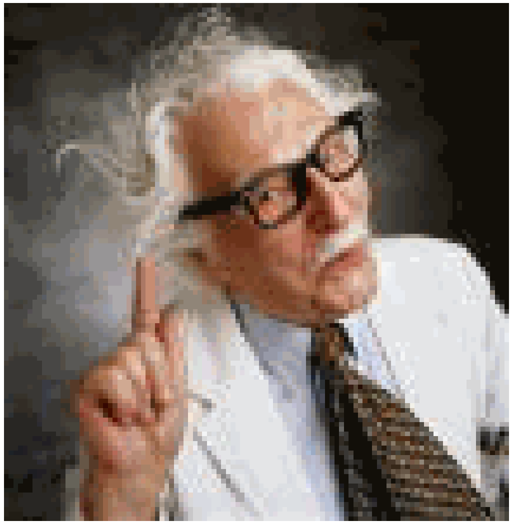
Topic: Determine proportions and convert change in % to fractions to prepare chemical solutions

Math lesson 2 – Lesson on determining change in % → fractions, finding an equivalent fraction, and converting words into an algebraic expression and simplifing.

Real World Application – Making chemical solutions for use in biomedical applications. Making dilutions of stock solutions for intravenous feeding into patients.

Background - Solutions are often calculated as weight per volume, that is, grams per liter. An often-used definition is a percent solution. So a 50% solution of a substance is defined as 50 g of a substance dissolved in 100 ml total volume of solvent (usually water). 30% solution would be 30 g/100 ml water.

Problem – if you wanted to make 1 liter (1000 ml) of a 10% solution of saline (NaCl), how many grams (g) of NaCl would you add to 1 liter of water? Remember that our units are in g of substance per 100 ml of water. Start with converting 10<u>% into a fraction</u> with the correct units. Then write an <u>equivalent fraction</u> with a denominator of 1000 to get your result.



Part 2 - How much of the 10% solution would you use to make 1000 ml of 0.9% NaCl (physiological saline) for intravenous feeding of a patient?

In other words we want 0.9 out of 10 *(the dilution factor)* ***of 1000 ml.*** As an algebraic expression:

Amount of original needed for new solution =

total volume times the quotient of the concentration of the original divided by concentration of the final concentration needed.

- How many ml of the 10% solution will we use and how much water will we add to make a total of 1000 ml?