

Math Diversion Problem 939

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If you misjudge the actual nature of the problem that
besets you, you'll likely also misjudge the solution
to it, making things even worse.
— The Author

Source: <https://www.algebra.com/algebra/homework/word/mixtures/Mixture-problems.lesson>
Title: Changing a Concentration Problem
Presenter: Patrick

1 Problem

How much of a 10% acid solution should be added to 1000 milliliters of a 2% acid solution to get a 4% acid solution? Concentrations here are volume-to-volume, part-to-whole, measured in $[\text{mL}/\text{mL}] \times 100\%$ units.

2 Solution

Let's make a diagram to help out.

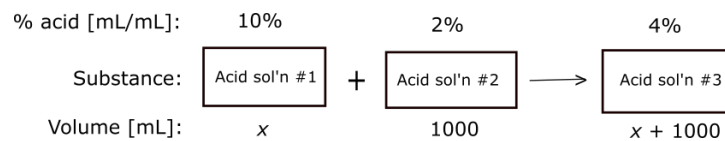


Figure 1. Apparently, the point of so many similar problems is for the student to grasp this kind of problem from every angle.

- 1) Conservation of volume is accounted for.
- 2) Next, we write down the conservation of 'pure' acid equation:

$$(0.01)(x) + (0.02)(1000) = (0.04)(x + 1000). \quad (1)$$

The solution for x is 333.3 mL.