Dilutions

Warm Up 3/23/2015

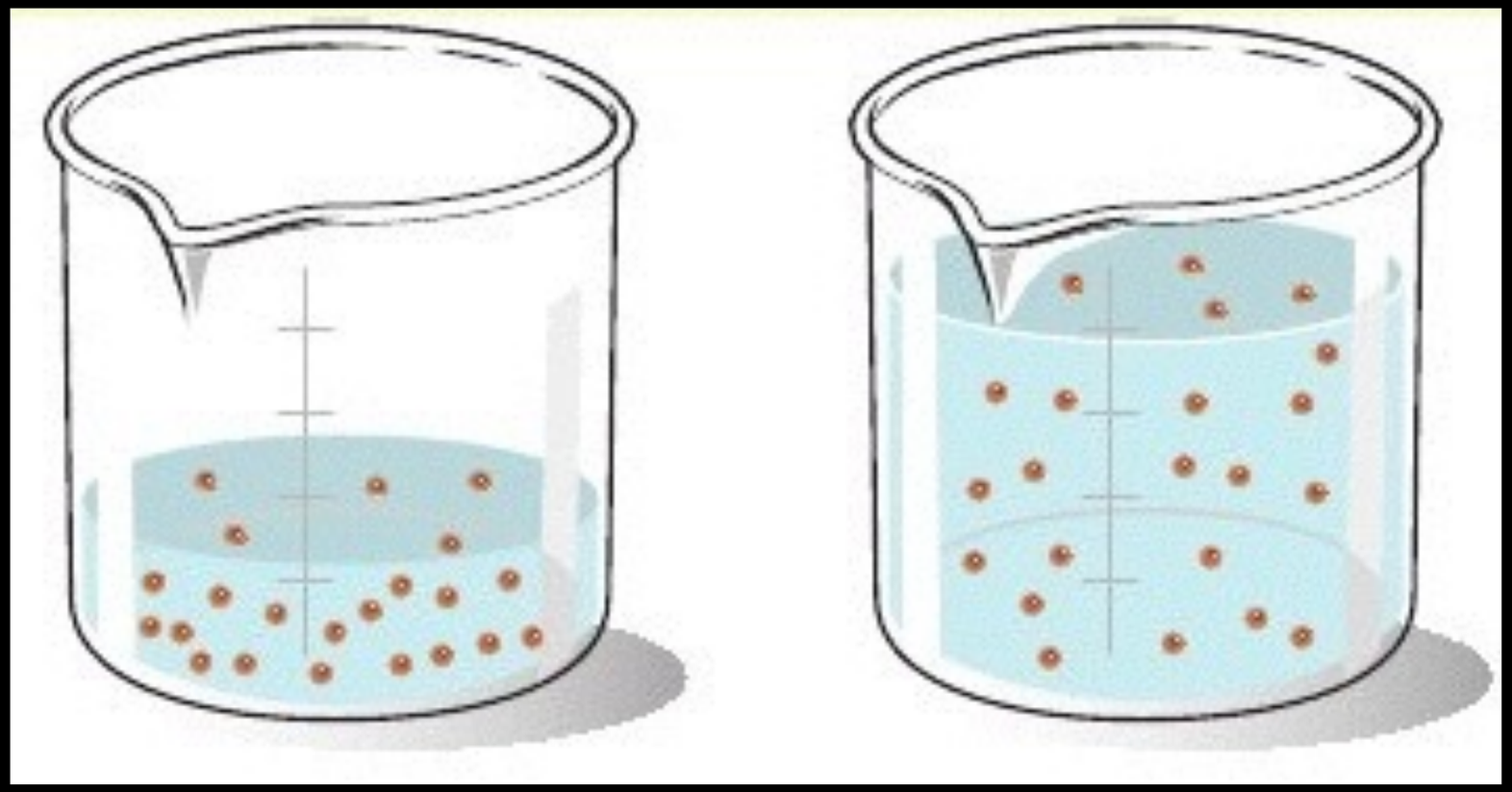
1. How many moles are in a 10 mL, 2 M solution?

2. How many moles are in a 100 mL 0.2 M solution?

- What relationships, if any, exist between questions 1 and 2?

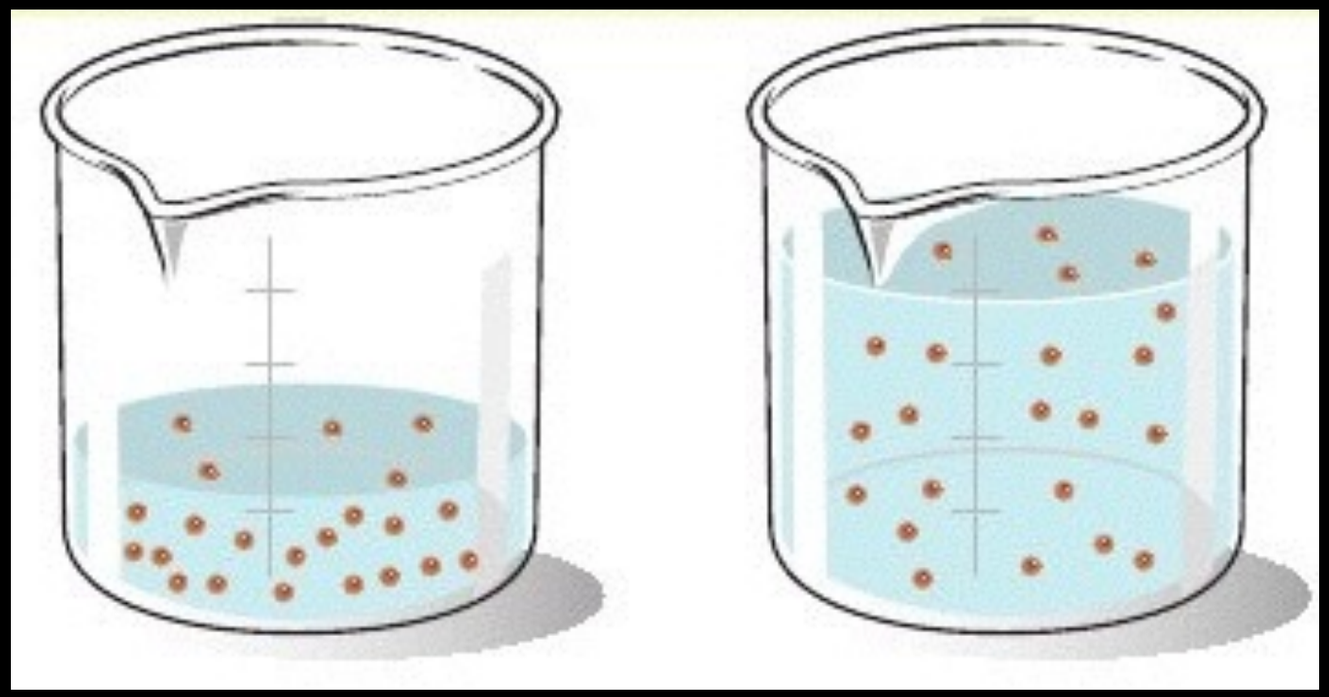
- If you add water to a solution, what happens to the concentration? Does the number of things change in a dilution? Explain your reasoning.

1 2



Dilutions

1 2

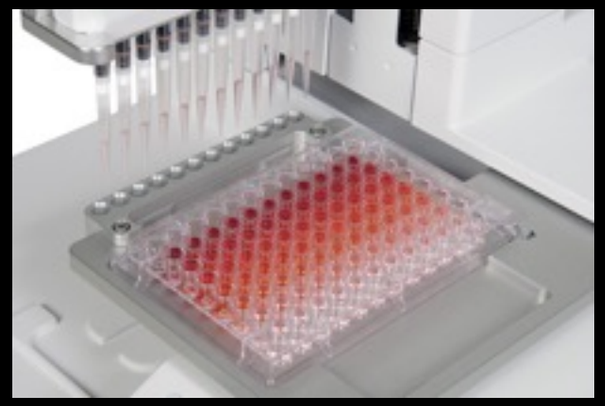


moles 1 =
volume 1 x molarity 1
V_1 M_1

moles 2 =
volume 2 x molarity 2
V_2 M_2

$M_1V_1 = M_2V_2$

- Moles are equal between the two solutions.
- Molarity changes inversely to volume.
- Steps to solve:
  1. Start with initial molarity (M_1) and volume (V_1)
  2. Identify quantity of either molarity (M_2) **or** volume (V_2) you want in your final solution.
  3. Solve for the remaining variable.



Practice

- How many mL do you need of a 0.58 M ammonium nitrate solution to make a 400 mL, 0.25 M solution?

Practice

- What molarity of NaCl solution if you add 170 mL to make a 400 mL 0.25 M solution of NaCl?

- How many grams would be in your new 400mL 0.25M NaCl solution?

Exploring Dilutions

- Which is more accurate to make 1M solution of potassium hydroxide in 1 L or 0.1 M in 100 mL?

  -think about the number of grams you will have to weigh out on a scale and accuracy of your scale. (Solution Stoichiometry)

- **Stock solutions** = concentrated solutions, which you use to make a diluted solution.

- In above example 1 M solution is a stock solution that can be used to make 0.5 M 10 mL solution. How many mL of the 0.1 M solution do you need to make a 0.5 M solution in 10 mL.

Why use dilutions?

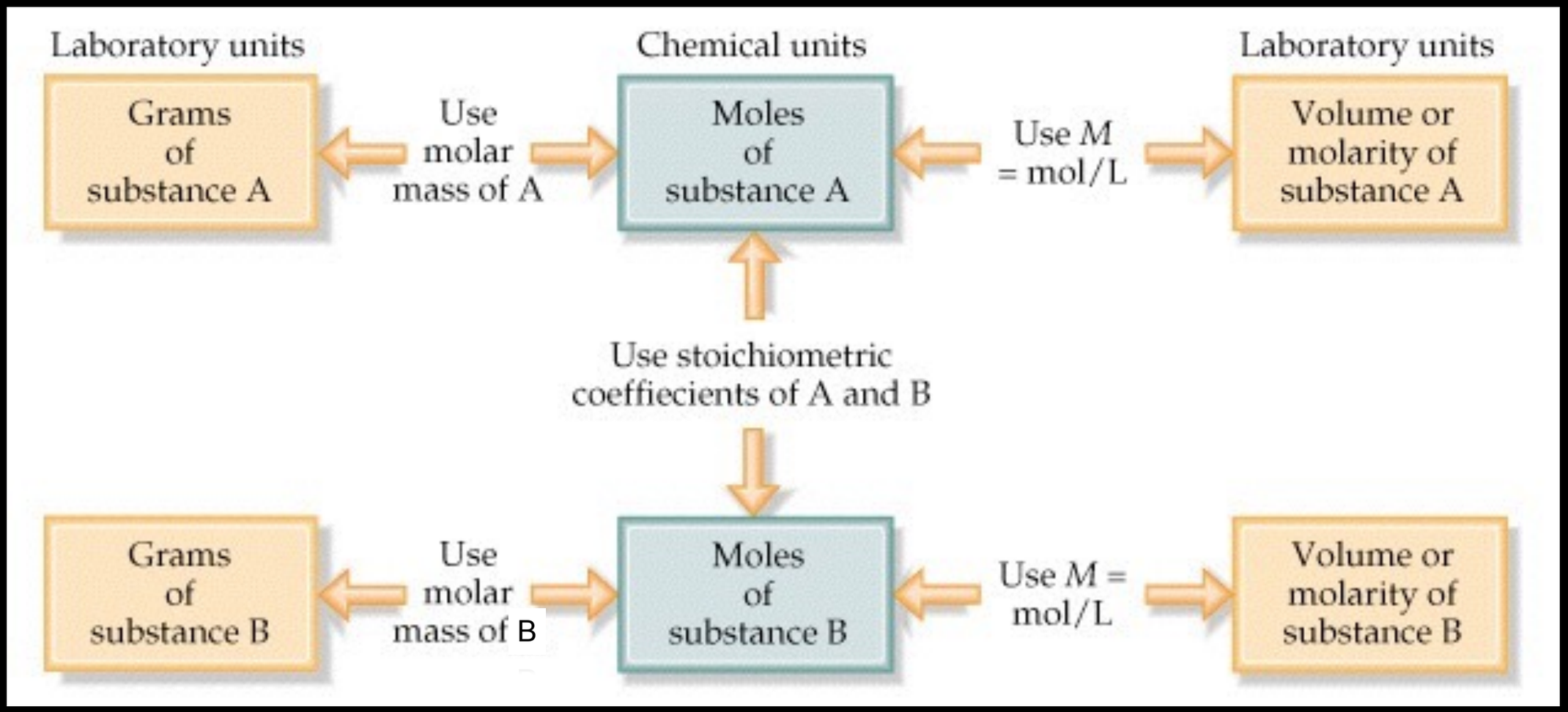
Need: 20 mL 0.9 M solution
Which of the following would make a better stock solution and why?

12.1 M solution HCl
300 mL

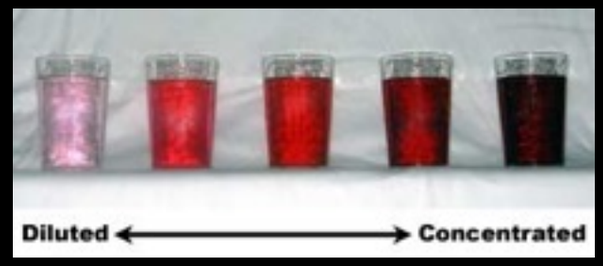
3 M solution HCl
500 mL

Tying it all together - Solution Stoichiometry

pssst… You've already been doing this!



- http://figures.boundless.com/14261/full/ncentration-simple-example.jpeg



- http://www.integra-biosciences.com/sites/images/viaflo/viaflo_assist/assist_serial_dilution_2.jpg