

Student Learning Advisory Service

Contact us

Please come and see us if you need any academic advice or guidance.

Canterbury

Our offices are next to Santander Bank

Open

Monday to Friday, 09.00 – 17.00

E: learning@kent.ac.uk

T: 01227 824016

Medway

We are based in room G0-09, in the Gillingham Building and in room DB034, in the Drill Hall Library.

Open

Monday to Friday, 09.00 – 17.00

E: learningmedway@kent.ac.uk

T: 01634 888884

The Student Learning Advisory Service (SLAS) is part of the Unit for the Enhancement of Learning and Teaching (UELТ)

Acknowledgments

All materials checked by Dr Scott Wildman, Dr Cleopatra Branch, Jerome Durodie and Andrew Lea, Medway School of Pharmacy, Anson Building, Central Avenue, Chatham Maritime, Chatham, Kent. ME4 4TB.

This leaflet has been produced in conjunction with **sigma** Network for Excellence in Mathematics and Statistics Support



 [kent.slas](https://www.facebook.com/kent.slas)

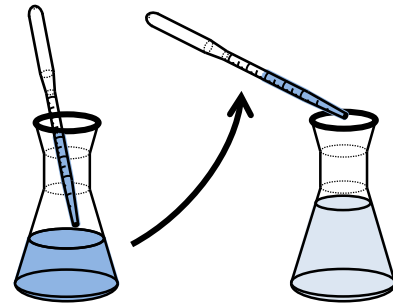
 [@unikentSLAS](https://twitter.com/unikentSLAS)

www.kent.ac.uk/learning



AT A GLANCE/ PHARMACY CALCULATIONS MULTIPLE DILUTIONS

Calculating the amount of substance needed in an initial concentration to produce a final desired dilution and volume.



Example 1

What amount of a substance is required to make 1500mL of a product such that 50mL diluted to 1000mL will give a 1% v/v concentration?

Method

Step 1: Calculate the quantity of substance in the final dilution

$$\frac{1}{100} \times 1000\text{mL} = 10\text{mL}$$

Step 2: If the 1000mL contains 10mL of the substance, then the 50mL must also have contained 10mL of the substance

$$10\text{mL in } 1000\text{mL} \therefore 10\text{mL in } 50\text{mL}$$

Step 3: Use $c_1/v_1 = c_2/v_2$ to calculate the initial amount needed

$$\frac{10\text{mL}}{50\text{mL}} = \frac{x}{1500\text{mL}}$$

Step 4: Transpose for x and solve

$$x = \frac{10 \times 1500}{50} = 300\text{mL} \checkmark$$

Example 2

What weight of a substance is required to make 45mL of a product such that 3mL diluted to 100mL will give a 1 in 5000 concentration ?

Method

Step 1: Calculate the quantity of substance in the final dilution

$$\frac{1}{5000} \times 100mL = 0.02g$$

Step 2: If the 100mL contains 0.02g of the substance, then the 3mL must also have contained 0.02g of the substance

0.02g in 100mL ∴ 0.02g in 3mL

Step 3: Use $c_1/v_1 = c_2/v_2$ to calculate the initial amount needed

$$\frac{0.02g}{3mL} = \frac{x}{45mL}$$

Step 4: Transpose for x and solve

$$x = \frac{0.02 \times 45}{3} = 0.3g \checkmark$$

Example 3

How much 20% v/v concentrate should you use to make up 1200mL of a solution, such that 10mL diluted to 500mL will give a final dilution of 0.04% v/v?

Method

Step 1: Calculate the quantity of substance in the final dilution

$$\frac{0.04}{100} \times 500mL = 0.2mL$$

Step 2: If the 500mL contains 0.2mL of the substance, then the 10mL must also have contained 0.2mL of the substance

0.2mL in 500mL ∴ 0.2mL in 10mL

Step 3: Use $c_1/v_1 = c_2/v_2$ to calculate the initial amount needed

$$\frac{0.2mL}{10mL} = \frac{x}{1200mL}$$

Step 4: Transpose and solve

$$x = \frac{0.2 \times 1200}{10} = 24mL$$

Step 5: Use $c_1 \times v_1 = c_2 \times v_2$ to calculate the amount of 20% concentrate needed

percentages cancel out

$$100(\%) \times 24 = 20(\%) \times x$$

Step 6: Transpose for x and solve

$$x = \frac{24 \times 100}{20} = 120mL \checkmark$$

Q1

What weight of a substance is required to make 375mL of a solution such that 25mL diluted to 2L will give a 1 in 1000 solution?

Q2

What amount of substance is required to make 1.6L of a solution such that 50mL diluted to 1200mL will give a 0.5% v/v solution?

Q3

What weight of ingredient is required to make 560mL of a product such that 8mL diluted to 450mL will give a 2mg/5mL solution?

Q4

How much 5% v/v concentrate should you use to make 1.25L of a product such that 10mL diluted to 4L will give a 25ppm solution?

Q5

How much of 15mcL/mL concentration should you use to make 120mL of a product such that 0.5mL diluted to 10mL will give a 0.002% v/v solution?

Answers

Q1 = 30g. **Q2** = 192mL. **Q3** = 12.6g. **Q4** = 250mL. **Q5** = 3.2mL.