There are 100 paramecia in a 20mL sample, how many paramecia would there be in a 10^3 mL sample.

You have a 1.0L salt solution that needed 30g of NaCl for the required concentration, how much NaCl would you need for a 250mL solution of the sample concentration.

You have a solution that has a concentration of 50mg/mL of enzyme, how much enzyme is needed to make a 10^{-4}uL solution of the same concentration.

You need a 1.2%(w/v) of agarose gel solution in a total volume of 35mL, how much agarose gel would you need.

You need to make 25mL of a 50mM solution of $MgCl_2$, how many grams of $MgCl_2$ (MW = 95.211 g/mol) would you need.

You need to make 100mL of a 0.2mM solution of $MgSO_4$, how many grams of $MgSO_4$ (MW = 120.42 g/mol) would you need.

You need to make 15mL of a 10%(w/v) solution of ammonium persulfate, how many grams of ammonium persulfate would you need.

You need to pour a 1.2% (w/v) agarose gel in a total volume of 35mL, how much agarose gel do you need.

How many grams of $MgCl_2$ (MW: 95.211) would you use to make 25mL of 50mM solution?

How would you make 15mL of a 10% (w/v) solution of ammonium persulfate (APS).

How much $MgSO_4$ (MW: 120.42) do you need for 100mL of a 0.2mM solution.

You need a 1.6%(w/v) of agarose gel solution in a total volume of $2.3x10^{-3}$ L, how much agarose gel would you need.

There are 100 paramecia in a 20mL sample, how many paramecia would there be in a 10^3 mL sample.

$$C_1 = \frac{M}{V} = \frac{100 \text{ paramecia}}{20 \text{ mL}}$$

$$C_2 = \frac{M}{V} = \frac{x}{10^3 \text{ mL}}$$

set:

$$C_1 = C_2$$

$$\frac{100 \text{ paramecia}}{20 \text{ mL}} = \frac{x}{10^3 \text{ mL}}$$

$$x = 10^3 \cancel{\text{mL}} \left(\frac{100 \text{ paramecia}}{20 \cancel{\text{mL}}} \right)$$

$$x = 5000 \text{ paramecia}$$

$$\boxed{x = 5000 \text{ paramecia}}$$

You have a 1.0L salt solution that needed 30g of NaCl for the required concentration, how much NaCl would you need for a 250mL solution of the sample concentration.

$$C_1 = \frac{M}{V} = \frac{30 \text{ g}}{1.0 \text{ L}}$$

$$C_2 = \frac{M}{V} = \frac{x}{250 \text{ mL}}$$

set:

$$C_1 = C_2$$

$$\frac{30 \text{ g}}{1.0 \text{ L}} = \frac{x}{250 \text{ mL}}$$

$$x = 250 \cancel{\text{mL}} \left(\frac{30 \text{ g}}{1.0 \cancel{\text{L}}} \right) \left(\frac{1 \cancel{\text{L}}}{1000 \cancel{\text{mL}}} \right)$$

$$x = 7.5 \text{ g}$$

$$\boxed{x = 7.5 \text{ g}}$$

You have a solution that has a concentration of 50mg/mL of enzyme, how much enzyme is needed to make a 10^{-4}uL solution of the same concentration.

$$C_1 = \frac{50\ mg}{mL}$$

$$C_2 = \frac{M}{V} = \frac{x}{10^{-4}\ \mu L}$$

set: $C_1 = C_2$

$$\frac{50\ mg}{mL} = \frac{x}{10^{-4}\ \mu L}$$

$$x = 10^{-4}\ \cancel{\mu L}\left(\frac{50\ mg}{1\ \cancel{mL}}\right)\left(\frac{1\ \cancel{mL}}{1000\ \cancel{\mu L}}\right)$$

$$x = 5 \times 10^{-6}\ \cancel{mg}\left(\frac{1000\ \cancel{mg}}{\cancel{mg}}\right)\left(\frac{1000\ ng}{\cancel{\mu g}}\right)$$

$$\boxed{x = 5\ ng}$$

You need a 1.2%(w/v) of agarose gel solution in a total volume of 35mL, how much agarose gel would you need.

$$C_1 = 1.2\%\ (w/v) = \frac{1.2\ g}{100\ mL}$$

$$C_2 = \frac{M}{V} = \frac{x}{35mL}$$

set: $C_1 = C_2$

$$\frac{1.2g}{100\ mL} = \frac{x}{35\ mL}$$

$$x = 35\cancel{mL}\left(\frac{1.2g}{100\ \cancel{mL}}\right)$$

$$x = 0.42\ \cancel{g}\left(\frac{1000\ mg}{1\ \cancel{g}}\right)$$

$$x = 420\ mg$$

$$\boxed{x = 420\ mg}$$

You need to make 25mL of a 50mM solution of $MgCl_2$, how many grams of $MgCl_2$ (MW = 95.211 g/mol) would you need.

$$C_1 = 50\ mM = \frac{50\ \cancel{mmol}}{L}\left(\frac{95.211\ g}{\cancel{mol}}\right)\left(\frac{\cancel{mol}}{1000\ \cancel{mmol}}\right) = \frac{4.7555\ g}{L}$$

$$C_2 = \frac{M}{V} = \frac{X}{25\ mL}$$

set:

$$C_1 = C_2$$

$$\frac{4.7555\ g}{L} = \frac{X}{25\ mL}$$

$$X = 25\ \cancel{mL}\left(\frac{4.7555\ g}{\cancel{L}}\right)\left(\frac{\cancel{L}}{1000\ \cancel{mL}}\right)$$

$$X = 0.1188875\ \cancel{g}\left(\frac{1000\ mg}{\cancel{g}}\right)$$

$$\boxed{X = 118.9\ mg}$$

You need to make 100mL of a 0.2mM solution of $MgSO_4$, how many grams of $MgSO_4$ (MW = 120.42 g/mol) would you need.

$$C_1 = 0.2\ mM = \frac{0.2\ \cancel{mmol}}{L}\left(\frac{120.42\ g}{\cancel{mol}}\right)\left(\frac{1\ \cancel{mol}}{1000\ \cancel{mmol}}\right) = 0.0241\ g/L$$

$$C_2 = \frac{M}{V} = \frac{X}{100\ mL}$$

set:

$$C_1 = C_2$$

$$\frac{0.0241\ g}{L} = \frac{X}{100\ mL}$$

$$X = 100\ \cancel{mL}\left(\frac{0.0241\ g}{\cancel{L}}\right)\left(\frac{1\ \cancel{L}}{1000\ \cancel{mL}}\right)$$

$$X = 2.41\times10^{-3}\ \cancel{g}\left(\frac{1000\ mg}{1\ \cancel{g}}\right)$$

$$X = 2.41\ mg$$

$$\boxed{X = 2.41\ mg}$$

You need to make 15mL of a 10%(w/v) solution of ammonium persulfate, how many grams of ammonium persulfate would you need.

$C_1 = 10\%\,(w/v) = \frac{10\ g}{100\ mL}$

$C_2 = \frac{M}{V} = \frac{X}{15\ mL}$

set:

$C_1 = C_2$

$\frac{10\ g}{100\ mL} = \frac{X}{15\ mL}$

$X = 15\ \cancel{mL}\left(\frac{10\ g}{100\ \cancel{mL}}\right)$

$X = 1.5\ g$

$\boxed{X = 1.5\ g}$

You need to pour a 1.2% (w/v) agarose gel in a total volume of 35mL, how much agarose gel do you need.

$C_1 = 1.2\%\,(w/v) = \frac{1.2\ g}{100\ mL}$

$C_2 = \frac{M}{V} = \frac{X}{35\ mL}$

set:

$C_1 = C_2$

$\frac{1.2\ g}{100\ mL} = \frac{X}{35\ mL}$

$X = 35\ \cancel{mL}\left(\frac{1.2\ g}{100\ \cancel{mL}}\right)$

$X = 0.42\ \cancel{g}\left(\frac{1000\ mg}{1\ \cancel{g}}\right)$

$X = 420\ mg$

$\boxed{X = 420\ mg}$

How many grams of $MgCl_2$ (MW: 95.211) would you use to make 25mL of 50mM solution?

$$C_1 = 50\,mM = \frac{50\ \cancel{mmol}}{L}\left(\frac{95.211\ g}{\cancel{mol}}\right)\left(\frac{\cancel{mol}}{1000\ \cancel{mmol}}\right) = \frac{4.76\ g}{L}$$

$$C_2 = \frac{M}{V} = \frac{x}{25\,mL}$$

set:

$$C_1 = C_2$$

$$\frac{4.76\ g}{L} = \frac{x}{25\ mL}$$

$$x = 25\,\cancel{mL}\left(\frac{4.76\ g}{\cancel{L}}\right)\left(\frac{\cancel{1L}}{1000\,\cancel{mL}}\right)$$

$$x = 0.12\,\cancel{g}\left(\frac{1000\ mg}{\cancel{g}}\right)$$

$$\boxed{x = 119\ mg}$$

How would you make 15mL of a 10% (w/v) solution of ammonium persulfate (APS).

$$C_1 = 10\%\ (w/v) = \frac{10\ g}{100\ mL}$$

$$C_2 = \frac{M}{V} = \frac{x}{15\,mL}$$

set:

$$C_1 = C_2$$

$$\frac{10g}{100mL} = \frac{x}{15mL}$$

$$x = 15\,\cancel{mL}\left(\frac{10\ g}{100\ \cancel{mL}}\right)$$

$$x = 1.5\ g$$

$$\boxed{x = 1.5\ g}$$

How much $MgSO_4$ (MW: 120.42) do you need for 100mL of a 0.2mM solution.

$$C_1 = 0.2\,mM = \frac{0.2\,\cancel{mmol}}{L}\left(\frac{120.42\,g}{\cancel{mol}}\right)\left(\frac{1\,\cancel{mol}}{1000\,\cancel{mmol}}\right) = \frac{0.024\,g}{L}$$

$$C_2 = \frac{M}{V} = \frac{x}{100\,mL}$$

set:

$$C_1 = C_2$$

$$\frac{0.024\,g}{L} = \frac{x}{100\,mL}$$

$$x = 100\,\cancel{mL}\left(\frac{0.024\,g}{\cancel{L}}\right)\left(\frac{1\,\cancel{L}}{1000\,\cancel{mL}}\right)$$

$$x = 2.41 \times 10^{-3}\,\cancel{g}\left(\frac{1000\,mg}{1\,\cancel{g}}\right)$$

$$x = 2.41\,mg$$

$$\boxed{x = 2.41\,mg}$$

You need a 1.6%(w/v) of agarose gel solution in a total volume of 2.3×10^{-3} L, how much agarose gel would you need.

$$C_1 = 1.6\,\%(w/v) = \frac{1.6\,g}{100\,mL}$$

$$C_2 = \frac{M}{V} = \frac{x}{2.3\times10^{-3}\,L}$$

set:

$$C_1 = C_2$$

$$\frac{1.6\,g}{100\,mL} = \frac{x}{2.3\times10^{-3}\,L}$$

$$x = 2.3\times10^{-3}\,\cancel{L}\left(\frac{1.6\,g}{100\,\cancel{mL}}\right)\left(\frac{1000\,\cancel{mL}}{1\,\cancel{L}}\right)$$

$$x = 0.0368\,\cancel{g}\left(\frac{1000\,mg}{1\,\cancel{g}}\right)$$

$$x = 36.8\,mg$$

$$\boxed{x = 36.8\,mg}$$