Dilutions Worksheet

1)   If I add 25 mL of water to 125 mL of a 0.15 M NaOH solution, what will the molarity of the diluted solution be?

2)   If I add water to 100 mL of a 0.15 M NaOH solution until the final volume is 150 mL, what will the molarity of the diluted solution be?

3)   How much 0.05 M HCl solution can be made by diluting 250 mL of 10 M HCl?

4)   I have 345 mL of a 1.5 M NaCl solution. If I boil the water until the volume of the solution is 250 mL, what will the molarity of the solution be?

5)   How much water would I need to add to 500 mL of a 2.4 M KCl solution to make a 1.0 M solution?

Dilutions Worksheet - Solutions

1) If I add 25 mL of water to 125 mL of a 0.15 M NaOH solution, what will the molarity of the diluted solution be?

$$M_1V_1 = M_2V_2$$
$$(0.15 \text{ M})(125 \text{ mL}) = x \, (150 \text{ mL})$$
$$x = 0.125 \text{ M}$$

2) If I add water to 100 mL of a 0.15 M NaOH solution until the final volume is 150 mL, what will the molarity of the diluted solution be?

$$M_1V_1 = M_2V_2$$
$$(0.15 \text{ M})(100 \text{ mL}) = x \, (150 \text{ mL})$$
$$x = 0.100 \text{ M}$$

3) How much 0.05 M HCl solution can be made by diluting 250 mL of 10 M HCl?

$$M_1V_1 = M_2V_2$$
$$(10 \text{ M})(250 \text{ mL}) = (0.05 \text{ M}) \, x$$
$$x = 50,000 \text{ mL}$$

4) I have 345 mL of a 1.5 M NaCl solution. If I boil the water until the volume of the solution is 250 mL, what will the molarity of the solution be?

$$M_1V_1 = M_2V_2$$
$$(1.5 \text{ M})(345 \text{ mL}) = x \, (250 \text{ mL})$$
$$x = 2.07 \text{ M}$$

5) How much water would I need to add to 500 mL of a 2.4 M KCl solution to make a 1.0 M solution?

$$M_1V_1 = M_2V_2$$
$$(2.4 \text{ M})(500 \text{ mL}) = (1.0 \text{ M}) \, x$$
$$x = 1200 \text{ mL}$$

1200 mL will be the final volume of the solution. However, since there's already 500 mL of solution present, you only need to add 700 mL of water to get 1200 mL as your final volume. The answer: 700 mL.