

$$M_C V_C = M_D V_D$$

Name _____ Date _____ Hour _____

Dilutions Worksheet

1) Your teacher needs to make a 0.500 M solution of HCl from concentrated 12.0 M HCl. If the volume of the dilute needs to be 500.0 mL, then how many mL of the concentrated solution does he need to mix with how much water?

$$\frac{M_C V_C}{M_C} = \frac{M_D V_D}{M_C}$$

$$V_C = \frac{(0.500 M)(500.0 \text{ mL})}{12.0 M}$$

$$V_C = \frac{M_D V_D}{M_C}$$

$$V_C = 20.8 \text{ mL HCl with } 479.2 \text{ mL H}_2\text{O}$$

2) It is necessary to make a 0.500 M solution of HCl from 500.0 mL of a 3.00 M solution of HCl.

What is the volume of the new solution?

$$\frac{M_C V_C}{M_D} = \frac{M_D V_D}{M_D}$$

$$V_D = \frac{(3.00 M)(500.0 \text{ mL})}{0.500 M}$$

$$V_D = \frac{M_C V_C}{M_D}$$

$$V_D = 3000 \text{ mL or } 3^{\circ}\text{L}$$

3) What is the molarity of a solution which has a volume of 1500.0 mL if it was obtained by diluting 250.0 mL of a 6.00 M solution of H₂SO₄?

$$\frac{M_C V_C}{V_D} = \frac{M_D V_D}{V_D}$$

$$M_D = \frac{(6.00 M)(250.0 \text{ mL})}{1500.0 \text{ mL}}$$

$$M_D = \frac{M_C V_C}{V_D}$$

$$M_D = 1.00 M$$

4) Your teacher needs to make 500.0 mL of a 3.00 M solution of H₂SO₄. Concentrated H₂SO₄ from the chemical company is 18.0 M. How many mL of the concentrated acid is needed to dilute which how much water to make this solution? (It should be noted that sulfuric acid gives off tremendous heat as it is diluted. The dilution needs to be done in an ice bath because the heat released is so great that the beaker can shatter.) The old saying from diluting acids is... "You know you really oughter add the acid to the water."

$$\frac{M_C V_C}{M_C} = \frac{M_D V_D}{M_C}$$

$$V_C = \frac{(3.00 M)(500.0 \text{ mL})}{18.0 M}$$

$$V_C = \frac{M_D V_D}{M_C}$$

$$V_C = 83.3 \text{ mL H}_2\text{SO}_4$$
$$500 - 83.3 = 416.7 \text{ mL H}_2\text{O}$$