

Name: \_\_\_\_\_

## Dilution

Concentrated hydrochloric acid,  $\text{HCl}$  (aq), is sold commercially as *muriatic acid*. The concentrate is 37% by mass  $\text{HCl}$ , with the remainder of the solution being water.

1. What is the **mole fraction** of  $\text{HCl}$  in muriatic acid?
2. Tammie, an unpaid work-study student, needs to make 500 mL of a 6.0 M aqueous  $\text{HCl}$  solution for a teaching lab. What mass of muriatic acid will she need?
3. What is the **molality** of  $\text{HCl}$  in muriatic acid?

The density of muriatic acid is 1.2 g/mL.

4. What mass of  $\text{HCl}$  is present in 1.000 L of muriatic acid?
5. What is the **molarity** of  $\text{HCl}$  in muriatic acid?

6. What volume of muriatic acid solution will Tammie need to make 500 mL of a 6.0 M HCl solution?
7. Gabrimin and Benjarel need to dilute a stock solution of 6.0 M HCl to make 100 mL of a 0.50 mol HCl solution. What volume of 6.0 M HCl should they use?
8. Quigg has 25 mL of a 0.50 M solution of HCl in a graduated cylinder. What is the mass of HCl in the cylinder?