

Molarity = _____

1 Liter = _____ mL = _____ cm³

1. Fill in the formula and blanks, above.

2. a. What is the formula for sodium sulfate? _____

b. What mass of sodium sulfate is required, in order to make 350 mL of 2.0 Molar sodium sulfate?
Show your math in two different ways.

3. **Mini-lab!** You will be making 50.0 mL of 0.800 M NaHCO₃ solution.

a. Calculate the mass of NaHCO₃ you'll need to weigh out, to make the solution.

b. Procedure: What steps will you need to take in lab? Include what type of glassware you'll use.

1. Weigh out _____ grams of NaHCO₃ (use weighing paper).

2.

4a. What is the formula for lithium nitrate? _____

b. Suppose that 0.1812 moles of lithium nitrate were dissolved into 243 mL of water, and the total solution volume (after the solid dissolved) was 250. milliliters. Calculate the molarity of lithium nitrate in this solution.

c. Calculate the concentration of a solution that contains 12.2 grams of lithium nitrate into water, so that the total solution volume (after dissolving) was 75.0 mL.

d. Which solution was more dilute – the one in (b) or (c)? _____

- 5. a.** What is the formula for ferric sulfate? _____
b. If you have 1500 mL of 0.20 M ferric sulfate solution, and you boil off all of the water, what mass of ferric sulfate would be left behind?
- 6. a.** What is the formula for chromium III nitrate? _____
b. If 88.9 grams of chromium III nitrate are mixed with 323 mL of water, the entire solution volume comes to 356 mL once the solid dissolved. Calculate the molarity of chromium nitrate in this solution.
- 7.** Soap can be made by reacting a fat or oil (for example, coconut oil, beef tallow, lard, olive oil...) with a concentrated solution of sodium hydroxide (aka "lye").
Suppose that you need to make 300. mL of 5.0 Molar NaOH in order to make a batch of soap.
What mass of NaOH would you need to weigh out?
- 8.** What is the formula for potassium chloride? _____
b. Calculate the molarity of potassium chloride in a solution that contains 3.58 moles of potassium chloride per 750. mL solution.
- 9.** In the sugar demo (the first week of the class), about 50. mL of 18. Molar sulfuric acid (H_2SO_4) was added to the sugar, to catalyze the sugar's decomposition into carbon and water vapor. How many moles of H_2SO_4 were present in the 50. mL?
- 10.a.** What is the formula for aluminum bromide? _____
b. What mass of aluminum bromide is contained in 20.0 mL of 0.667 M aluminum bromide solution?
- 11.** Calcium phosphate ($\text{Ca}_3(\text{PO}_4)_2$) has a molar mass of 310.185 g/mole. As a mineral, calcium phosphate and related compounds are sometimes referred to as "phosphate rock." Your solubility chart says that calcium phosphate is "insoluble" in water, however it is *very very slightly* soluble into water. A saturated solution of calcium phosphate contains 0.000047 grams dissolved in a total solution volume of 1250 mL. Calculate the molarity of calcium phosphate in this solution.