

Stoichiometry with Solutions Name _____

1. $\text{H}_3\text{PO}_4 + 3 \text{NaOH} \rightarrow \text{Na}_3\text{PO}_4 + 3 \text{H}_2\text{O}$
How much 0.20 M H_3PO_4 is needed to react with 100 ml. of 0.10 M NaOH?

2. $2 \text{HCl} + \text{Zn} \rightarrow \text{ZnCl}_2 + \text{H}_2$
When you use 25 ml. of 4.0 M HCl to produce H_2 gas, how many grams of zinc does it react with?

What volume of H_2 gas is produced at STP?

3. $\text{CaCO}_3 + 2 \text{HCl} \rightarrow \text{CaCl}_2 + \text{H}_2\text{O} + \text{CO}_2$
How much 0.80 M HCl would be needed to dissolve a CaCO_3 pearl which weighs 4.0 grams?

4. $3 \text{Fe} + 2 \text{Au}(\text{NO}_3)_3 \rightarrow 3 \text{Fe}(\text{NO}_3)_2 + 2 \text{Au}$
Throwing some scrap iron in a gold nitrate solution causes the gold metal to precipitate. How much 0.50 M gold nitrate solution would react with 224 grams of iron metal?

5. Sea water is about 0.50 M NaCl. To produce Cl_2 gas, a company evaporates sea water, melts the NaCl, and runs electricity through it. $2 \text{NaCl} \rightarrow 2 \text{Na} + \text{Cl}_2$ How many liters of sea water are needed to fill a tank car with 1,120,000 liters of chlorine gas at STP?

6. $\text{H}_3\text{PO}_4 + 3 \text{NaOH} \rightarrow \text{Na}_3\text{PO}_4 + 3 \text{H}_2\text{O}$
If 36.0 ml. of H_3PO_4 react exactly with 80.0 ml. of 0.500 M NaOH, what is the concentration of the phosphoric acid?

Answers: 1) 17 mL 2) 3.3 g of zinc and 1.1 L of H_2 3) 0.10L 4) 5.3 L
5) 2.0×10^5 L 6) 0.370 M