**Write molecular equations for the following reactions:**

1. Sulfuric acid is added to sodium hydroxide solution

**H2SO4 + 2 NaOH 🡪 Na2SO4 + 2 H2O**

1. Nitric acid is added to solid magnesium oxide and is heated

**2 HNO3 + MgO 🡪 Mg(NO3)2 + H2O**

1. Zinc metal is reacted with concentrated hydrochloric acid

**Zn + 2 HCℓ 🡪 ZnCℓ2 + H2**

1. A model volcano is made using a reaction between acetic acid and sodium hydrogencarbonate

**CH3COOH + NaHCO3 🡪 NaCH3COO + H2O + CO2**

1. Crystals of ammonium chloride are dissolved in potassium hydroxide solution

**NH4Cℓ + KOH 🡪 KCℓ + H2O + NH3**

1. Calcium carbonate in marble chips reacts with dilute nitric acid

**CaCO3 + 2 HNO3 🡪 Ca(NO3)2 + H2O + CO2**

**Write molecular equations, ionic equations and observations for the following reactions**

1. Pellets of sodium hydroxide are added to hydrochloric acid solution.

**Molecular Equation: NaOH(s) + HCℓ(aq) 🡪 NaCℓ(aq) + H2O(ℓ)**

**Ionic Equation: NaOH(s) + H+(aq) 🡪 Na+(aq) + H2O**

**Observation: White solid dissolves in colourless liquid. A colourless solution is formed.**

1. Acetic acid is used to dissolve solid copper carbonate.

**Molecular Equation: 2 CH3COOH(aq) + CuCO3(s) 🡪 Cu(CH3COO)2(aq) + H2O(ℓ) + CO2(g)**

**Ionic Equation: 2 CH3COOH(aq) + CuCO3(s) 🡪 Cu2+(aq) + 2 CH3COO-(aq) + H2O(ℓ) + CO2(g)**

**Observation: Green solid dissolves in a colourless solution. Reacts to form a blue solution and a colourless, odourless gas**

1. A piece of magnesium is placed in a solution of sulfuric acid.

**Molecular Equation: Mg(s) + H2SO4(aq) 🡪 MgSO4(aq) + H2(g)**

**Ionic Equation: Mg(s) + 2 H+(aq) 🡪 Mg2+(aq) + H2(g)**

**Observation: Silver metal added to a colourless solution. Solid dissolves and forms bubbles of colourless, odourless gas**

1. Zinc oxide is dissolved in concentrated ethanoic acid

**Ionic Equation: ZnO(s) + 2 CH3COOH(aq) 🡪 Zn2+(aq) + 2 CH3COO-(aq) + H2O(ℓ)**

**Observation: White solid dissolves in colourless liquid to form a colourless solution.**

1. Barium hydroxide solution is used to neutralise phosphoric acid solution

**Ionic Equation: 3 Ba(OH)2(aq) + 2 H3PO4(aq) 🡪 Ba3(PO4)2(s) + 6 H2O(ℓ)**

**Observation: Two colourless solutions are mixed. A white precipitate forms.**

1. Barium hydroxide solution reacts with solid ammonium nitrate

**Ionic Equation: OH-(aq) + NH4NO3(s) 🡪 NO3-(aq) + H2O(ℓ) + NH3(g)**

**Observation: A white solid dissolves in a colourless liquid. Bubbles of a colourless gas with a pungent odour are formed.**