The National Orthodox School Shmaisani

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**Subject: Science/ Chemistry**

**Name:** **Writing chemical formulae**

**Date:** **Grade-Section: 8CS**

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A chemical formula is defined as a collection of chemical symbols that is used to show the elements present in any compound and its proportion.
https://www.youtube.com/watch?v=p9iQ5Qn42DM

**1. Complete the table; it will help you to answer later questions.**

| Cations (positively charged) | | |
|---|---|---|
| **Name** | **Formula** | **Charge** |
| Sodium | **$Na^+$** | |
| Potassium | **$K^+$** | 1+ |
| Magnesium | | |
| Calcium | **$Ca^{2+}$** | |
| Aluminium | | |
| Copper (II) | | |
| Zinc | **$Zn^{2+}$** | 2+ |

| Anions (negatively charged) | | |
|---|---|---|
| **Name** | **Formula** | **Charge** |
| Chloride | **$Cl^-$** | |
| Bromide | **$Br^-$** | |
| Oxide | | |
| Hydroxide | **$OH^-$** | |
| Nitrate | | 1- |
| Carbonate | **$CO_3^{2-}$** | |
| Sulphate | | |

Hydrochloric acid …….
Sulfuric acid ……..
Nitric acid ……

**2. Complete the table with the formulae formed by each pair of ions.**

| | | Negative ion | | |
|---|---|---|---|---|
| | | **Chloride** | **Bromide** | **Oxide** |
| **Positive ion** | **Potassium** | | | |
| | **Calcium** | | $CaBr_2$ | |
| | **Aluminium** | | | |

| | | Negative ion | | | |
|---|---|---|---|---|---|
| | | **Hydroxide** | **Nitrate** | **Carbonate** | **Sulphate** |
| **Positive ion** | **Sodium** | | | $Na_2CO_3$ | |
| | **Magnesium** | | $Mg(NO_3)_2$ | | |
| | **Aluminium** | | | | |

**3. Write the chemical formula of these compounds:**

| Compound | Positive ion | Negative ion | Chemical formula |
|---|---|---|---|
| **Lithium oxide** | | | |
| **Zinc nitrate** | | | |

| | | | |
|---|---|---|---|
| **Calcium carbonate** | | | |
| **Sodium hydroxide** | | | |
| **Calcium chloride** | | | |
| **Copper oxide** | | | |
| **Silver nitrate** | | | |
| **Aluminium oxide** | | | |
| **Iron oxide** | | | |
| **Copper carbonate** | | | |
| **Zinc oxide** | | | |
| **Silver hydroxide** | | | |
| **Iron sulfate** | | | |
| **Silver carbonate** | | | |

4. **Complete these equations, then rewrite each equation using the chemical formula** (***no need to balance the equations***)

a) Magnesium + Nitric Acid ⟶ _____+ _____

_____

b) Silver + sulfuric Acid ⟶ _____ + _____

_____

c) Magnesium carbonate + Hydrochloric Acid ⟶ _____ + _____ + _____

_____

d) Sodium Carbonate + Nitric Acid ⟶ _____ + _____ + _____

_____

e) Sodium Hydroxide + Hydrochloric Acid ⟶ _____+ _____

_____

f) Magnesium Oxide + Sulfuric Acid⟶ _____ + _____

**1. Complete the table; it will help you to answer later questions.**

| Cations (positively charged) | | |
|---|---|---|
| **Name** | **Formula** | **Charge** |
| Sodium | $Na^+$ | 1+ |
| Potassium | $K^+$ | 1+ |
| Magnesium | $Mg^{+2}$ | +2 |
| Calcium | $Ca^{2+}$ | +2 |
| Aluminium | $Al^{+3}$ | +3 |
| Copper (II) | $Cu^{+2}$ | +2 |
| Zinc | $Zn^{2+}$ | 2+ |

| Anions (negatively charged) | | |
|---|---|---|
| **Name** | **Formula** | **Charge** |
| Chloride | $Cl^-$ | −1 |
| Bromide | $Br^-$ | −1 |
| Oxide | $O^{-2}$ | −2 |
| Hydroxide | $OH^-$ | −1 |
| Nitrate | $NO_3^{-1}$ | 1- |
| Carbonate | $CO_3^{2-}$ | −2 |
| Sulphate | $SO_4^{-2}$ | −2 |

iron $Fe^{+2}$ +2

silver $Ag^{+1}$ +1

Hydrochloric acid .....HCl.....

Sulfuric acid .....$H_2SO_4$.....

Nitric acid .....$HNO_3$.....

**2. Complete the table with the formulae formed by each pair of ions.**

| | | Negative ion | | |
|---|---|---|---|---|
| | | Chloride $Cl^{-1}$ | Bromide $Br^{-1}$ | Oxide $O^{-2}$ |
| Positive ion | Potassium $K^{+1}$ | KCl | KBr | $K_2O$ |
| | Calcium $Ca^{+2}$ | $CaCl_2$ | $CaBr_2$ | CaO |
| | Aluminium $Al^{+3}$ | $AlCl_3$ | $AlBr_3$ | $Al_2O_3$ |

| | | Negative ion | | | |
|---|---|---|---|---|---|
| | | Hydroxide $(OH)^{-1}$ | Nitrate $(NO_3)^{-1}$ | Carbonate $(CO_3)^{-2}$ | Sulphate $(SO_4)^{-2}$ |
| Positive ion | Sodium $Na^{+1}$ | NaOH | $NaNO_3$ | $Na_2CO_3$ | $Na_2SO_4$ |
| | Magnesium $Mg^{+2}$ | $Mg(OH)_2$ | $Mg(NO_3)_2$ | $MgCO_3$ | $MgSO_4$ |
| | Aluminium $Al^{+3}$ | $Al(OH)_3$ | $Al(NO_3)_3$ | $Al_2(CO_3)_3$ | $Al_2(SO_4)_3$ |

**3. Write the chemical formula of these compounds:**

| Compound | Positive ion | Negative ion | Chemical formula |
|---|---|---|---|
| Lithium oxide | $Li^{+1}$ | $O^{-2}$ | $Li_2O$ |
| Zinc nitrate | $Zn^{+2}$ | $(NO_3)^{-1}$ | $Zn(NO_3)_2$ |

| | | | |
|---|---|---|---|
| Calcium carbonate | $Ca^{+2}$ | $(CO_3)^{-2}$ | $CaCO_3$ |
| Sodium hydroxide | $Na^{+1}$ | $(OH)^{-1}$ | $NaOH$ |
| Calcium chloride | $Ca^{+2}$ | $Cl^{-1}$ | $CaCl_2$ |
| Copper oxide | $Cu^{+2}$ | $O^{-2}$ | $CuO$ |
| Silver nitrate | $Ag^{+1}$ | $(NO_3)^{-1}$ | $AgNO_3$ |
| Aluminium oxide | $Al^{+3}$ | $O^{-2}$ | $Al_2O_3$ |
| Iron oxide | $Fe^{+2}$ | $O^{-2}$ | $FeO$ |
| Copper carbonate | $Cu^{+2}$ | $(CO_3)^{-2}$ | $CuCO_3$ |
| Zinc oxide | $Zn^{+2}$ | $O^{-2}$ | $ZnO$ |
| Silver hydroxide | $Ag^{+1}$ | $(OH)^{-1}$ | $AgOH$ |
| Iron sulfate | $Fe^{+2}$ | $(SO_4)^{-2}$ | $FeSO_4$ |
| Silver carbonate | $Ag^{+1}$ | $(CO_3)^{-2}$ | $Ag_2CO_3$ |

**4. Complete these equations, then rewrite each equation using the chemical formula (*no need to balance the equations*)**

a) Magnesium + Nitric Acid ⟶ magnesium nitrate + hydrogen

$Mg + HNO_3 \longrightarrow Mg(NO_3)_2 + H_2$

b) Silver + sulfuric Acid ⟶ silver sulfate + hydrogen

$Ag + H_2SO_4 \longrightarrow Ag_2SO_4 + H_2$

c) Magnesium carbonate + Hydrochloric Acid ⟶ magnesium chloride + water + carbon dioxide

$MgCO_3 + HCl \longrightarrow MgCl_2 + H_2O + CO_2$

d) Sodium Carbonate + Nitric Acid ⟶ sodium nitrate + water + carbon dioxide

$Na_2CO_3 + HNO_3 \longrightarrow NaNO_3 + H_2O + CO_2$

e) Sodium Hydroxide + Hydrochloric Acid ⟶ sodium chloride + water

$NaOH + HCl \longrightarrow NaCl + H_2O$

f) Magnesium Oxide + Sulfuric Acid ⟶ magnesium sulfate + water

$MgO + H_2SO_4 \longrightarrow MgSO_4 + H_2O$