

# Ionic Reactions

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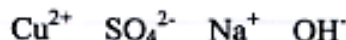
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## Example Reaction (Double Replacement)

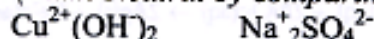
Given:  $\text{CuSO}_4 + \text{NaOH}$

### MOLECULAR EQUATION:

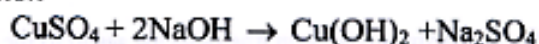
i) *Identify Ions*



ii) *Swap Partners (Make Neutral by comparing charge.)*

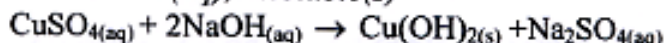


iii) *Balance Reaction*



iv) *Determine States (Look at solubility rules...see handout.)*

*Soluble(aq), Insoluble(s)*



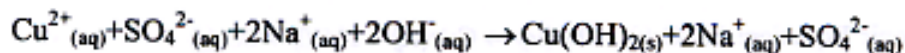
v) *Check for Driving Force (The formation of a new solid(s), liquid(l)...formation of H<sub>2</sub>O, gas(g), or weak acid from a strong acid)*

[1] If there is a driving force then reaction occurs, if not then there is no reaction.

[2] If reaction forms H<sub>2</sub>CO<sub>3</sub>, H<sub>2</sub>SO<sub>3</sub>, or NH<sub>4</sub>OH then they will decompose into H<sub>2</sub>O and a gas.

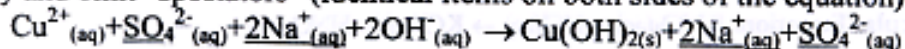
### TOTAL IONIC EQUATION

Write down ionic and non ionic compounds after dissociation:

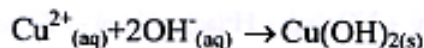


### NET IONIC EQUATION

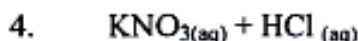
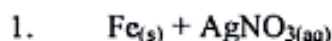
Identify and omit "spectators" (identical items on both sides of the equation)



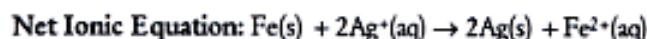
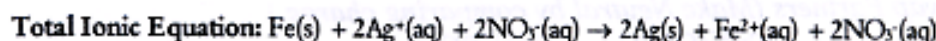
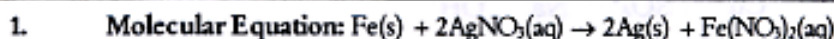
Yields:



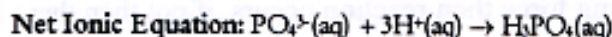
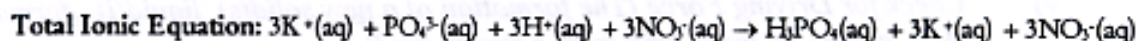
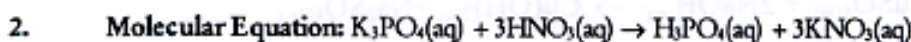
### Practice:



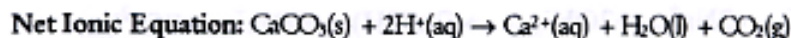
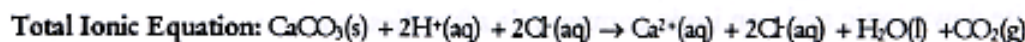
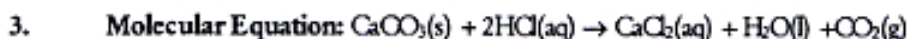
### Solutions:



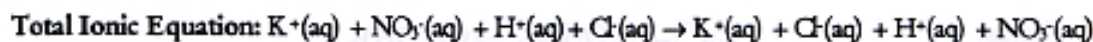
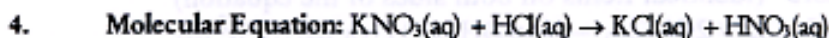
The driving force was the transfer of electrons from iron (the reducing agent) to the silver ion (the oxidizing agent).  
*Remember: The reducing agent is the reactant that donates the electrons to the reactant that is reduced. When the reducing agent loses electrons, it is oxidized. The oxidizing agent is the reactant that receives the electrons from the reactant that is oxidized. In doing so, the oxidizer is reduced.*



The driving force was the formation of the weakly ionized acid.



The driving force was the formation of water and gas!



**Net Ionic Equation:** There is no net because all species remained as aqueous ions before and after my hypothesized double replacement reaction. The lack of a driving force leads me to conclude that the correct hypothesis is **No Reaction**.