Single Displacement Reactions

A + BC → AC + B

$$K_{(s)} + CaF_{2(aq)} \rightarrow KF_{(aq)} + Ca_{(s)}$$

$$Al_{(s)} + CuSO_{4(aq)} \rightarrow Al_2(SO_4)_{3(aq)} + Cu_{(s)}$$

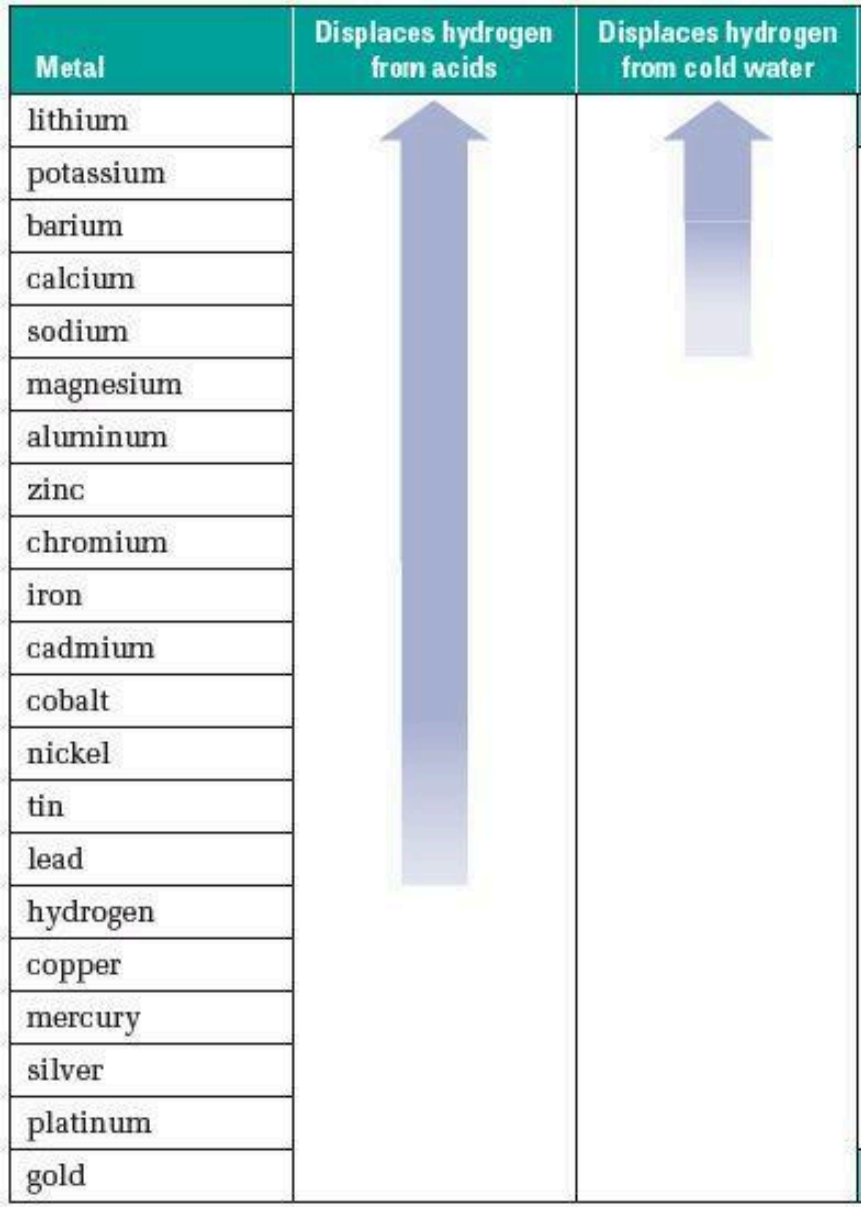
$$Fe_{(s)} + NaCl_{(aq)} \rightarrow \text{No reaction}$$

Single Displacement Reactions

Hydrogen is complicated.

You can use the regular metal activity series for displacement from acids

BUT for water:
Only sodium and up will actually displace hydrogen from water
and
each metal only displaces **one** H atom per water.



Metal	Displaces hydrogen from acids	Displaces hydrogen from cold water
lithium		
potassium		
barium		
calcium		
sodium		
magnesium		
aluminum		
zinc		
chromium		
iron		
cadmium		
cobalt		
nickel		
tin		
lead		
hydrogen		
copper		
mercury		
silver		
platinum		
gold		

Predict the products of these single displacement reactions:

$K + NaF \rightarrow$	$K + FeO \rightarrow$
$K + CaCl_2 \rightarrow$	$K + Sn_3N_2 \rightarrow$
$K + MgBr_2 \rightarrow$	$K + PbS \rightarrow$
$K + ZnI_2 \rightarrow$	$K + Cu_3P_2 \rightarrow$

$Mg + NaF \rightarrow$	$Mg + FeO \rightarrow$
$Mg + CaCl_2 \rightarrow$	$Mg + Sn_3N_2 \rightarrow$
$Mg + AlBr_3 \rightarrow$	$Mg + PbS \rightarrow$
$Mg + ZnI_2 \rightarrow$	$Mg + Cu_3P_2 \rightarrow$

$Sn + NaF \rightarrow$	$Sn + FeO \rightarrow$
$Sn + CaCl_2 \rightarrow$	$Sn + PbS \rightarrow$
$Sn + AlBr_3 \rightarrow$	$Sn + Cu_3P_2 \rightarrow$
$Sn + ZnI_2 \rightarrow$	$Sn + Au(NO_3)_3 \rightarrow$

$Ag + NaF \rightarrow$	$Ag + FeO \rightarrow$
$Ag + CaCl_2 \rightarrow$	$Ag + PbS \rightarrow$
$Ag + AlBr_3 \rightarrow$	$Ag + Cu_3P_2 \rightarrow$
$Ag + ZnI_2 \rightarrow$	$Ag + Au(NO_3)_3 \rightarrow$

$F_2 + NaCl \rightarrow$	$Cl_2 + FeCl_3 \rightarrow$
$Cl_2 + CaBr_2 \rightarrow$	$Br_2 + PbF_4 \rightarrow$
$Br_2 + ZnI_2 \rightarrow$	$F_2 + CuI_2 \rightarrow$
$F_2 + SnBr_4 \rightarrow$	$Cl_2 + YBr_3 \rightarrow$

Predict the products of these single displacement reactions:

$K + H_2O \rightarrow$	$Li + H_2O \rightarrow$
$Na + H_2O \rightarrow$	$Mg + H_2O \rightarrow$
$Ca + H_2O \rightarrow$	$Al + H_2O \rightarrow$
$Ba + H_2O \rightarrow$	$Zn + H_2O \rightarrow$

$K + HCl \rightarrow$	$Li + H_2CO_3 \rightarrow$
$Na + H_2SO_4 \rightarrow$	$Ag + HF \rightarrow$
$Ca + HNO_3 \rightarrow$	$Al + H_3PO_4 \rightarrow$
$Cu + HBr \rightarrow$	$Zn + HCl \rightarrow$