

Exercise 8.3a(H)

Using the Activity Series

Name: _____

Date: _____ Per: _____

In a single replacement reaction, one element replaces another element in a compound. For one element to replace another, it must be more reactive than the element it replaces. During the replacement, the more reactive element increases its stability more than the element it is replacing did during the formation of the compound.

For example, in a compound of zinc chloride, two chlorine atoms remove two electrons from a single atom of zinc. As the zinc loses its electrons it becomes more stable. Calcium is more reactive than zinc. When it loses two electrons, it releases much more energy than zinc does when it loses two electrons. So, if calcium is added to a solution of zinc chloride, calcium will lose its electrons to zinc to maximize the stability of the system. The zinc will become less stable again, but the calcium will become much more stable. Chemicals react to achieve the greatest stability.

The reactivities of many elements have been ranked and are shown below in the *Activity Series Table*. More reactive elements are at the top of the chart and will be the elements below them on the chart.

DIRECTIONS: For each set of reactants below, if a reaction will occur based on the elements' positions in the Activity Series, complete the equation and balance it. If there is no reaction, write "No Reaction".

[NOTE: For metals, the format for single replacement reactions is $AB + C \rightarrow CB + A$; for nonmetals the format is $AB + D \rightarrow AD + B$]

- ___ Mg(s) + ___ HCl(aq) \rightarrow _____
- ___ Ag(s) + ___ Cu(NO₃)₂(aq) \rightarrow _____
- ___ Zn(s) + ___ Mn(C₂H₃O₂)₇(aq) \rightarrow _____
- ___ Al(s) + ___ HCl(aq) \rightarrow _____
- ___ Cu(s) + ___ HBr(aq) \rightarrow _____
- ___ Cu(s) + ___ AgC₂H₃O₂ (aq) \rightarrow _____
- ___ Sn(s) + ___ H₂SO₄(aq) \rightarrow _____
- ___ Mg(s) + ___ Pb(NO₃)₂(aq) \rightarrow _____
- ___ Pb(s) + ___ AuCl(aq) \rightarrow _____
- ___ Zn(s) + ___ AgNO₃(aq) \rightarrow _____
- ___ Al(s) + ___ H₂SO₄(aq) \rightarrow _____
- ___ Li(s) + ___ H₂O(l) \rightarrow _____
- ___ Al(s) + ___ Pb(NO₃)₂(aq) \rightarrow _____
- ___ Cl₂(g) + ___ NaI(aq) \rightarrow _____
- ___ Al(s) + ___ CuCl₂(aq) \rightarrow _____
- ___ Zn(s) + ___ H₂SO₄(aq) \rightarrow _____
- ___ Cl₂(g) + ___ MgI₂(aq) \rightarrow _____

Activity Series	
Metals	Nonmetals
Li	F ₂
Rb	Cl ₂
K	Br ₂
Cs	I ₂
Ba	
Sr	
Ca	
Na	
Mg	
Al	
Ti	
Mn	
Zn	
Cr	
Fe	
Co	
Ni	
Sn	
Pb	
H ₂	
Cu	
Ag	
Pt	
Au	

Directions: Write and balance the full formula equation for the following.

- lead + zinc acetate: _____
- aluminum bromide + chlorine: _____
- calcium + hydrochloric acid: _____
- magnesium + nitric acid: _____
- sodium + water: _____