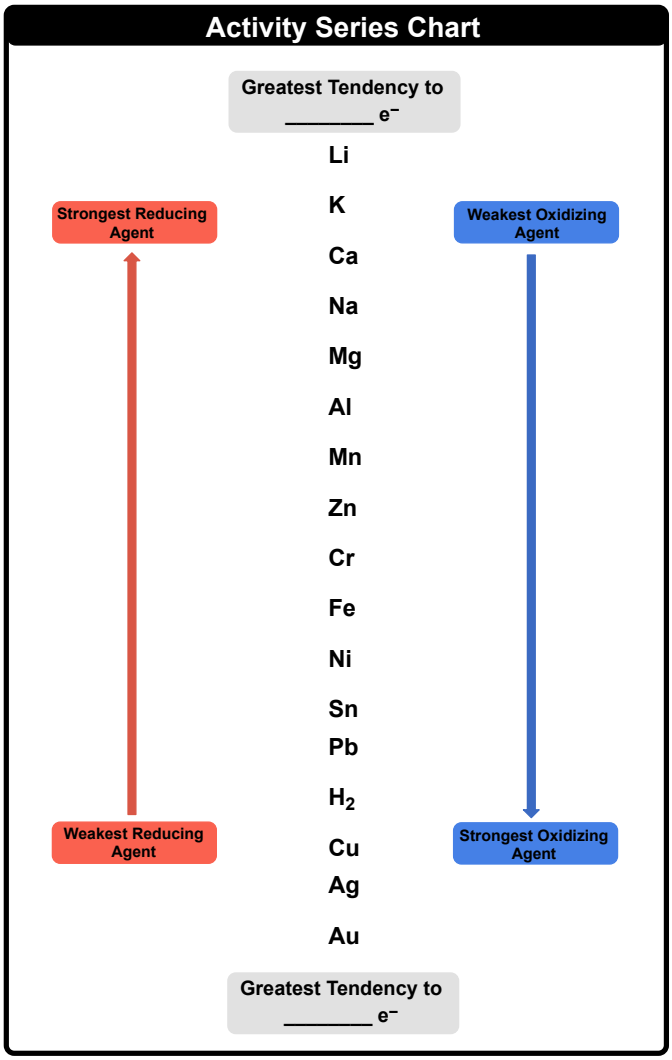
CONCEPT: SPONTANEOUS REDOX REACTIONS

- Redox Reactions are spontaneous when an element can _____ *displace* another element within a compound.
  - □ **Displace**: To remove an element from its compound and thereby _____ it.
    - **Activity Series Chart** determines if an element can *displace* another element.
  - □ An element _____ in the activity series chart will displace an element _____ in the activity series chart.
  - □ Recall, an oxidizing agent is _____ and the reducing agent is _____.



EXAMPLE: Based on Activity Series Chart, determine if the following reaction represents a spontaneous redox reaction.

Ca (s) + AgCl (s) ⟶

STEP 1: Locate the monoatomic element on the Activity Series Chart.

STEP 2: If it is _____ on the Activity Series Chart, it will displace the element within the nearby compound.

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PRACTICE: Which element is the best reducing agent?

a) Manganese b) Aluminum c) Lithium d) Nickel e) Chromium

PRACTICE: Determine which of the following redox reactions will occur spontaneously in the forward direction?

a) $Ni\ (s) + Zn^{2+}\ (aq) \longrightarrow Ni^{2+}\ (aq) + Zn\ (s)$

b) $Fe\ (s) + Pb^{4+}\ (aq) \longrightarrow Fe^{2+}\ (aq) + Pb\ (s)$

c) $Al\ (s) + Ag^{+}\ (aq) \longrightarrow Al^{3+}\ (aq) + Ag\ (s)$

d) $Pb\ (s) + Mn^{2+}\ (aq) \longrightarrow Pb^{2+}\ (aq) + Mn\ (s)$

PRACTICE: Suppose you wanted to cause Ni^{2+} ions to come out of solution as solid Ni. Which metal could you use to accomplish this?

a) Au b) Sn c) Mn d) Ag e) Cu