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# Iron Data Sheet

## **Pre-Lab Activity**

Test Tube	Solution 1	Oxidation # of Iron	Solution 2	Oxidation # of Iron
1			Potassium ferrocyanide $K_4[Fe(CN)_6]$	
2	Iron(II) sulfate FeSO <sub>4</sub>		Potassium ferricyanide $K_3[Fe(CN)_6]$	
3			Potassium thiocyanate KSCN	
4			Potassium ferrocyanide K <sub>4</sub> [Fe(CN <sub>6</sub> ]	
5	Iron(III) chloride FeCl <sub>3</sub>		Potassium ferricyanide $K_3[Fe(CN)_6]$	
6			Potassium thiocyanate KSCN	

Show all work.

### **Redox Observations**

Test Tube	Solution 1	Solution 2	Observations
1		Potassium ferrocyanide $K_4[Fe(CN)_6]$	
2	Iron(II) sulfate FeSO <sub>4</sub>	Potassium ferricyanide $K_3$ [Fe(CN) <sub>6</sub> ]	
3		Potassium thiocyanate KSCN	
4		Potassium ferrocyanide $K_4$ [Fe(CN <sub>6</sub> ]	
5	Iron(III) chloride FeCl <sub>3</sub>	Potassium ferricyanide $K_3[Fe(CN)_6]$	
6		Potassium thiocyanate KSCN	

## Determination of Unknown

Test Tube	Solution 1	Solution 2	Observations	Oxidation # of Iron
1		Potassium ferrocyanide $K_4[Fe(CN)_6]$		
2	Iron-containing solution	Potassium ferricyanide K <sub>3</sub> [Fe(CN) <sub>6</sub> ]		
3		Potassium thiocyanate KSCN		-

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#### **Post-Lab Questions**

1. How can potassium thiocyanate be used to confirm that Fe<sup>2+</sup> ions have been oxidized to Fe<sup>3+</sup>? Will tube 1 eventually turn Prussian blue?

2. How can potassium ferricyanide be used to confirm that  $Fe^{3+}$  ions have been reduced to  $Fe^{2+}$ ?

3. Use the oxidation state rules to assign oxidation states for the indicated atoms in each oxidizing agent and its product. Show your work.

Atom	<b>Oxidizing Agent</b>	Oxidation State
Mn	MnO <sub>4</sub> -	
Ο	$H_2O_2$	
Cl	OCl-	
Ι	IO <sub>3</sub> -	
S	SO <sub>4</sub> <sup>2–</sup>	

- 4. Circle the correct choices to complete the following definitions.
  - a. An oxidizing agent is a substance that causes the (*oxidation/reduction*) of another reactant in a redox reaction. The oxidation state of the oxidizing agent (*increases/decreases*), and the oxidizing agent itself undergoes (*oxidation/reduction*) during the reaction.
  - b. A reducing agent is a substance that causes the (*oxidation/reduction*) of another reactant in a redox reaction. The oxidation state of the reducing agent (*increases/decreases*), and the reducing agent itself undergoes (*oxidation/reduction*) during the reaction.

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