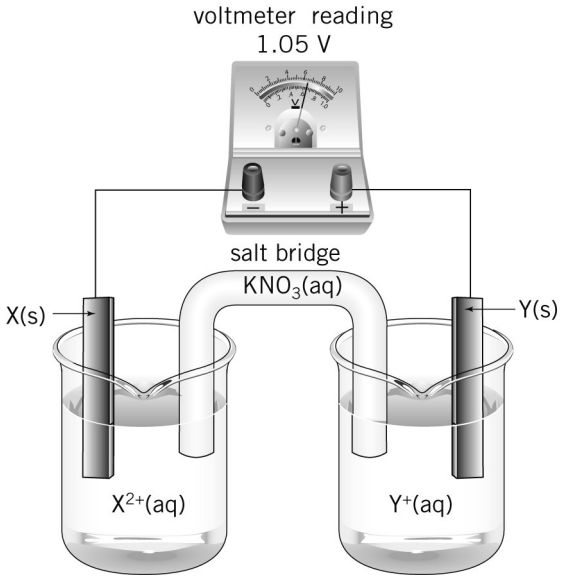
Worksheet 9.2

Electrochemical cells

NAME: **CLASS:**

INTRODUCTION

In order to investigate the relative reductant strength of metals, a series of electrochemical cells may be used. One such cell (cell 1) is shown below. All solutions used are 1.0 mol L^{-1}.



No.	Question	Answer
1	For the cell shown above: **a** which electrode (X or Y) is positive? **b** in which direction are the electrons flowing? **c** which electrode (X or Y) is the anode? **d** in which direction are anions flowing through the salt bridge?	
2	For the cell shown above, write balanced half-equations for the reactions occurring at: **a** electrode X **b** electrode Y.	

A second cell (cell 2) was set up. A strip of metal, Z, was placed in a beaker containing a 1.0 mol L^{-1} solution of $Z(NO_3)_2$. This half-cell was connected to the X^{2+}/X half-cell used in cell 1. Electrons flowed from electrode X to electrode Z, and a cell potential of 0.59 V was recorded.

3	For this cell, write balanced half-equations for the reactions occurring at: **a** electrode X **b** electrode Z.	
4	Based on the observations made in questions **1–3**, list the metals X, Y and Z in order of decreasing reductant strength. Explain how you arrived at your order.	
5	For a cell constructed by connecting the Z^{2+}/Z and Y^{+}/Y half-cells, predict the following: **a** the direction of electron flow **b** the anode **c** the reduction half-equation **d** the cell potential.	
6	If the set of half-cells used above was constructed using 0.5 mol L^{-1} solutions and the experiment was repeated, what changes in results, if any, would you expect?	
7	All half-cells in this series of cells have been connected using filter papers dipped in potassium nitrate solution. Explain why potassium nitrate is a suitable substance to use in this way.	
8	If metal Z is identified as copper, suggest a possible identity for: **a** metal X **b** metal Y.	