WHAT IS A PENNY WORTH???

Purpose:
To determine the actual monetary value of a penny, using your knowledge of chemical reactions and stoichiometry.

Introduction:
In 1982 the U.S. government made some changes in the composition of the penny. Earlier pennies were composed of over 95% copper. In 1982 the government began producing pennies composed of 97.5% zinc and 2.5% copper. Why was this change made? The cost of copper became so expensive that the penny had to be altered so that producing pennies did not become overly expensive. In this lab you will be using your knowledge of chemical reactions and stoichiometry to determine the actual value of a penny.

What do you think a penny is worth? What was your guess based on?

Calculate how many mL of 6.0 M hydrochloric acid you will need for 1 penny. Assume that the penny is made of zinc for this calculation

Materials:
100 mL or 150 mL Beakers, Balance, file, 6.0 M hydrochloric Acid, forceps

Procedure:
You decide. Use 3 pennies
Have your procedure checked before you begin.

Calculations:
Use your experimental data to determine the value of a penny.
Show your calculations in an organized manner. Label what you are calculating. Use proper units. Circle answers.
Note: the price of copper = $1.85 per pound and the price of zinc = .87 per pound.

Questions:
1) In this lab what was the limiting reactant? What was the excess reactant?
2) Why didn't the copper react? Please make reference to oxidation and reduction in your answer.
3) Calculate the mass of zinc chloride produced in this lab (Combine all three trials together).
4) Calculate the volume of hydrogen gas produced in this lab (Combine all three trials together).
5) Write the net ionic equation for the reaction which took place.
6) Use the price per pound data and the data in the introduction to calculate the actual value of a penny.

Error Analysis:
Use your answer from #6 above and your experimental value of a penny (determined from your calculations), in order to calculate your percent error.

Conclusion:
Give a detailed written explanation of the math you used to determine the volume of HCl required to consume the penny.