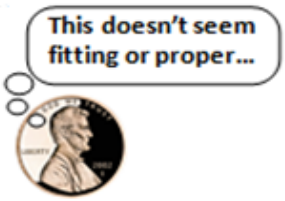
**Naked Penny Lab!** Name: _____

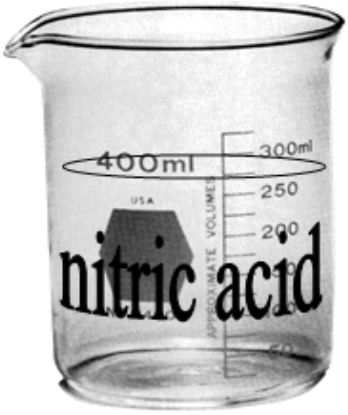
Part I: Removing the zinc from the inside of a penny:

1. Obtain a new penny (post '82). This new penny is actually made of zinc, with a thin coating of copper plated on. Use the flat side of a file to file away the copper coating from 3-4 spots around the perimeter of a post '82 penny, then place the penny in some dilute HCl solution.




Part II: Removing the copper from the outside of another penny

1. Obtain a second new penny (post '82) and examine it. Date: _____ Make a guess as to what percent (by weight) of the penny is actually copper: _____




2. The unit we use in science for mass is the gram. A gram is roughly the mass of a dollar bill. So just by hefting it in your hand, estimate the mass of the penny in grams: _____. Now weigh it. Actual mass: _____

3. Now take this penny over to "the fume hood" where Mr. A will help you remove the copper coating with nitric acid. This is a little tricky since nitric acid reacts with both copper and zinc. In fact, it reacts much more vigorously with zinc than it does with copper. The trick is to take it out as soon as the bubbling reaction goes from mild to wild! After it has been rinsed with water to remove any extra acid, wipe it dry with a paper towel and then use a piece of steel wool to buff off the black coating that formed on the zinc. Buff both front and back until the penny looks shiny.

4. Predict the mass of the "naked" penny in grams: _____ Now weigh it. Actual mass: _____

5. Calculate how much the copper coating weighed: _____ Calculate the percent copper in the original penny: _____

**Follow up questions:**

1. In an attempt to see how thick the copper coating was, Ben used a ruler to measure the thickness of the penny before and after the reaction. Why would this probably not tell him much?

2. Can you think of a better way Ben could determine the thickness of the copper coating using one hundred pennies and a ruler?

3. Why would using one hundred pennies provide better a better estimate of the copper's thickness?

4. Can you think of a completely different way Ben could determine the thickness of the copper coating using just one penny, the mass measurements you made above, a metric ruler, and being given the density of copper as 8.96 g/mL?

5. What is the balanced chemical reaction that occurred in part I? _____

6. Suppose the zinc in the penny is 2.50 grams. How many grams of HCl is needed to react with this zinc?