

Name \_\_\_\_\_

Per \_\_\_\_\_

Date \_\_\_\_\_

## Lab 1 - A Penny For Your Thoughts

### Materials:

- paper towels (around the room)
- 250 mL beaker with 20 mL of clear liquid and metal (zinc) pellets in it
  - **CAUTION: This liquid is sodium hydroxide, NaOH, and is highly caustic. Use extreme care when handling.**
- 2 pennies
- 150 mL beaker
- cold water (tap water is fine)
- hotplate
- rubber "oven mitt" for holding hot beaker
- tongs for dipping penny (may also use provided tweezers, whichever is more comfortable and feels safer for you)
- scrubby sponge
- 1 pair of gloves (for penny-dipper)

### Procedure:

1. Make sure all lab group members are wearing appropriate clothing and required safety gear: goggles, and aprons are required for this lab.
2. Make sure your lab station has all the materials from the materials list. If it doesn't, stop and tell your teacher.
3. Fill the 150 mL beaker  $\frac{1}{2}$  full with water from the tap.
4. Gently place 250 mL beaker with NaOH and zinc pellets on hot plate.
5. Set hot plate to setting 3 to start. Do not go higher than 4.
6. DO NOT allow NaOH solution to boil, as it is highly caustic and may spatter if boiling. One lab member should remain with the solution at all times to monitor. If it starts to boil, immediately turn off hot plate, step away, and alert the teacher.
7. While NaOH solution is heating, rub pennies with scrubby sponge to clean, and rinse in cold water. They should be as bright and shiny as you can get them.
8. After cleaning, handle pennies only with gloved hands; oils from skin can interfere with the reaction.
9. Weigh your pennies on the electronic balances, and record mass on lab handout.  
HINT - use the date of the pennies to identify them.
10. Once pennies are clean, and NaOH solution is bubbling (tiny bubbles from the bottom, NOT a boil), use tongs to gently drop one penny into the hot solution. This person MUST be wearing gloves. Do not drop the penny from a height, which could cause a splash. Place the penny near the bottom of the beaker and release.



11. The penny should begin to turn silvery white and small bubbles of gas will fizz from the solution.
12. Once the penny is completely silver, use the rubber "oven mitt" to stabilize the beaker of solution, and the tongs to remove the penny.
13. Dip the penny into the beaker of tap water. Swirl it around to cool it, and completely wash away any remaining NaOH. Dry with a paper towel and do not handle with bare fingers (leave on paper towel).
14. Weigh the silver penny and record the second mass on your lab handout.
15. Using rubber "oven mitt", move beaker of NaOH to the side of the hot plate.
16. Place the silver penny on the hot plate. When it has completely changed color, remove with tongs, and swirl in tap water beaker to cool. Dry with a paper towel.
17. Repeat steps 10-16 with your second penny.
18. Weigh both pennies a third time, and record masses on your lab handout.
19. Record observations about color change and qualities of the final pennies on your lab handout.

**Clean Up:**

- Give used pennies to your teacher
- Turn hot plate off
- Leave NaOH beaker on the counter as you found it (do **not** dump contents)
- Dump out tap water, and leave water beaker empty, like you found it
- If you are 1st - reset for next class. If you are 2nd - follow specific clean-up

**Prelab Assignment - Write/type on separate piece of paper and turn in on lab day:**

1. You are using sodium hydroxide (NaOH) at a high concentration in this lab. What should you do if any of it spills on the counter? What should you do if it spills on your skin? (This is not in the lab. You must do some research)
2. What are two other important safety concerns for this lab? For each concern, how can you avoid accidents?
3. What should you do if the sodium hydroxide begins to **boil**?
4. What should the sodium hydroxide solution be doing **before** you add the pennies?
5. When cleaning up, what should you do with the sodium hydroxide?
6. Which step comes first: Letting the penny sit in the sodium hydroxide solution, or letting the penny sit on the hot plate?
7. What do you need to do to the pennies before you start the experiment?
8. **Thinking Question:** What do you **think** happens to the pennies after these changes? (This question is for you to use your current knowledge of chemistry and the world around you to tell me your educated guess. No research required, just your brain!)