**NAme\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Partner\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ LAB STATION\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
Alchemy: Can you turn a penny into gold?
In this lab, you will be converting a regular penny into a “gold” penny. In doing so, you are following a tradition that dates back to the earliest days of chemistry.

The modern practice of chemistry started with the study of alchemy in medieval Europe and the Middle East. Alchemists convinced people that by doing certain chemical reactions, you could turn cheap metals into gold. The alchemist would sell them the secret and by the time anyone realized that the “secret” didn’t work, they’d be long gone with the money.

In this lab, you will be making an alloy. Just like the alchemist you will mix zinc with copper and make brass, it will appear to be gold. Since gold is an element on the periodic table we cannot really make gold, but we can combine elements into compounds through chemical reactions or combine elements physically into mixtures.

 The zinc will dissolve in the sodium hydroxide and attaches to the penny. It forms a thin layer over the outside of the penny, this process if referred to as plating. You may be familiar with silver plated jewelry, which is usually stainless steel with a thin outer coating of silver. In other words it is not solid silver. When the zinc plated penny is heated over the Bunsen burner, the silvery zinc coating melts along with the copper metal forming a new metal, brass that appears “gold” in color.

Brass is a metal alloy that has frequently been confused for gold, especially by people who don’t see gold often.

Would an alloy be considered a compound or a mixture? Why? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Bronze is another alloy, do you have any idea what two metals combine to form bronze?

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*Safety:*

      Follow Bunsen burner safety – on lab table

      Tie back your hair & roll up your sleeves

      Wear closed toed shoes

      Wear goggles & aprons at all time ( using corrosive chemicals)

      Keep your ring stand below eye level.

      If chemicals get in your eye rinse at the eye wash station for 15 minutes and notify Mr.Yoast. Rinse clothing if you get chemicals on your clothing.

*Procedure:*

*Step 1:* Clean pennies using steel wool, rinse with water and dry completely.

*Step 2:* Mix chemicals:

o   Place a half spoon of Zinc (dust or Mossy) in evaporating dish; distribute to cover the bottom of dish.

o   Add 20mL of 1M NaOH to evaporating dish and stir with the wooden splint.

*Step 3:* Light the Bunsen burner according to directions. Keep the burner on throughout the experiment. Turn off the gas when you are completely finished.

*Step 4:* Place evaporating dish with sodium hydroxide and zinc mixture on ring stand over Bunsen burner (about 4 cm above the hottest part of the flame). Never allow the mixture to boil, it should remain at a simmer.

*Caution:* Never allow your chemicals to boil, raise your hand to ask for assistance if your chemicals are boiling. Do not allow the evaporation dish to go dry, add 1 pipet (Medicine Dropper provided)of NaOH when necessary before adding your pennies.

*Step 5 Plating process:*

Using tweezers take a penny and submerge it into the sodium hydroxide so they sit on top of the zinc mixture.

                Allow the penny to “plate” for about two minutes. Then using the tweezers turn the pennies over until both pennies are completely plated with the Zn. It will appear silver in color.

                Remove penny one using the tweezers and rinse in your beaker of water until the slimy coating is removed. Blot dry with a paper towel.

*Step 6 making an alloy:*

Using the tweezers, hold the penny at its edge and place it in the flame flipping the penny over so both sides are heated equally. When the penny looks “gold” remove penny from flame and cool with water. Your penny should appear gold in color.

Repeat for each group member

Try the “new pennies”

*Step 7:* Place your group’s best “gold” penny and your best “silver” penny on an index card with your lab number on the back counter.

*Chemical disposal –* DO NOT handle hot chemicals. When they are cool Mr Yoast will dispose of them properly.

  Tape your best silver penny here Tape your best Gold penny here.**

 ***Repeat the experiment:*

Do the experiment over again, except manipulate one variable to improve your final product. A few helpful hints:

1.    Try plating the penny in the NaOH + Zn longer than two minutes, or plate it twice before melting.

2.    Reduce the time the penny melts in the flame.

3.    Transport your penny quickly to running water after melting for a shiny finish.

*Follow-up questions:*

1.             What did you manipulate and how did it affect the outcome of your experiment?**

 **2.             From your textbook reading and this lab, explain how an alloy forms and why manufacturing alloys make a more beneficial metal?**

 **3.             Research three alloys, what metals do they contain, and what properties make them useful:

*Name of Alloy:***

 ***Contains:*

*Useful properties:***

 **4.             Is it possible to really turn any metals into the element gold through a chemical reaction? Why or why not?**