

Penny Matter Lab

**Big Ideas:** 1. Properties of matter are used to describe and identify matter.

2. Data is the evidence used to support ideas and hypotheses

**Background:** The penny was the first United States coin. The first US penny was minted in 1787. The first pennies were made of pure copper, were 50% larger and weighed five times more than today’s pennies.

In the mid 1800’s, the composition (ingredients) of the penny changed from pure copper to a mixture of the elements copper, tin, and zinc. The element nickel was also added for a short time.

Since 1962 a penny has been made of a mixture of copper and zinc, but the amount of each of these metals in the penny has changed dramatically over time. In 1962 a penny was 95% copper and 5% zinc. Today, pennies are 5% copper and 95% zinc!

(source: <http://www.pennies.org/index.php/penny-history> )



A 1 cm3 cube of copper has a mass of 9.0 grams

A 1 cm3 cube of zinc has a mass of 7.1 grams

**Question:** Can physical property of mass be used to find out the year that the penny composition changed from being mostly copper (95%) and a little zinc (5%) to mostly zinc (95%) and a little copper (5%)?

**Hypothesis:** Do you think you can study the mass of many pennies to find the specific year the penny composition changed? OR Do you think that you won’t be able to find this answer by just studying penny mass? Write your hypothesis statement here:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Materials:** Triple beam balance, collection of pennies from many years

**Procedure (suggested):** There are many ways to collect data for this investigation. This procedure shows one possible way. You may use this procedure or design another. You must have enough data to clearly show the exact year the composition changed. Pennies can lose matter or be damaged by use, so it is a good idea to have more than one penny measured for each year.

1. Gather 2-4 pennies for each year
2. Create a page to record and organize your data. (Both you and your lab partner need to collect and record all data!) You can use a table, graph or chart.
3. Measure the mass of the pennies until you have collected enough data to support your hypothesis.
4. **Attach your data sheet to this lab when you finish**. NO DATA, NO CREDIT!

**Analysis (thinking about your data):** Use your data to answer these questions. You may use the back of this paper or another sheet of paper if you need space.

1. Based on your penny data, did you find the year the penny changed? Yes or No
2. If you answered yes, when did the US Mint change the penny composition from mostly copper to mostly zinc? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. How do you know this? What background knowledge helped you know this? (Please answer in 2-4 complete sentences)
4. Why do you think that the US made this change? (2-4 sentences please)
5. How does your work on this investigation support one of the big ideas mentioned in the beginning of this investigation? (2-4 sentences please)