Reference: "An Experiment in thinking Scientifically", D. J Sardella~
Chem. Ed. 69. 933 (1992)

Purpose: The purpose of this exercise is to determine experimentally the variation in mass of pennies both within a single mint year and over a range of years

Equiments: Eletronic balance, pennies

Procedure: ① Obtains a virai of pennies from your instrutor and record the mint years.
② Using a single balances, determine the precise (in grams) of each of years pennies (up to a maximum of 10) by placing them on the balance and weighting them using a weight boat.
③ Make sure to zero the balance with the weight boat before measuring the mass of each penny.
④ Record all your data in your laboratory notebook as you weight

Observation: Some Pennies are sink and reflect light from the damaged part. four of the pennies are very dark orange, two of them are mid orange and little bit of dirts in pennies, another four of them very little orange and again little dirts on them.

Calculation:

Average

$$\frac{3.124g + 3.074g + 3.131g + 3.103g + 3.032g + 3.090 + 3.076}{10}$$

$$\frac{+3.075g + 3.051g + 3.094g}{10} = \frac{30.85g}{10} = 3.085g$$

$$S = \sqrt{\frac{\Sigma(x-\bar{x})^2}{n-1}} = \sqrt{\frac{(3.124-3.085)^2 + (3.074-3.085) + \cdots}{10-1}}$$

$$\sqrt{\frac{(3.131-3.085) + (3.103-3.085) + (3.032-3.085) + (3.090-3.085) +}{10-1}}$$

$$\sqrt{\frac{(3.076-3.085) + (3.075-3.085) + (3.051-3.085) + (3.094-3.08}{10-1}}$$

$$= 0.03043gs$$

Procedure cont. - the pennies

⑤ Be sure to record the mass to the nearest 0.001 g. which is the limit of precisim of the balance.

⑥ Make sure to observe the penny's condition - corroded, dirty, etc.

Table 1. Raw Data for Pennies Experiment ND

Mint Year: 1977

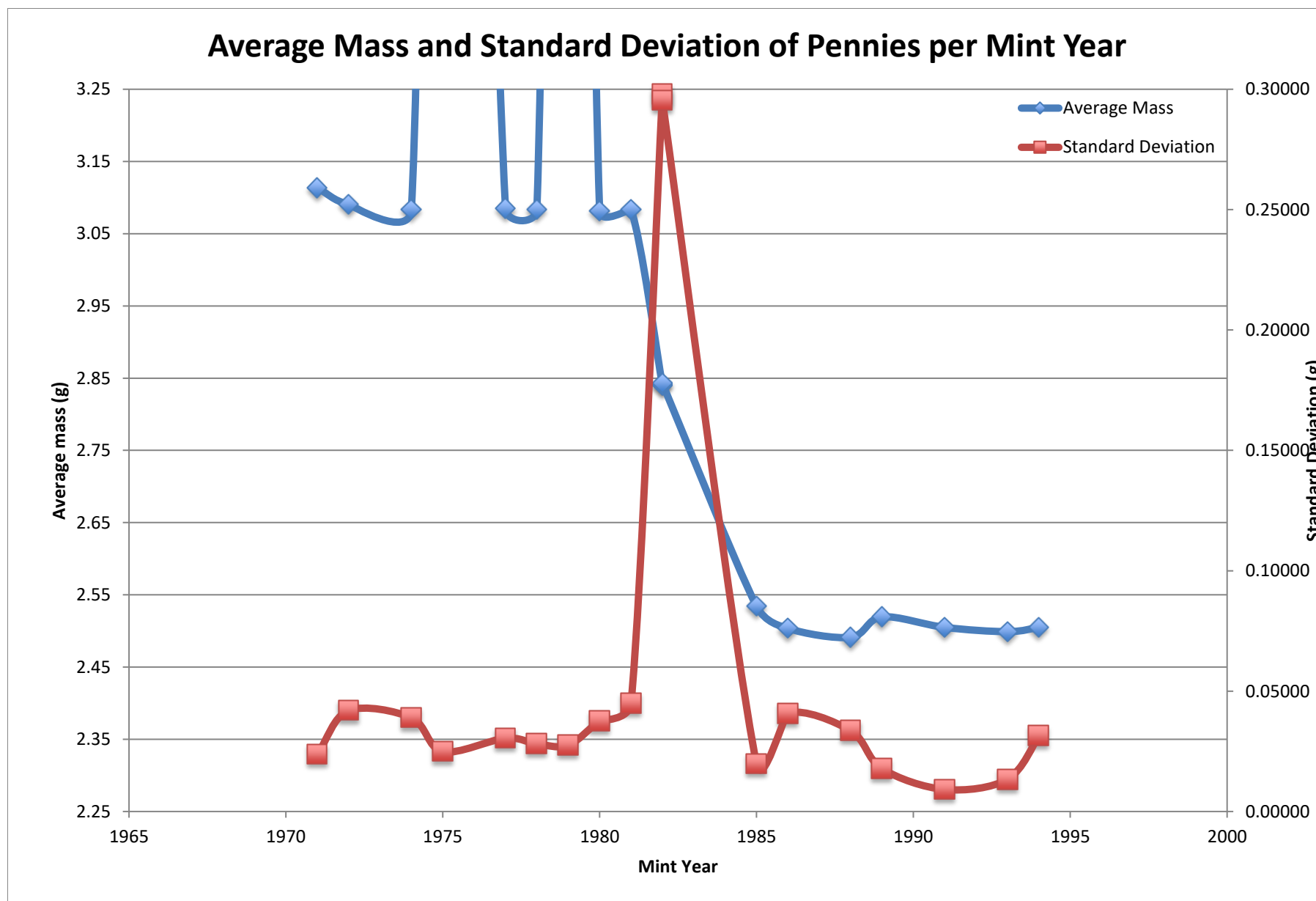| Penny Number	Mass (grams)
1	~~0.4183g~~ 3.124g
2	~~0.4285g~~ 3.074g
3	~~0.44~~ 3.131g
4	3.103
5	3.032g
6	3.090g
7	3.076g
8	3.074g
9	3.051g
10	3.094g

Figure 1. The Average Mass and its Standard Deviation of 10 Pennies plotted against the Pennies' Mint Year
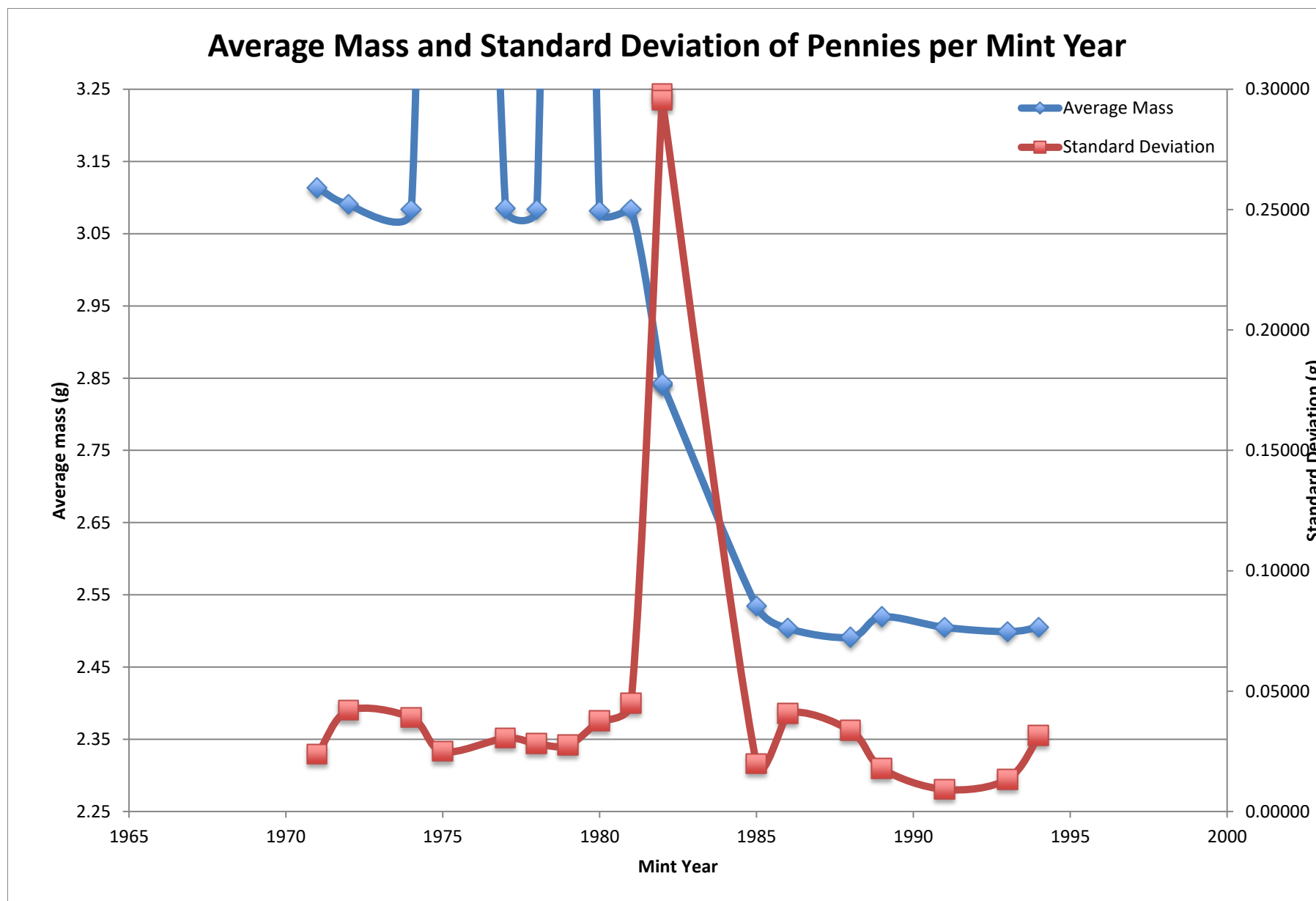
Figure 1. The Average Mass and its Standard Deviation of 10 Pennies plotted against the Pennies' Mint Year

Result: This sample coin from 1977 has a mean weight of 3.085, showing that coins during the early ages have created heavier coins. It also has a trend of increasing weightiness depending on penny dullness as it gets heavier if the penny is dull and covered with dirt, and it also goes verse as the shine gets lighter.

Discussion: Based on the coin experiment, it must have happened between the years 1975 to 1982 as it varied at different points of the year where the weighted average of the penny changed frequently as it varied between 5 grams to 3.0836, but some year's data so the predicted can be various as the data. It has a weird mountain cruise where it is the lowest weight it has happened between the years 1977 and 1978. After the curve, the weight changed back to normal, and it permanently changed materially during the year 1982 when it had the highest standard deviation where the penny permanently changed the material into containing higher copper than zine so pennies can be weightless. It also has reduced the cost of making high-content zine penny costs 2.1 cents to make one penny which is higher than the cost of high-content copper, which costs 1.10 cents for 1 cent. This is why the current composition of a penny is cost-effective for the government to be minting them.

Conclusion: To determine the variation in mass of a penny with a single mint year and it over a range of years. Each penny year was weight average and standard deviation simples of each to determine the variation of a penny with a single mint year and over a range of years. It has shown variation in the mass of pennies with corresponding years as it has reduced its weight through the years as penny composition, but it had various points of the year where it was irregular it has reverted to normal weight. As outcomes were remarkably similar, but it is not fully similar because of the irregular changes in the years when the penny where back to the original composition of higher concretion of zine.

No table of contents entries found.