

Name _____ Period _____ Date _____

Measurement and Uncertainty in Pennies

Purpose: To demonstrate the uncertainties and errors in scientific measurements.

Procedure: Get two pennies, a pre-1982 and a post-1982 penny.

Weighing the Pennies: Three different types of balances are found throughout the laboratory. Each measures the mass to a different degree of accuracy. Use all three to find the mass of your two pennies. Do not round off any readings.

Table 1	
Pre-1982 Penny	Date:
Balance #1 = ± 0.1	Mass Balance #1:
Balance #2 = ± 0.01	Mass Balance #2:
Balance #3 = ± 0.001	Mass Balance #3:
Post-1982 Penny	Date:
Balance #1 = ± 0.1	Mass Balance #1:
Balance #2 = ± 0.01	Mass Balance #2:
Balance #3 = ± 0.001	Mass Balance #3:

Record the masses of 6 other students got for their pennies in the table below. Use the balance that reads to the nearest ± 0.01 grams.

Table 2			
Pre-82 Date	Mass	Post-82 Date	Mass
Your value:		Your value:	
1.		1.	
2.		2.	
3.		3.	
4.		4.	
5.		5.	
6.		6.	

Measuring the Diameter: Using a ruler, measure the diameter of one of your pennies to the nearest ± 0.1 mm. Record the diameter below. Then get the diameters of at 5 other classmates. If they have made an incorrect measurement, tell them and correct it on your table.

Table 3	
Your diameter:	
Other classmates:	1.
	2.
	3.
	4.
	5.

Discussion Questions:

1. The Table 2 gives the values of the two different types of pennies both you and your classmates obtained. Find the average and range for each group. The range is the difference between the high and low value of the set.

	Pre-1982	Post- 1982
Average Mass		
Range		

Compare the masses of the pre-82 with the post-82 pennies. Using the ranges, are they significantly different? Explain your answer.

