Lab 01: Metric Estimation Activity

Task:

1. Our goal for this lab is to practice estimation and actual measurement of length in metric units.
2. There are six different objects for you to estimate their length (you choose objects 5 and 6).
3. Spend one minute to make your estimations of length as closely as possible without using a ruler and record your results.
4. Take out a metric ruler (http://www.vendian.org/mncharity/dir3/paper_rulers/) and actually measure the unknown length (in metric units).
    a. When doing this measure the object once and record the value (with units). Please pay attention to significant figures.
    b. Move on to the next object until all objects have been measured once.
    c. Then repeat a second, third and fourth time. You should come out with slightly different values each time.
5. Calculate the average of the four measurements for the object – Please pay attention to significant figures.
6. Calculate the %Error for each object.
    a. %Error = (|Average – Estimation|)/Average) *100% - Please pay attention to significant figures.
7. Record your values in the chart below. Then answer the questions that follow.

Station	Your Estimation of Unknown Length	Actual Measurement of Unknown Quantit					
		Trial 1	Trial2	Trial 3	Trial 4	Average	
Penny							
Quarter							

Dollar Bill							
Shoe Length							
Choice 1							
Choice 2							

1.) Which of your estimations was closest to the actual measured value (based on estimation and average)? Why do you think this one was your best?

2.) Which of your estimations was closest to the actual measured value (based on %Error)? Why do you think this one was your best?

3.) Which of your estimations was furthest from the actual measured value (based on estimation and average)? Why do you think this one was your worst?

4.) Which of your estimations was furthest from the actual measured value (based on %Error)? Why do you think this one was your worst?

5.) Was your best/worst estimate the same when you used comparison to actual value as when you used comparison to %error.

6.) Why is the %Error a better indicator of how far off your estimate is rather than just taking the difference between the average and the estimate?

7.) Is there any room for uncertainty in the actual measurement? If so, how is it accounted for?

8.) Could the estimation method be improved to reduce error? If so, how?

9.) How does the estimated size compare qualitatively (e.g., "slightly larger," "much smaller") to the average size?

10.) Are there any assumptions made during the process that could skew results?

11.) What is the average mass of a College student?

(1) 7 Kg   (2) 70 Kg   (3) 700 Kg   (4) 0.7 Kg

12.) What is the approximate length of a baseball bat?

(1) 10^{-1} meters   (2) 10^2 meters   (3) 10^0 meters
(4) 10^1 meters

13.) How long would it take the elevator to travel from the first to the second floor?

(1) 4 sec   (2) 40 sec   (3) 0.4 sec   (4) 400 sec

14.) What is the approximate speed of a student walking down the hall?

(1) 2.0×10^1 m/s   (2) 2.0×10^2 m/s   (3) 2.0×10^0 m/s   (4) 2.0×10^{-1} m/s

Make sure to submit as a PDF Document to dropbox when finished.