Name:_____
Partner(s):_____
_____
Period:_____

Reaction Time Lab
(Lab #2)

Intro: A person's reaction time is a measure of how quickly he or she can respond to a given stimulus. Since an average human reaction time is only a fraction of a second (typically somewhere around 180 ms or 0.18 s responding to light signals – what you see), it would be impossible to measure it directly. But we can figure it out by measuring how far the object falls before it is caught and then doing some clever calculations afterwards…

Procedure: You will be dropping a meter stick unexpectedly through a partner's open hand to test reaction time.

1. Have one group member hold the meter stick while the person to be tested rests an arm on the edge of the table.
2. Hold the meter stick vertically in the air between (but not touching) your partner's thumb and index finger.
3. Align a known marking on the meter stick (perhaps the zero of the meter stick) with the top of the thumb.
4. Without warning, one group member drops the meter stick at an unexpected time and the other person catches it as fast as possible.
5. Record (in meters) how far the meter stick has fallen by writing the displacement in the table below (if starting at zero, it's where the person catches it).
6. Now trade places to find your partner's reaction times. (Who's faster?)
7. Repeat at least ten times.

Trial	Your Distance (m)	Partner's Distance (m)	Reaction time
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
(11)			
(12)			
(13)			
Average			

Questions/Calculation:

1. After releasing the meter stick and before it is caught, does the meter stick fall with a **constant speed**? A **constant acceleration**? A **constant velocity**? We have five kinematic equations that work if the acceleration is constant. Would it be reasonable to use one of these to find the time the meter stick falls? **Yes/No**
2. Step one asks you to rest your arm on the table. Why is this necessary?

3. If we use these, we will need to plug in three known values. What is the acceleration at which the meter stick falls before it is caught? Write that acceleration below:
   $a_{\text{before being caught}}$ = _____ m/s^2

4. Do we need to know the initial velocity in order to calculate the time the meter stick fell? If so, record that velocity here:
   $v_{initial}$ = _____ m/s

5. Do we need to know the distance the meter stick fell? If so, how can we find that distance?

6. Do we need to know the final velocity in order to calculate the time the meter stick fell? If so, record that velocity here:
   v_{final} = _____ m/s

7. When we solve for time, we will not need to consider one variable. Which equation contains all our given variables and the time (what we want) but *does not* include the variable we do not have? (Remember to consider which variable we don't care about when selecting the correct equation.) Write that equation below:

   equation to solve for time: _____

8. Solve for time in all the above cases to fill in the data table.
9. Show one sample calculation here. Include the initial equation, all values properly plugged in, and the final answer with units for full credit.

10. How much faster or slower were you than your partner? Calculate the percent difference here using: $\%\ difference = \left[\frac{(your\_time_{avg} - partner's\_time_{avg})}{partner's\_time_{avg}}\right] \times 100\%$