

Physical Science (PHSC 100): Lab Expt. # 7 on Freefall and Reaction Time

Name: _____ Section: 100. _____ Date: _____

Note on this virtual experiment procedure

Read the introductory principle, procedure and experimental materials outlined below, and understand as to how this virtual experiment would be conducted under real lab condition to generate the theoretical data supplied in the **Tables 1** below. After clearly understanding the procedure and the formula for the calculations, complete the empty columns with calculated data and write brief discussions as per the guideline, and Submit it back in the **Drop Box**.

Introduction:

Reaction time is the time interval between receiving a signal and acting on it. Reaction time often affects the making of measurements. Depending on how quickly a person responds to a signal, there are differences in reaction time among different persons.

Objective: to measure your reaction time

Required Equipment:

- A meter sticks

Procedure

A group **consisting 5 to 6 persons** is formed and measurement on reaction time is done for each person one at a time. One person **holds a meter stick vertically** from the top while the other person positions his **thumb and index finger** at the **50 cm mark, without touching**. The person holding the meter stick **drops it (unannounced)** and the other one **catches it with his thumb and finger**. Accelerated by gravity (**g**), the stick falls a distance (**d**) during the reaction time (**t**) of the person who tries to catch it. Knowing distance (**d**) and gravitational acceleration (**g**), all needed to calculate time (**t**) is a relationship between **g, d, and t (equation below)**.

Three trials are done for each person and the **distance of fall in cm** is registered on the space provided in the data **Table 1** below. From the theoretical fall distance data for 6 persons in three trials (replications) given in the Data Table, **calculate mean distance values** and the reaction **time (t)** for each person using the following relationship (equation).

The distance (**d**) in cm, the meter stick will fall, is found using the relationship:

Where **d** is the mean distance in centimeters, **t** in seconds, and **g = 980 cm/s²**

(9.8 meters = 980 cm)

Simple rearrangement of the above equation gives the **time (t)** of fall in **seconds**.

[Final formula to be used in the calculation of time from the average distance (d)]

Table 1: Reaction Time theoretical data

Persons	Distance of catch (d) in centimeter				Calculate Reaction Time (t) in seconds
	Trial 1	Trial 2	Trial 3	Mean (d)	
1	25	25	18		
2	20	30	15		
3	15	30	25		
4	20	35	5		
5	35	10	10		
6	25	20	20		

$$t = 0.045 \sqrt{d}$$

Discussion

1. Is there a difference in reaction time of individuals in the group? What is the range of reaction time in seconds?

_____ to _____

2. Suggest possible explanations for why reaction times are different for different people.

3. Give some examples in which reaction time is important.
