

S432 Physics
Reaction Time & Stopping Distance

Name: _____
Per: _____

Part I - Computer-measured reaction time.

1. Use Netscape to go to <http://www.exploratorium.edu/baseball/reactiontime.html>
2. Do the reaction time activity three to five times (have fun with it..) and take an average. Make sure you record your average on the spreadsheet at the front of the room.

Trial	Reaction Time (seconds)
1	
2	
3	
4	
5	
Average:	

8. *Compare this reaction time to the one you calculated using the ruler. Which one do you think is more accurate.*

9. *How does the class' average compare to the average for all people given at the Exploratorium page? Can you account for any serious differences (greater than 5%)?*

Part II- Reaction Time & Stopping Distance

- A. Now, go to the site
<http://webphysics.ph.msstate.edu/javamirror/ntnujava/Reaction/reactionTime.html>
- B. Use this applet at a variety of speeds (perhaps ones that are relevant to the street you are investigating?) and observe the effect on stopping distance.

3. What do you guess the relationship is between stopping distance and initial velocity? (e.g. linear: double one double the other, inverse: one goes up the other goes down, parabolic: one doubles, the other increases by four, etc.,)

4. Determine the rate of negative (braking) acceleration on the car. One of the formulas should be VERY useful. Show your work.

5. Does the simulated car have a braking ability consistent with a real car? Explain

C. To better visualize the relationship that initial speed has on stopping distance you should make a data table and then graph the results. Your graph should have initial speed on the horizontal axis. Obviously, every time you do this, it is with a slightly different reaction time so you'll have to take an average at about six different speeds.

Data Table:

Initial Speed Units:	Stopping Distance Units:
Average:	

Initial Speed Units:	Stopping Distance Units:
Average:	

Initial Speed Units:	Stopping Distance Units:
Average:	

Initial Speed Units:	Stopping Distance Units:
Average:	

Initial Speed Units:	Stopping Distance Units:
Average:	

Initial Speed Units:	Stopping Distance Units:
Average:	

6. *What does your graph reveal about stopping distance?*
7. *If reaction time were to increase, what effect do you think this would have on stopping distance and the shape of the graph?*
8. *Hypothesize the causes and effects of wet or icy pavement. You can use the simulator to check your ideas and discuss the results here (be sure to include why you picked your values)*
9. *What implications does this have for the speed limit on the road you are studying? (For example, consider where a car might have to start braking to stop safely or if something interferes with the driver's ability to see what is happening on the road)*