AP Biology: Reaction Time Lab

Introduction: A meter stick can be held perpendicular to the floor, dropped, and a student can catch it to determine how far it falls before the student reacts. The slower the reaction on the part of the student, the farther the meter stick will fall. The student can convert distance into times and measure reaction time. Differences in the reaction time of the student to different stimuli can be compared.

Hypothesis: Hypothesize which type of stimulus will elicit the fastest reaction time: visual, auditory, or tactile. Why?

Procedure: For this lab, all distances must be recorded in METERS!
1. A meter stick will be held vertically between the experimental student’s thumb and index finger. The stick should be held so that the 10 cm (.1 meter) mark is between the thumb and index finger.
2. The lab partner will drop the meter stick and the student must catch it between his/her thumb and index finger as quickly as possible. The distance the meter stick traveled before being caught will be measured and recorded on the Evidence Table (remember to subtract the 10 cm that were below the finger level at the beginning of the experiment) for visual stimuli.
3. The student will repeat the procedure for a total of five trials and then determine the average reaction distance for visual stimuli, recording it on the Data Table.
4. The student will now measure reaction to an auditory signal; the student will close his/her eyes and the student will hold the meter stick as before. As the partner releases the meter stick he/she will say, “Now,” and the student will catch the meter stick. The distance will be measured and recorded on the Data Table. After five trials, the average reaction distance for auditory stimuli will be calculated and recorded on the Table.
5. Finally, the reaction distance for tactile (touch) stimuli will be measured. This time the experimental student will close his/her eyes, and the while the student scientist holds the meter stick in one hand, he/she places the other hand on the experimental student’s shoulder. When the student drops the meter stick, he/she should simultaneously lightly squeeze the partner’s shoulder. After five trials, the average reaction distance for tactile stimuli will be calculated and recorded on the data Table.
6. Now the reaction times will be calculated in seconds:

The formula is: Time in seconds = .45√ distance in meters

Or

Time in seconds = √2 X the distance in cm / 980 cm/sec²

<table>
<thead>
<tr>
<th>Reaction Time Data Table</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of stimulus</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Visual</td>
</tr>
<tr>
<td>Auditory</td>
</tr>
<tr>
<td>Tactile</td>
</tr>
</tbody>
</table>
Analysis Questions:
1. Specifically, which parts of the nervous system were used when the student responded to the dropped meter stick in the tests for visual stimuli?

2. Did the results surprise you? Why or why not?

3. If you continued to repeat the test for visual stimuli, do you think you would get faster? Why or why not?

4. What factors would ultimately limit your speed of response?

5. How does a reaction differ from a reflex?

6. Draw a simple reflex arc that would occur when a person steps on a nail. Label all of the neurons involved.

Go to the following website: www.getyourwebsitehere.com/jswb/rttest01.html
You will be instructed to test your reaction time using a simulation of a stop light. Complete the five trials and record your average time (seconds) below.

Average visual reaction time (seconds) = _______________________________

How does your average reaction time calculated by the website compare to your average visual reaction time calculated using the meter stick? Which do you think is more accurate, and why?