Name:………………………………………. Teacher …………………… Group no………… Date …….

**Gr12 Vertical Projectile motion – Using gravity to measure a Person’s Reaction Time**

**Aim:** To use a falling ruler to measure a person’s reaction time.

**Method:** Work in pairs:

Conduct and record an experiment to determine your lab-partner’s reaction time using a ruler.

* Person A (“dropper”) holds the ruler vertically.
* Person B (“catcher”) holds their hand ready to catch it when dropped. Their elbow and forearm must be resting on a desk with only their hand over the edge. Have a chosen mark on the ruler, e.g. 20cm, suspended level with the catchers ready fingers.
* Person A drops the ruler unannounced and person B catches it. Determine the distance the ruler fell between dropping and catching. This is the distance fallen during person B’s **reaction time**.
* Repeat the measurement a number of times until consistency is reached.
* Repeat process with a an auditory cue instead i.e. with the catchers eyes closed she responds to a sound made when dropped. Teacher will explain.
* Record the values in a table and from the average calculate the person’s reaction time using g=9.8 m.s-2.

**Your written communication:** attach to this sheet.

1. Tabulate results.
2. Show and explain the calculation used.
3. Comments / Questions:
4. Comment on your results. Are they what you expected? Were there any “mistakes”, i.e. measurements you discarded for any reason? This indicates understanding of constraints (things to be taken care to avoid) and also possible prejudices (attitudes and expectations that making measurements subjective rather than objective and scientific). These could also include improvements if you feel the method to be flawed or invalid or unreliable.
5. Is there a significant difference between the visual cued results and the auditory cued results?
6. Warning Cue: Explain why saying “ready steady go” is an unacceptable method.
7. Is this a reliable or valid method for measuring reaction rates?
8. Is it suitable to use to test:

* aptitude for certain activities e.g. pilot, racing driver, slip fielder in cricket? OR
* the competence of a drunk driver?

**Rubric**

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| --- | --- | --- | --- | --- | --- |
| Category | 1 | 2 | 3 | 4 | 5 |
| Results | Poorly represented | too many missing | some missing categories | Tabulated, headings, units, sufficient repetition, clear & neat, averaged | Tabulated, headings, units, sufficient repetition, any discarded trials also shown, clear & neat, averaged |
| Calculation | Poor ...…. | Unacceptable Mistakes | Acceptable Calculation correct but unclear what it stands for | Calculations correct & show equation , Good explanation & calculation | Calculation correct & show equation, excellent explanation & justification of the equation used. |
| Comments | Poor ……. | Unacceptable …….. | Acceptable …….. | Meaningful by less clear / concise | Meaningful, insightful & clear comments |

[15]

Comments

A mistake made by some was to not convert the distance into metres. The calculation for time was then horribly wrong.