* Name:
* Date:
* SBA:
* Topic: Acceleration of a Pendulum
* Title: Periodicity
* Aim:
 1. To observe how differing the length of a pendulum affects the square of its period.
 2. To determine the acceleration of a pendulum, g, due to gravity
* Equations:
 1. **T2/*l* =**  **slope = Δy ÷ Δx = (y1 – y2) ÷ (x1 – x2)2. g = (4π2) ÷ slope** *Where g = acceleration due to gravity in metres per second (ms-1), = 3.14, l = length in metres (m), T = time/period in seconds (s)*
* Materials/Apparatus: metre rule, mass, clamp stand, timer or stop watch, protractor
* Method:
1. Set up the apparatus as demonstrated below.
2. Using a measuring cylinder cut at least 80 cm of string.
3. Tie the string onto a mass to make a pendulum.
4. Affix the pendulum to the clamp stand and shorten it to 70 cm.
5. Measure an amplitude of about 40o – 50o .
6. Let the pendulum go and record the time it takes to allow it to oscillate 5 times.
7. Repeat steps 4 – 6 with a 60 cm, 50 cm, 40 cm, 30 cm, 20 cm and 10 cm string.
8. Construct a graph of period squared (s2) against length of pendulum (m).
* Observations: (*Write what you saw here*)
* Diagram:



DIAGRAM SHOWING HOW LAB WAS EXECUTED TO DETERMINE THE ACCELERATION OF A PENDULUM

* Data and Results:

TABLE SHOWING THE TIME IT TAKES FOR A PENDULUM TO OSCILLATE AT AN ANGLE OF 40O USING THE SAME MASS A VARYING LENGTHS

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Length of pendulum (m) | Time it takes for 5 oscillations to transpire (s) | Average time of 5 oscillations (s) | Period/Time it takes for one oscillation (s) | Time Squared or Period Squared (s2) |
|  | Trial 1 | Trial 2 | Trial 3 |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
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|  |  |  |  |  |  |  |

* Calculations:

1. Average time for 5 oscillations = A + B + C = D **÷** 3

2. Period/Time it takes for 1 oscillation to transpire = (D÷ 3) ÷ 5 = E

3. Square period, T2 = E × E

4. Slope = (y1 – y2) / (x1 – x2)

5. Acceleration of the bob = (4π2) ÷ slope

* Discussion:
**Paragraph 1**What is a pendulum?

**Paragraph 2**What affects the period of a pendulum?
Discuss the results based on your graph and what you obtained from the experiment.
* Limitation:
1.
* Precautions:
1.
2.
* Reflections:
* Conclusion:

**Measurement and Manipulation – Periodicity**1. Follows instructions /3

(excellent – 3, good – 2, poor – 1)

2. Uses basic laboratory equipment correctly:
\* Avoids parallax when using the metre rule /1
\* Operates the timer on the phone or stop watch
 properly /1
\* Understands how to use clamp stand /1

3. Prepares material for observation or investigation correctly:
\* Measures string correctly /1
\* Attached string to the clamp stand properly /1
\* Adjusts string between change of length properly /1
\* Measures and maintains the same amplitude
 throughout the lab /1

Total: /10

**Observation & Recording – Periodicity** a. Student’s ability to record observations and
to collect and organise data; observations and
data may be recorded in:
(i) Prose
Written description of observations
in the correct tense /1
(ii) Table
Appropriate headings /1
Title given /1
(iii) Graph
\* Title for graph /1
\* Title axes labelled for
 both x and y /2
\* Correct scales /2
\* Accurate plotting:
All points plotted correctly /5
Every point incorrectly plotted
minus one point
\* Fine points used /1
\* Best fit line drawn /1

(b) Reporting
Student’s ability to prepare a comprehensive
written report on their assignments using the
following format:
(i) Date (*date of experiment*) /1
(ii) Aim (*what is to be
accomplished by doing the
experiment*) /1
(iii) Apparatus and Materials
(*all equipment and materials
used in the experiment must
be listed*) /1
(iv) Method/Experimental
Procedure (*step by step
procedure written in past
tense*) /2

Total: /20