**Topic 02 EXPERIMENTAL MODEL LAB**

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|---|---|
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| **Your Section** | 01 |
| **Your PIN** | 03 |
| **Your Lab Group (Lab Table Number)** | 4 |

***"Virtual Lab" (performed over the Internet):***

**Use the Pendulum Simulation to investigate the following questions:**

**Part A - Does the Period of a Pendulum depend on its Mass?**

| **Be sure to hold the variables below constant:** | | Mass | Period (T) in s |
|---|---|---|---|
| Length = 200 | | 0.5 | 2.8 |
| Amplitude (angle theta in degrees) = 30 | | 1.0 | 2.8 |
| Gravity (g) = 980 cm/s^2 | | 1.5 | 2.8 |
| | | 2.0 | 2.8 |
| **The Period of a Pendulum (does / does not) depend on its Mass:** | Does Not | | |

**Part B - Does the Period of a Pendulum depend on its Amplitude (Angle) ?**

| **Be sure to hold the variables below constant:** | | theta (degrees) | Period (T) in s |
|---|---|---|---|
| Length = 200 | | 20.0 | 2.8 |
| Mass = 1.0 | | 40.0 | 2.9 |
| Gravity (g) = 980 cm/s^2 | | 60.0 | 3.0 |
| | | 80.0 | 3.1 |
| **The Period of a Pendulum (does / does not) depend on its Amplitude:** | Does | | |

**Part C - Does the Period of a Pendulum depend on its Length ?**

| **Be sure to hold the variables below constant:** | | Length | Period (T) in s |
|---|---|---|---|
| Amplitude (angle theta in degrees) = 30.0 | | 50 | 1.4 |
| Mass = 1.0 | | 100 | 2.0 |
| Gravity (g) = 980 cm/s^2 | | 150 | 2.5 |
| | | 200 | 2.8 |
| **The Period of a Pendulum (does / does not) depend on its Length:** | Does | | |

**Part D - Does the Period of a Pendulum depend on Gravity ?**

| **Be sure to hold the variables below constant:** | | g (cm/s^2) | Period (T) in s |
|---|---|---|---|
| Amplitude (angle theta in degrees) = 30.0 | | Moon (160) | 8.2 |
| Mass = 1.0 | | Mars (380) | 4.7 |
| Length = 200 | | Earth (980) | 2.8 |
| | | Jupiter (2480) | 1.8 |
| **The Period of a Pendulum (does / does not) depend on Gravity:** | Does | | |

***"Hands On Lab" (performed in class):***

**Use the Laboratory Apparatus to investigate the following questions:**

**Part A - Does the Period of a Pendulum depend on its Mass?**

| **Be sure to hold the variables below constant:** | | Mass (grams) | 10 swings in s | Period (T) in s | |
|---|---|---|---|---|---|
| Length = 100.00 cm | | 10.0 | 20.15 | 2.015 | Prediction |
| Amplitude (angle theta in degrees) = 15.0 | | 20.0 | 20.18 | 2.018 | (Do first) |
| Gravity (g) = 980 cm/s^2 | | 50.0 | 20.41 | 2.041 | Period (T) in s |
| | | 30.0 | 20.02 | 2.002 | 2.022 |
| | | 40.0 | 20.07 | 2.007 | 2.037 |
| **The Period of a Pendulum (does / does not) depend on its Mass:** | Does Not | | | | |

**Part B - Does the Period of a Pendulum depend on its Amplitude (Angle) ?**

| **Be sure to hold the variables below constant:** | | theta (degrees) | 10 swings in s | Period (T) in s | |
|---|---|---|---|---|---|
| Length = 100.00 cm | | 20 | 20.21 | 2.021 | |
| Mass (m) = 50.0 g | | 30 | 20.73 | 2.073 | Prediction |
| Gravity (g) = 980 cm/s^2 | | 40 | 20.73 | 2.073 | (Do first) |
| | | 50 | 20.90 | 2.090 | Period (T) in s |
| | | 25 | 20.35 | 2.035 | 2.05 |
| | | 45 | 20.85 | 2.085 | 2.08 |
| **The Period of a Pendulum (does / does not) depend on its Amplitude:** | Does | | | | |

**Part C - Does the Period of a Pendulum depend on its Length ?**

| **Be sure to hold the variables below constant:** | | Length (cm) | 10 swings in s | Period (T) in s | |
|---|---|---|---|---|---|
| Amplitude (angle theta in degrees) = 15.0 | | 20.0 | 9.99 | 999 | |
| Mass = 50.0 g | | 30.0 | 11.06 | 1.106 | |
| Gravity (g) = 980 cm/s^2 | | 40.0 | 13.30 | 1.33 | |
| | | 60.0 | 15.75 | 1.575 | Prediction |
| | | 80.0 | 18.16 | 1.816 | (Do first) |
| | | 100.0 | 20.14 | 2.014 | Period (T) in s |
| | | 35.0 | 11.29 | 1.129 | 1.4 |
| | | 70.0 | 17.05 | 1.705 | 1.7 |
| **The Period of a Pendulum (does / does not) depend on its Length:** | Does | | | | |

**NOTE: YOU WILL HAND IN A GRAPH (ON PAPER) OF YOUR PART C DATA!**