**Post-Activity Quiz Answer Key**

**Answer the following quiz questions:**

1. **If you took a pendulum from Earth (g = 9.8 m/s2) to Mars (g = 3.77 m/s2), how would that affect the period of the pendulum? Show your work. It would take about 1.6 times longer on Mars.**

$T=2π\sqrt{\frac{L}{g}}$$T\_{Earth}=2π\sqrt{\frac{1}{9.8}}=2.007 sec$

$T\_{Mars}=2π\sqrt{\frac{1}{3.77}}=3.236 sec$

$\frac{T\_{Mars}}{T\_{Earth}}= \frac{3.236 sec}{2.007 sec}= 1.612 times longer$

**Students can plug in any pendulum length (in this case, 1 m) and find that reducing the gravity by this factor will be based on the square root of the gravity.**

1. **What do the units of this equation represent? In particular, what does the squaring of the period allow you to calculate? The acceleration due to gravity.**

**Complete the following performance assessment:**

1. **Using the following data, calculate the acceleration due to gravity on two unknown planets.
(Note: Error has been introduced in the data to simulate actual data, so find the average or a best fit.)**

**Planet 1:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Length (m)** | **0.20** | **0.50** | **0.65** | **0.82** | **1.00** |
| **Period (s)** | **1.45** | **2.31** | **2.59** | **2.92** | **3.23** |
| **g (m/s2)** | **3.76** | **3.70** | **3.83** | **3.80** | **3.78** |

**Average = 3.772 m/s2 (this approximates Mars)**

**For both planets, use the equation:** $g=\frac{4π^{2}L}{T^{2}}$

**Planet 2:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Length (m)** | **0.20** | **0.50** | **0.65** | **0.82** | **1.00** |
| **Period (s)** | **0.85** | **1.34** | **1.52** | **1.71** | **1.88** |
| **g (m/s2)** | **10.93** | **10.99** | **11.11** | **11.07** | **11.17** |

**Average = 11.074 m/s2 (this approximates Saturn)**