Name: ______________________________ Date: ____________________ Class: __________________

Post-Activity Quiz Answer Key

Answer the following quiz questions:

1. If you took a pendulum from Earth (g = 9.8 m/s^2) to Mars (g = 3.77 m/s^2), how would that affect the period of the pendulum? Show your work. It would take about 1.6 times longer on Mars.

$$T = 2\pi\sqrt{\frac{L}{g}} \qquad T_{Earth} = 2\pi\sqrt{\frac{1}{9.8}} = 2.007\ sec$$

$$T_{Mars} = 2\pi\sqrt{\frac{1}{3.77}} = 3.236\ sec$$

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

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.

2. 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:

3. 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/s^2)	3.76	3.70	3.83	3.80	3.78

Average = 3.772 m/s^2 (this approximates Mars)

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

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/s^2)	10.93	10.99	11.11	11.07	11.17

Average = 11.074 m/s^2 (this approximates Saturn)