Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period \_\_\_\_\_\_\_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_



**Lesson 1: Drop the Ball**

Any object that has mass exerts a gravitational force; the larger the mass, the greater the force of attraction. Objects placed near a large mass undergo acceleration, which is called gravitational acceleration (*g*). Can you pull off an experiment to determine the value of “*g*” on various astronomical objects?

**Doing the Science**

1. Start the Space Gravity Simulation by clicking on the “Sim” tab.

2. Note and record in Table 1 the ten-letter Location code.

3. Click on the Drop Button located below the blue ball in the right-hand part of the screen.

4. Note and record in Table 1 the length of time the ball took to drop and the distance the ball fell.

5. Use the following formula to calculate the *g* value. You will have to algebraically rearrange the equation to solve for *g*. Record your calculated *g* value in Table 1.

 **distance dropped= ½*g*(time to fall)2**

6. Click the Identify button and choose the Space Location from the list that most closely matches your *g*-value. Record this Space Location in Table 1 in the column labeled “Identification.”

**Table 1.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Location ID** | **Time (s)** | **Distance (m)** | ***g* value (m/s2)** | **Identification** |
|  |  |  |  |  |

7. Once you correctly identify a location, choose a Rocket Fuel and Launch your rocket. When you arrive at a new location, repeat steps 2 - 6 for the new location and complete Table 2.

**Table 2.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Location ID** | **Time (s)** | **Distance (m)** | ***g* value (m/s2)** | **Identification** |
|  |  |  |  |  |

**Do You Understand?**

1. Which space location of the two you investigated had the larger *g* value?

2. If a new space location had a *g* value larger than your answer to question #1, would the ball take a longer or a shorter time to fall 5 meters when dropped? Please explain your response.