One of the best ways to explore the effects of gravity on different bodies in the solar system is to calculate what your weight wound be if you were standing on their surfaces!

Scientists use kilograms to indicate the mass of an object, and it is common for Americans to use pounds as a measure of weight. On Earth, the force that one kilogram of mass has on the bathroom scale is equal to 9.8 Newtons or a weight of 2.2 pounds.

The surface gravity of a planet or other body is what determines your weight by the simple formula W = Mg where W is the weight in Newtons, M is the mass in kilograms, and g is the acceleration of gravity at the surface in meters/sec2. For example, on Earth, g = 9.8 m/sec, and for a person with a mass of 64 kg, the weight will be W = 64 x 9.8 = 627 Newtons. Since 9.8 Newtons equals 2.2 pounds, this person weighs 627 x (2.2/9.8) = 140 pounds.

Problem 1 - Using proportional math, complete the following table to estimate the weight of a 110-pound (50 kg) person on the various bodies that have solid surfaces.

Object	Location	G (m/sec^2)	Weight (pounds)
Earth	Planet	9.8	110
Mercury	Planet	3.7	
Mars	Planet	3.7	
Io	Jupiter moon	1.8	
Moon	Earth moon	1.6	
Titan	Saturn moon	1.4	
Europa	Jupiter moon	1.3	
Pluto	Planet	0.58	
Charon	Pluto moon	0.28	
Vesta	Asteroid	0.22	
Enceladus	Saturn moon	0.11	
Miranda	Uranus moon	0.08	
Deimos	Mars moon	0.003	

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Object	Location	G (m/sec^2)	Weight (pounds)
Earth	Planet	9.8	**110**
Mercury	Planet	3.7	**41.5**
Mars	Planet	3.7	**41.5**
Io	Jupiter moon	1.8	**20.2**
Moon	Earth moon	1.6	**18.0**
Titan	Saturn moon	1.4	**15.7**
Europa	Jupiter moon	1.3	**14.6**
Pluto	Planet	0.58	**6.5**
Charon	Pluto moon	0.28	**3.1**
Vesta	Asteroid	0.22	**2.5**
Enceladus	Saturn moon	0.11	**1.2**
Miranda	Uranus moon	0.08	**0.9**
Deimos	Mars moon	0.003	**0.03**

Note: For the Mars moon Deimos, which is a rocky body only 12 km (7.5 miles) in diameter, your weight would be 0.03 pounds or just ½ ounce! Astronauts that visit this moon would not 'land' on its surface but 'dock' with the moon the way that they do with visits to the International Space Station!