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## Escape Velocity on the Moon

Physicists tell us that the escape velocity on our planet Earth is some seven miles per second. To find out the escape velocity on the Moon, we first must know the Moon's mass in relation to Earth's (1/81 = 0.012) and the Moon's radius in comparison with Earth's (1080 miles/3960 miles = 0.273). Once we know these two things, we take Moon's mass and divide it by its radius (0.012 divided by 0.273 = 0.044) to come up with a figure of 0.044. Then we take the square root of that number, which is 0.21. Multiplying 0.21 by 7 miles per second gives the answer we are seeking. The escape velocity at the Moon is about 1.47 miles per second.

## Asteroid Ceres

Let's give another example, this time with the solar system's largest known asteroid, Ceres. I've read that Ceres' mass is about 1/100th of the Moon's, or 1/8100th of the Earth's (1/100 x 1/81 = 1/8100 = 0.00012). Ceres' radius is around 290 miles, which when compared to Earth's is 290/3960 = 0.073. So, once again, we divide Ceres' mass by its radius (0.00012 divided by 0.073) to get an answer of 0.0016. Finally, we find the square root of 0.0016 = 0.04. Multiplying 0.04 x 7 miles per second = 0.28 miles per second. Converting that answer to feet gives almost 1478 feet per second, the escape velocity at Asteroid Ceres.

As a double check, we can compute Ceres' escape velocity in reference to the Moon. The mass of Ceres is 1/100, or 0.01 of the Moon's, and its diameter compared to the Moon's is 290 miles/1080 miles, or 0.269. Dividing mass by radius (0.01 divided by 0.269) gives us 0.037. Taking the square root of 0.037 = 0.19. Multiplying 0.19 x 1.47 miles per second (our computed escape velocity for the Moon) gives 0.279 miles per second, the escape velocity on Asteroid Ceres, which is in close agreement with the answer in the previous paragraph.

Of course, I encourage you, my dear reader, to double-check my efforts here or elsewhere, keeping in mind that I took the liberty of rounding off numbers. Sometimes, when I think out loud, engaging in mental gymnastics, I don't always land on my feet. So I more than welcome a gentle spotting from any of my readers!

by Bruce McClure

Escape Velocity On Other Worlds