This image shows a Martian dust devil tearing across the surface of Mars in the region called Amazonis Planitia. The image was obtained by the Mars Reconnaissance Orbiter on February 16, 2012. The dust devil rises up more than a half mile high (1000 meters) and is about 100 feet (30 meters) wide. Although rare in the equatorial region where NASA's InSight lander will be located, the movement of so much mass near the sensitive seismometer will disturb its measurements. So, how much mass is in a dust devil like the one above?

Problem 1 – The average martian dust devil observed by the Mars Pathfinder Rover has a diameter of about 200 meters. If its height is 1000 meters and is cylindrically shaped, what is its total volume in cubic meters? (Use $\pi = 3.14$)

Problem 2 – If the average dust density is about 0.0000035 kg/m^3, how many kilograms of dust would be present in an average dust devil to the nearest kilogram? How much is this in pounds to the nearest pound? (1 kg = 2.2 pounds)

Sources:

http://aoss-research.engin.umich.edu/planetaryenvironmentresearchlaboratory/docs/Ferri.et.al.JGR03.pdf

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Answer: $V = \pi R^2 h$ so $V = (3.14)\ (100m)^2\ (1000m) =$ **3.1×10^7 meters^3**.

Problem 2 – If the average dust density is about 0.0000035 kg/m^3, how many kilograms of dust would be present in an average dust devil, to the nearest kilogram? How much is this in pounds, to the nearest pound? (1 kg = 2.2 pounds)

Answer: Mass = density x volume, so $M = 3.5 \times 10^{-6} \times 3.1 \times 10^7 =$ **109 kilograms**.

In pounds this is $M = 2.2 \times 109 =$ **240 pounds**.