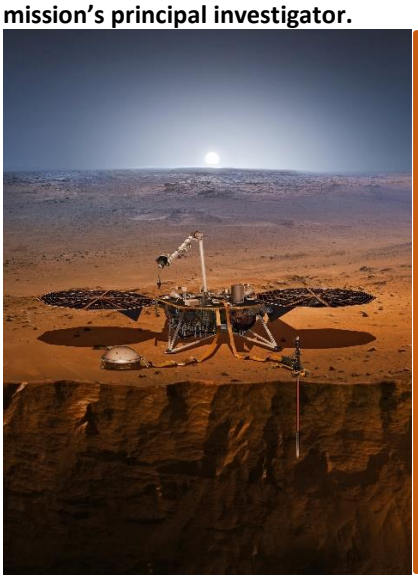
FLUIDS,DENSITY

Unit 17, Dr. John P. Cise, Physics Professor, Austin Com. College, Austin Tx., USA
jpcise@austincc.edu & New York Times by Kenneth Chang , April 30, 2018. Dedicated to my always exploring wife Gertrudes.

Mars InSight: NASA's Journey Into the Red Deepest Mysteries

The newest mission to Mars is to launch on Saturday morning. It will search for marsquakes and try to produce a map of . the planet's insides.

The landing site for the Mars InSight mission is "as close to a 100 kilometer-long parking lot as we could find anywhere," said the mission's principal investigator.



INTRODUCTION: Density of the earth from NASA is 5515 kg./m.^{3}. Object of this application is to convert given density of Mars below as 245 lb./ft.^{3} to units of kg./m.^{3}. Then, check the statement below that Mars is about 30% less dense than the earth.

QUESTIONS: (a) Convert 245 lb./ft.^{3} to kg./m.^{3} ?. This is the density of Mars. ,(b) What percent is the density of Mars relative to density of earth?, (c) Show mass of Mars is about 1/9 to 1/10 mass of earth? (d) Find volume of Mars in m.^{3} ?, (e) Knowing mass and volume of Mars, find density of Mars? (f) How does Ans.(e) compare with answer (a)?

HINTS: 0.454 kg./lb., 0.0283 m.^{3}/ft.^{3}, $m_{EARTH} = 6 \times 10^{24}$ KG., $m_{MARS} = 6.42 \times 10^{23}$ kg. R_{EARTH} = 6371 km., $V_{SPHERE} = 4/3\ \pi R^3$, ρ (density) = m/V, R_{MARS} = 3390 km.

ANSWERS: (a) ρ_{MARS} = ~ 3930 kg./m.^{3} , (b) 71% , (c) _____.
(d) $V_{MARS} = 1.63 \times 10^{20}$ m.^{3}, (e) ρ_{MARS} = ~ 3926 kg./m.^{3}, (f) Quite close a comparison

- **NASA's Mars InSight spacecraft, scheduled to launch on Saturday, is headed to one of the most boring places on the red planet.**

Its landing spot will be Elysium Planitia, an idyllically named expanse that will likely be flat as far as the spacecraft's eyes can see — no mountains in the distance, probably not even many large rocks nearby. "We picked something as close to a 100 kilometer-long parking lot as we could find anywhere," said Bruce Banerdt, the mission's principal investigator.He said that one of his colleagues described it as "Kansas without the corn."Which is exactly what the scientists want.

Augmented Reality: Explore InSight, NASA's Latest Mission to Mars

On Saturday, the InSight spacecraft will head to Mars to listen for marsquakes and study the planet's structure.

InSight — the name is a compression of the mission's full name, Interior Exploration Using Seismic Investigations, Geodesy and Heat Transport — is in many ways a diversion from "follow the water," the mantra that has kept NASA focused on the possibility that the sun's fourth planet may have once been hospitable for life.

This mission will instead probe the mysteries of Mars's deep interior and help answer geophysical questions about the planet's structure, composition and how it formed. Since there was not much interest in what InSight will find at the surface, a safe — that is, flat — landing spot was selected. Mars is, like Earth, largely rock. But **it is considerably smaller — half as wide as Earth and one-ninth the mass. A cubic foot of Mars weighs, on average, 245 pounds, making it almost 30 percent less dense than Earth.** (Because Mars is smaller, the gravity is weaker, and the center is not squeezed as tightly.) Space Launch Complex 3 at Vandenberg Air Force Base in California, where InSight is scheduled to launch May 5. If all goes well, **it will reach Mars on Nov. 26.**