

- 1.) Find the average density in gm/cm^3 to two significant figures for (data from NASA Planetary Fact Sheet <http://nssdc.gsfc.nasa.gov/planetary/factsheet/>):
- a) Earth: radius 6371 km, mass 6×10^{24} kg
 - b) Venus: radius 6051 km, mass 5×10^{24} kg
 - c) Mars: radius 3389 km, mass 0.6×10^{24} kg
 - d) Mercury: radius 2439 km, mass 0.3×10^{24} kg
 - e) Moon: radius 1738 km, mass 0.07×10^{24} kg

Compare the mean density of each to the density of rock. What can you conclude?

Plot the density vs. mass for each planet. What body stands out as the largest anomaly?

Identify each planet on the graphic below.



2.) To understand the cause of one anomaly, watch the 2011 AGU Shoemaker lecture (<http://fallmeeting.agu.org/2011/scientific-program/lectures/bowie-and-named-lectures/8dec/>) Summarize Solomon's proposals for Mercury from the MESSENGER mission.

3.) Mars' small size presents another anomaly in the distance vs size relation for the inner planets. Summarize Brandon's (Nature, News and Views) explanation for this citing a recent study (Dauphas and Pourmand, 2011). references on class website: <http://lunar.earth.northwestern.edu/courses/351/index.html>

4.) Read the NY Times article, "Please Call Earth", on the Drake Equation: http://www.nytimes.com/2008/03/02/weekinreview/02overbye.html?_r=0 Then go to the Drake Equation website: <http://www.pbs.org/wgbh/nova/space/drake-equation.html> going through the descriptions of the terms. Choosing your own values for the terms, find the resulting value of N. Compare with Drake's choices. We'll return to this at the end.

5.) Explain Ward and Brownlee's ideas on how a habitable planet forms (Chapters 1&2):