

ESS 306 – Summer 2013

“Points to Ponder” : Part of your grade for this course (8%) is based on giving 2 short (5 min.) presentations to the class. These aren’t graded, you just automatically get 4 pts for each one you do ($4 \times 2 = 8\%$). The presentations should consist of 3-4 slides, and can be on any topic related to planetary geology. You can choose from the suggested topics/questions listed below, or you can come up with your own – all I ask is that you run it by me first to OK it.

NOTE: For the list of previous topics from Weeks 1-6, see the document “p2p-su13-v2.pdf”

Week 7: Icy Satellite Interiors, Galilean Satellites (also asteroids & meteorites)

1. JUICE (Jupiter Icy Moons Explorer) is the European Space Agency’s next major science mission. What are its science objectives and how do they plan to achieve them?
2. The Russian Space Agency wants to piggy-back a lander mission on JUICE – where do they want to land and what could they learn that JUICE can’t?
3. What is the fifth largest satellite of Jupiter and what do we know about it?
4. Pedestal craters are found on Mars and Ganymede. What are they and how might they form?
5. What are the implications for the lifetime of subsurface liquid oceans on icy satellites of the theoretical analysis by Robert Tyler (formerly at UW, now at NASA Goddard) regarding obliquity tides?
6. What are some proposed energy sources for potential life in an ocean on Europa?
7. How are the high-pressure phases of water ice created and studied in the laboratory? What is the highest pressure that can be achieved?
8. The observation that old windows (>200 years) are sometimes found to be thicker at the bottom than at the top is often offered as supporting evidence for the view that glass flows over a timescale of centuries, the assumption being that the glass was once uniform but has flowed to its new shape, which is a property of liquid. What are some pieces of evidence that this is not correct?
9. How many near Earth asteroids are known and tracked? What are the chances of one of them hitting the Earth?
10. What is the origin of the Perseid meteor shower? When do they peak, and why is viewing of a meteor shower always better after midnight?
11. What are the Kirkwood Gaps in the asteroid belt, and what causes them?
12. What is the largest known meteorite, where is it now, and what is an explanation for why it didn’t form an impact crater?
13. What’s the largest meteorite ever found in the U.S., where is it now, and why was there no crater found with it?
14. What is the estimated size and mass of the object that caused the giant fireball meteor over Chelyabinsk, Russia on Feb. 15, 2013? How many fragments of the meteorite have been found since then? How did people find them? And how much are they selling for on eBay?