Do the following problems and be prepared to discuss them in class.

1. Explain briefly (1 sentence each) why:
a) small objects are less likely to have atmospheres than large objects;

b) objects near the Sun are less likely to have atmospheres than more distant objects;

c) Saturn receives ∼1% as much sunlight per square meter as does Earth;

d) smooth surfaces are likely to be younger than heavily cratered surfaces;

e) the water in oceans under the icy crusts of our Solar System moons is likely to contain salts and other impurities.

2. Find the best match between object and description:

Table 1. Solar System matching

	Object		Description
01	Pluto	_____	boring blue weather
02	Io	_____	approximate plane of the Solar System
03	Enceladus	_____	rotates retrograde
04	Ceres	_____	planet discovered using math and physics
05	Eris	_____	lakes of liquid methane
06	Uranus	_____	binary system with center of mass outside the larger object
07	Rosetta	_____	Saturnian moon with tiger stripes and water geysers
08	Titan	_____	asteroid belt dwarf planet
09	Venus	_____	icy Trans-Neptunian object about the size of Pluto
10	Ecliptic	_____	rover that's been on Mars ∼14 years
11	Opportunity	_____	orbits Neptune retrograde
12	Triton	_____	many volcanoes
13	Olympus Mons	_____	Jovian moon with a larger diameter than Mercury
14	Neptune	_____	spacecraft that orbited 67P/Churyumov-Gerasimenko
15	Ganymede	_____	largest volano in the Solar System

3. The albedo of Iapetus is ∼60%; about 60% of the incident light is reflected back into space. What would you expect to be the temperature of the sunlit side of Iapetus?

4. The Galileo spacecraft orbited Jupiter over 1995–2003. It required about 500 W of power to operate the instruments and on-board systems.
a) How large a solar panel would be needed (in m^2) to generate this amount of power at Jupiter, assuming 100% of the solar flux could be converted into electricity?
b) Calculate the panel's temperature (in K) if the panel acted as a blackbody and was in thermal equilibrium with the solar radiation.