Nuclear Lunch Questions: Feb. 26, 2014 (Quantum Gravity)

1. Is it possible to measure the change in strength of gravity at high energies, as suggested by the Grand Unification Theory? Why or why not? If yes, what experiment would be done? **(Brian)**
2. In simple language, how do you explain what is meant by renormalization? Why is it important for a theory to be renormalizable? **(Andrea)**
3. What is supersymmetry? Is supersymmetry necessary for unification of gravity? Is it an integral part of string theory? **(Tyler)**
4. What is the difference between quantum mechanics (QM) and quantum field theory (QFT)? Why is QFT necessary to derive the Planck scale? Why use the Compton wavelength instead of the deBroglie wavelength in this derivation? **(Nick)**
5. On the last page of Witten's paper, he says that new symmetries (from string theory) have led to new insights about quark confinement (among other things). What is this new insight? Put another way, what does string theory imply about quark confinement? **(Bijaya)**
6. Why does string theory require 10 or 11 dimensions? Why can't it be done in 4 dimensions? **(Anthony)**