The Great Ball of Fire

1. Draw what the Sun looked like through the "Sunspotter" device. Explain any interesting features. (If it was cloudy or hazy, save this part of the worksheet for next week.)

One square meter of Earth's surface receives 1370 watts of power (1370 joules per second, or with the units from class, 1.37×10^{10} ergs per second) of solar energy – enough to power about 20 light bulbs.

2. Imagine that we build a *gigantic* hollow shell completely encasing the Sun just outside Earth's orbit. What would its surface area be (in square meters)? ($A = 4\pi r^2$, 1 AU = 1.5×10^{11} m)

3. What total power (in watts) would the *entire* mega-shell receive from the Sun?

4. Use your answer from part 3 to write down the luminosity (total power emitted) of the Sun. Convert this to ergs per second (1 watt = 10^7 erg/s) and compare to the figure given in lecture.

5. The largest thermonuclear bomb ever exploded released about 250,000 terajoules (2.5×10^{17} joules) of total energy. How many thermonuclear bombs per second would have to be exploded to generate the amount of power released by the Sun?