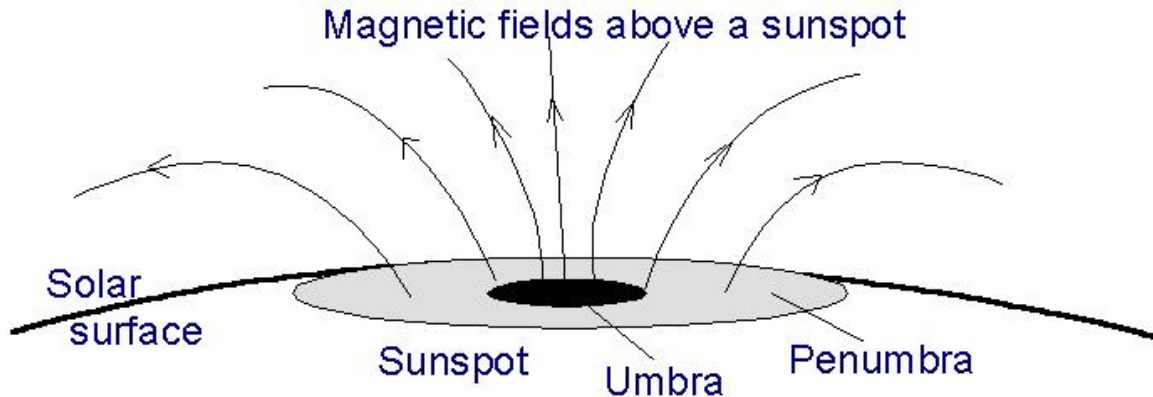




SUNSPOT MAGNETIC FIELDS

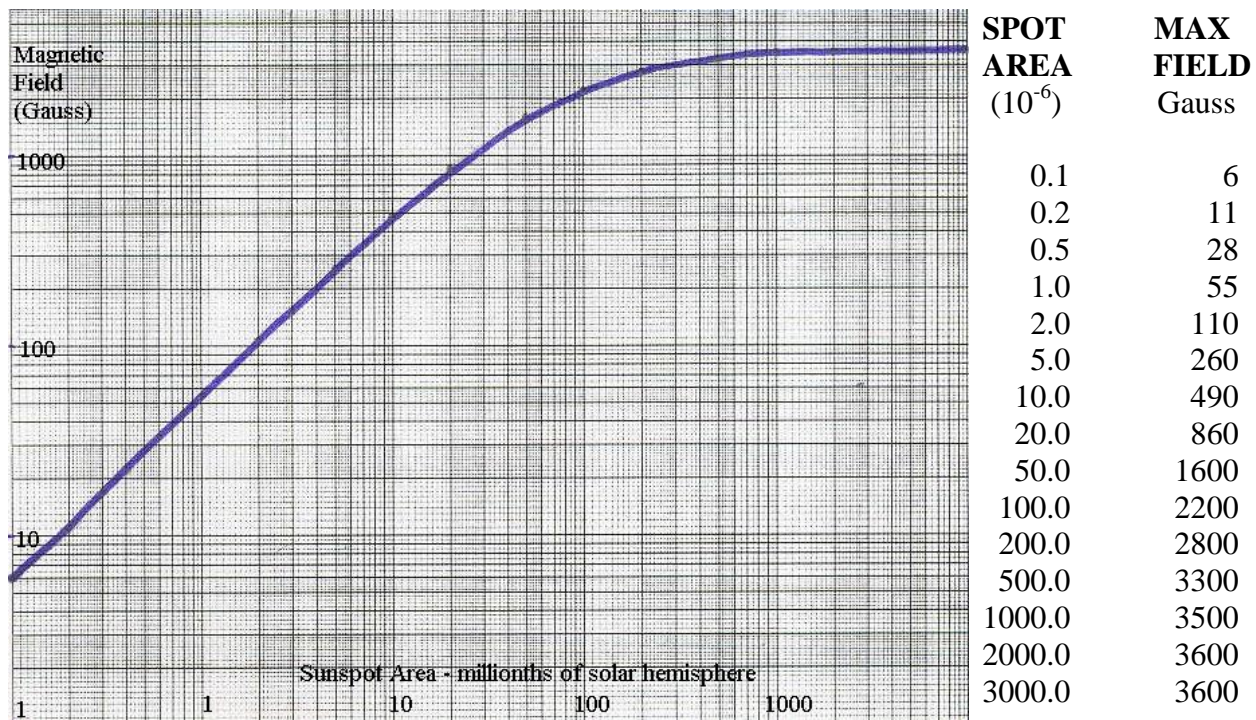
Sunspots are dark regions on the solar surface resulting from magnetic fields. Large sunspots consist of a light outer penumbra containing a darker inner penumbra. The maximum magnetic field is found in the umbra in the middle. The field lines at this point are usually directed away from the surface, but as we travel toward the outer edge of the sunspot, the magnetic fields tend to bend over toward the edge. This is shown in the diagram below:



For a rough approximation of the strength of the maximum magnetic field in the umbra of a spot, use the formula:

$$B_m = 3700 A / (A + 66)$$

where B_m is the maximum field in Gauss and A is the spot area in millionths of the solar hemisphere. The following graph and table illustrate the values obtained using this formula:



Sunspots that are growing or decaying may show wide variations from the above figures, as the formula was derived from measurements of relatively stable spots. Note that the maximum field saturates around 3600 G, and in fact there is little change for spot areas above 1000 millionths.