

48. The mass of the hydrogen in the Sun's core is $m_{\text{H}} = 0.35(\frac{1}{8}M_{\text{Sun}})$. The time it takes for the hydrogen to be entirely consumed is

$$t = \frac{M_{\text{H}}}{dm/dt} = \frac{(0.35)(\frac{1}{8})(2.0 \times 10^{30} \text{ kg})}{(6.2 \times 10^{11} \text{ kg/s})(3.15 \times 10^7 \text{ s/y})} = 5 \times 10^9 \text{ y} .$$