Average distance from the Sun (AU)

Sun

1.4 million kilometers

Abundance of H and He

We can use the **ideal gas** argument of Lecture 3 to estimate the temperature required for hydrogen and helium to escape from a planetary atmosphere:-

$$T_{esc} = \frac{1}{54}\frac{GM_P m}{k R_P} = \frac{1}{54}\frac{GM_P \mu m_H}{k R_P}$$

$$= \frac{6.673\times10^{-11}\times5.976\times10^{24}\times1.674\times10^{-27}\left(M_P/M_{Earth}\right)\mu}{54\times1.381\times10^{-23}\times6.378\times10^{6}\left(R_P/R_{Earth}\right)}\,\mathrm{K}$$

$$= \frac{140\left(M_P/M_{Earth}\right)\mu}{\left(R_P/R_{Earth}\right)}\,\mathrm{K}$$