**8.12.** **Model:** The earth is considered to be a particle in uniform circular motion around the sun.

**Solve:** The earth orbits the sun in 365 days and is $1.5\times10^{11}$ m from the sun. The angular velocity and centripetal acceleration are

$$\omega = \frac{2\pi \text{ rad}}{365 \text{ days}} \times \frac{1 \text{ day}}{24 \text{ h}} \times \frac{1\text{h}}{3600 \text{ s}} = 2.0\times10^{-7} \text{ rad/s}$$

$$a_r = g = r\omega^2 = \left(1.5\times10^{11} \text{ m}\right)\left(2.0\times10^{-7} \text{ rad/s}\right)^2 = 6.0\times10^{-3} \text{ m/s}^2$$

**Assess:** The smallness of this acceleration due to gravity is essentially due to the large earth-sun distance.