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How many kilograms of helium are needed to fill a 1,000 m radius sphere with helium if the final density of the helium is  $0.1800 \text{ kg/m}^3$ ?

$$\text{Density} = (\text{mass}) / (\text{volume})$$

$$\begin{aligned}\text{Vol (sphere)} &= \frac{4}{3} \pi r^3 = \left(\frac{4}{3}\right) (\pi) (1\text{m})^3 \\ &= \frac{4\pi}{3} \text{m}^3\end{aligned}$$

$$\begin{aligned}\text{mass} &= (\text{Density}) (\text{volume}) \\ &= (0.1800 \text{ kg/m}^3) \left(\frac{4\pi}{3} \text{m}^3\right) \\ &= (0.0600 \text{ kg}) (4\pi) \\ &= 0.2400\pi \text{ kg} \\ \text{mass} &= 0.7540 \text{ kg}\end{aligned}$$

$\therefore$  Mass of Helium = 0.7540 Kilograms