

20080305_0910

A gym is 120.0 ft long, 100.0 ft wide, and 30.00 ft tall. If the density of the air is 1.29 kg/m^3 determine the mass of the air in the gym.

1st find Volume of gym $V = lwh$

$$V = (120.0 \text{ ft})(100.0 \text{ ft})(30.00 \text{ ft})$$

$$V = (1.200 \times 10^2 \text{ ft})(1.000 \times 10^2 \text{ ft})(3.000 \times 10^1 \text{ ft})$$

$$V = 3.600 \times 10^5 \text{ ft}^3$$

Convert into m^3

$$V = (3.600 \times 10^5 \text{ ft}^3) \left(0.3048 \frac{\text{m}}{\text{ft}}\right)^3$$

$$V = (3.600 \times 10^5 \text{ ft}^3) \left(0.028317 \frac{\text{m}^3}{\text{ft}^3}\right)$$

$$V = 0.10194 \times 10^5 \text{ m}^3$$

$$V = 1.0194 \times 10^4 \text{ m}^3$$

2nd Use $\rho = m/V$ to solve for mass

$$\text{mass} = \rho V$$

$$= (1.29 \text{ kg/m}^3)(1.0194 \times 10^4 \text{ m}^3)$$

$$= 1.3150 \times 10^4 \text{ kg}$$

The gym holds 13,150 kg of air