

Dry sand has a density of 1.5 g/cm^3 . A child's sandbox measuring 4.0ft by 5.0ft, is filled with sand to a depth of 6.0in. What is the mass of the sand in kg? In lb?

Solution:

Let's calculate sandbox volume first:

$$V = 4\text{ft} * 5\text{ft} * 0.5\text{ft} = 10\text{ft}^3$$

(1 foot equals to 12 inches, so 6 inches = 0.5ft)

One foot = 30.48 cm, so 1 cubic foot equals to $(30.48 \text{ cm})^3 = 28316.8 \text{ cm}^3$, so 10ft^3 are equal to 283168 cm^3 .

Then, sandbox filled with mentioned volume of sand will contain such mass of sand:

$$m = \rho * V = 1.5 \text{ g/cm}^3 * 283168 \text{ cm}^3 = 424752 \text{ g} = 424.752 \text{ kg}$$

(where ρ - is density of sand, V - volume of sand).

One kilogram approximately equals to 2.20 pounds, so 424.752 kilograms of sand will weight $424.752 \text{ kg} * 2.20 = 934.4544 \text{ lb}$

Answer:

Sandbox with dimensions mentioned in task will contain 424.752 kg or 934.4544 lb of sand.