

## Answer on Question 61592, Physics, Other

### Question:

Fine grains of beach sand are assumed to be spheres of radius  $52.3 \mu m$ . These grains are made of silicon dioxide which has a density of  $2600 \text{ kg/m}^3$ . What is the mass of each grain of sand? Answer in units of  $\text{kg}$ .

### Solution:

By the definition of the density we have:

$$\rho = \frac{m}{V},$$

here,  $\rho$  is the density of the grain of sand,  $m$  is the mass of each grain of sand and  $V$  is the volume of the grain of sand.

Then, from this formula we can find the mass of each grain of sand:

$$m = \rho V.$$

We know, that fine grains of beach sand are assumed to be spheres, thus we need to use the formula for the volume of the sphere:

$$V = \frac{4}{3} \pi r^3,$$

here,  $r$  is the radius of the sphere.

Finally, we can find the mass of each grain of sand:

$$m = \rho V = \frac{4}{3} \pi \rho r^3 = \frac{4}{3} \cdot \pi \cdot 2600 \frac{\text{kg}}{\text{m}^3} \cdot (52.3 \cdot 10^{-6} \text{ m})^3 = 1.56 \cdot 10^{-9} \text{ kg}.$$

### Answer:

$$m = 1.56 \cdot 10^{-9} \text{ kg}.$$