The volume of the Earth is $1.08321*10^{12}$ km³ and the density of the earth is 5.52 g/cm³. What is the mass of the earth in grams and kilograms?

Solution:

$$d(earth) = 5.52 \text{ g/cm}^3; V(earth) = 1.08321 \cdot 10^{12} \text{ km}^3$$

$V(earth) = \frac{m(earth)}{d(earth)}$ then

$$m(earth) = V(earth) \cdot d(earth)$$

in 1 km³ is $(1000)^3$ m³ and it is $1\cdot10^9$ m³

in 1 m³ is $(100)^3$ m³ and it is $1\cdot10^6$ cm³

That's why in 1 km³ is $1\cdot10^9\cdot1\cdot10^6$ cm³ and it is $1\cdot10^{15}$ cm³

$$m(earth) = 1.08321 \cdot 10^{12} \cdot 10^{15} \cdot 5.52 = 5.98 \cdot 10^{27} \approx 6 \cdot 10^{27} \text{g}$$

in 1 kg is 1000 g and

in X kg is $6\cdot10^{27}$ g

$$\text{Then X} = \frac{1\cdot6\cdot10^{27}}{1000} = 6 \cdot 10^{24} \text{kg is the mass of the Earth.}$$