Know: Mass density $\rho \left[\frac{kg}{m^3}\right]$

and, atomic mass number A

So: $M_{mol} = \left(\frac{A}{1000}\right) \left[\frac{kg}{mol}\right]$

So, looking at the units:

Molar density $\left[\frac{moles}{m^3}\right] = \frac{\rho}{M_{mol}} = \frac{\rho}{(A/1000)}$

Also know: Avagadro's Number

$N_A = 6.02 \times 10^{23}$ particles/mole

$\therefore$

$$\left(\frac{moles}{m^3}\right)\left(\frac{particles}{mole}\right) = \frac{particles}{m^3} = \frac{N}{V}$$

and, $$\frac{N}{V} = \frac{\rho}{(A/1000)} N_A$$

a.) <u>aluminum</u>: $\rho = 2700 \frac{kg}{m^3}$, $A = 27$

$$\frac{N}{V} = 6.02 \times 10^{28}\ m^{-3}$$

b.) <u>lead</u>: $\rho = 11,300 \frac{kg}{m^3}$, $A = 207$

$$\frac{N}{V} = 3.29 \times 10^{28}\ m^{-3}$$