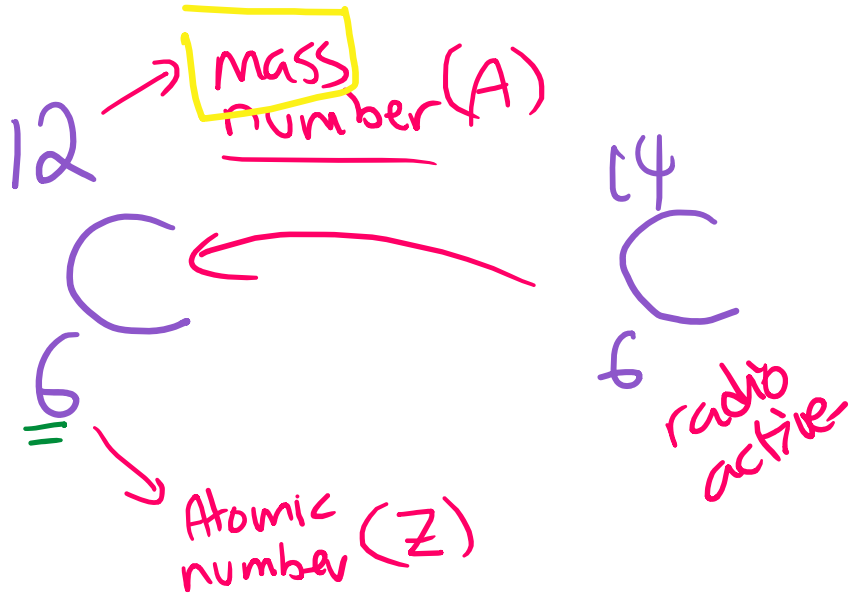
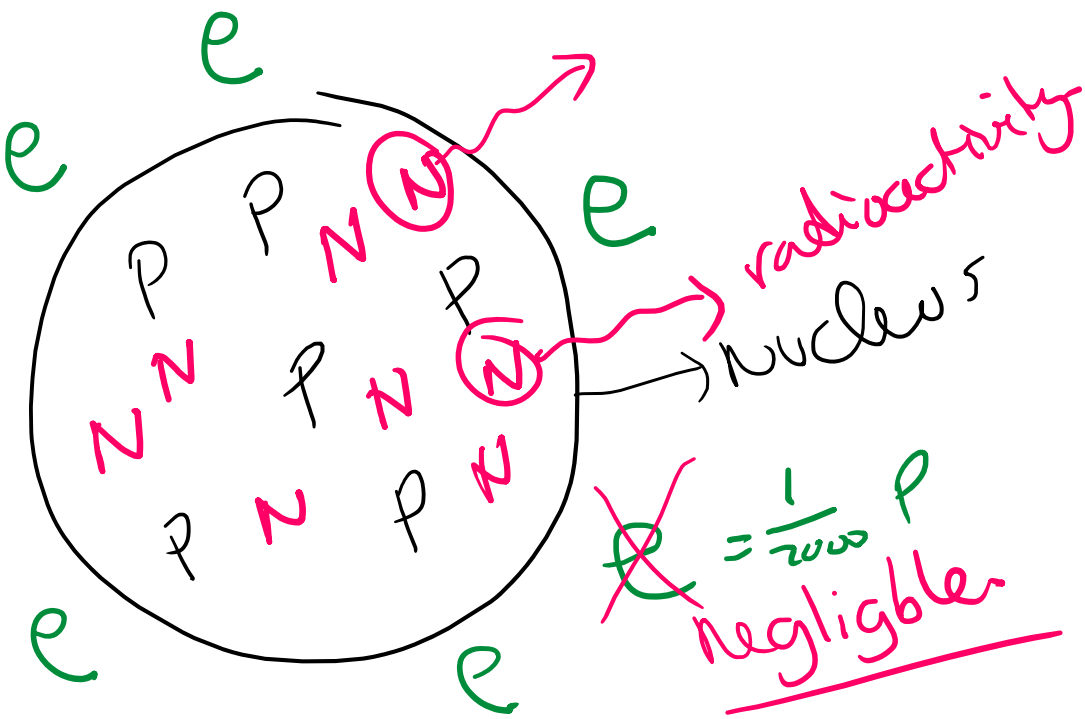
Mass - weight - Density





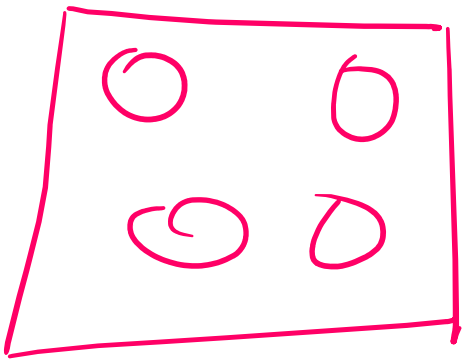
mass = 12

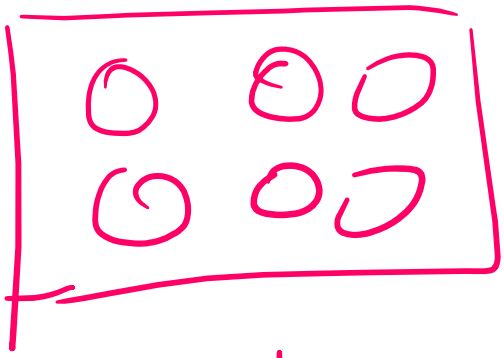
mass P = mass N = 2000 e

mass: Quantity of matter in an object.

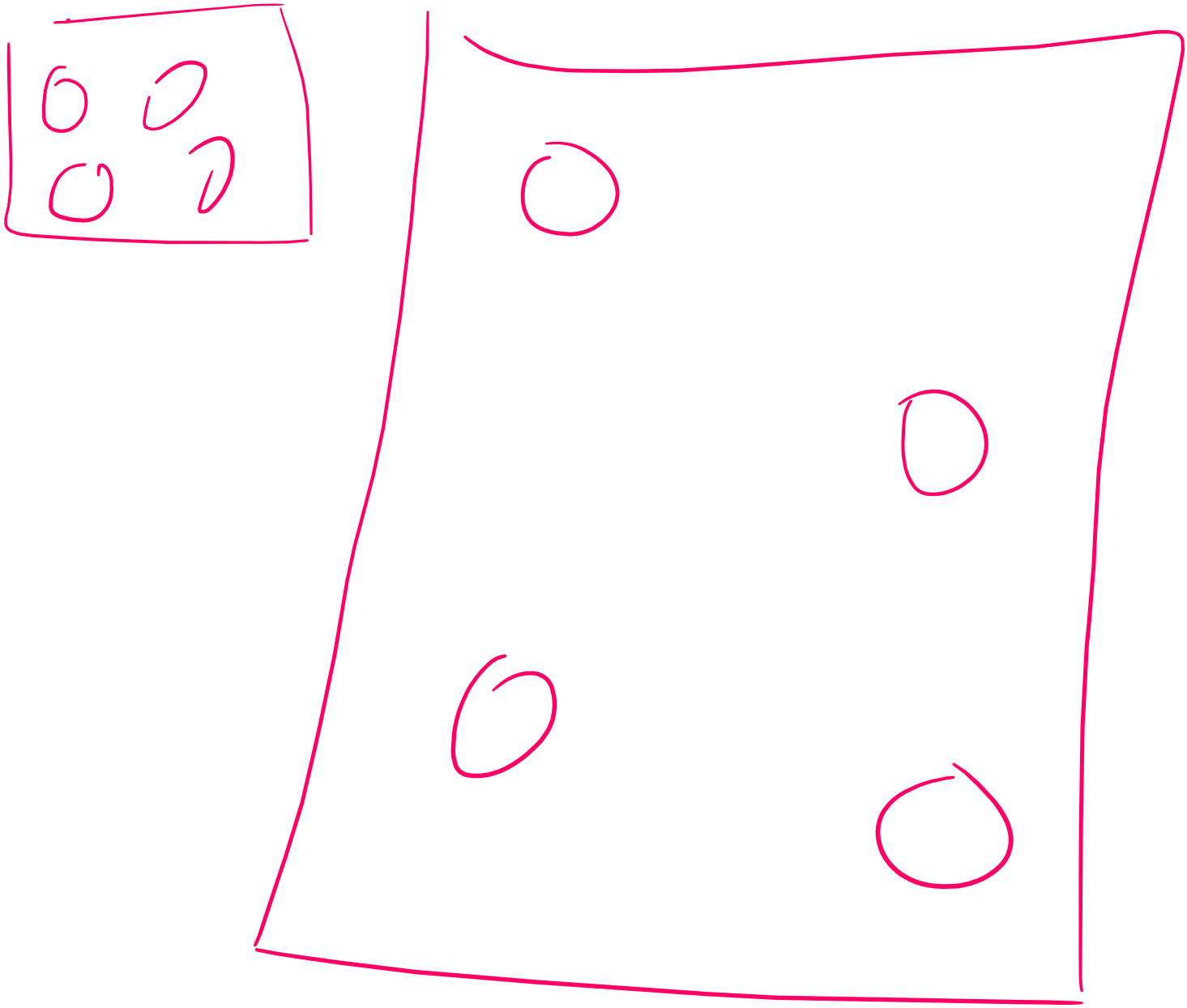
particles

proton neutron.



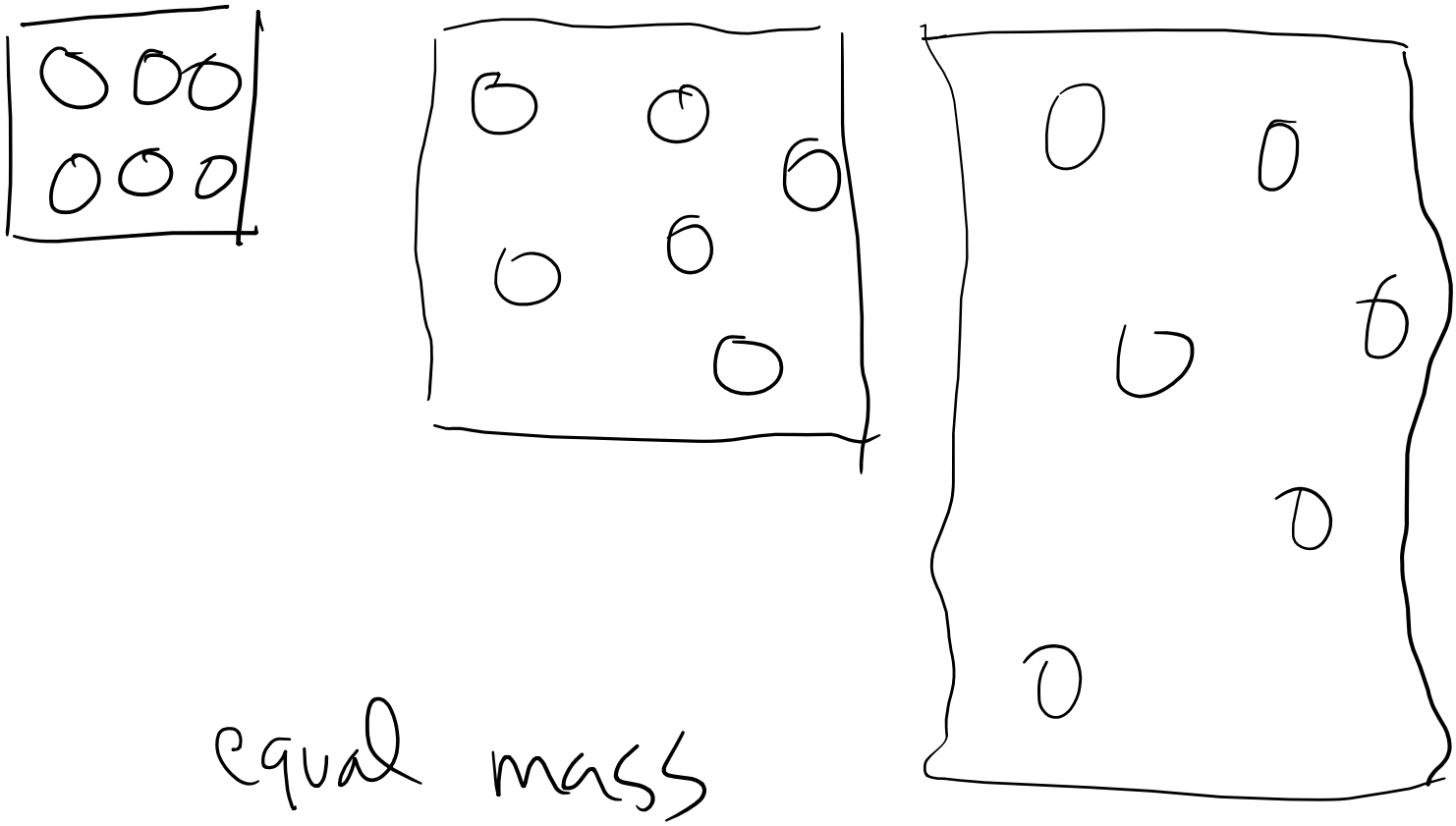


bigger mass



States of matter

Solid liquid gas



equal mass

How can mass change?

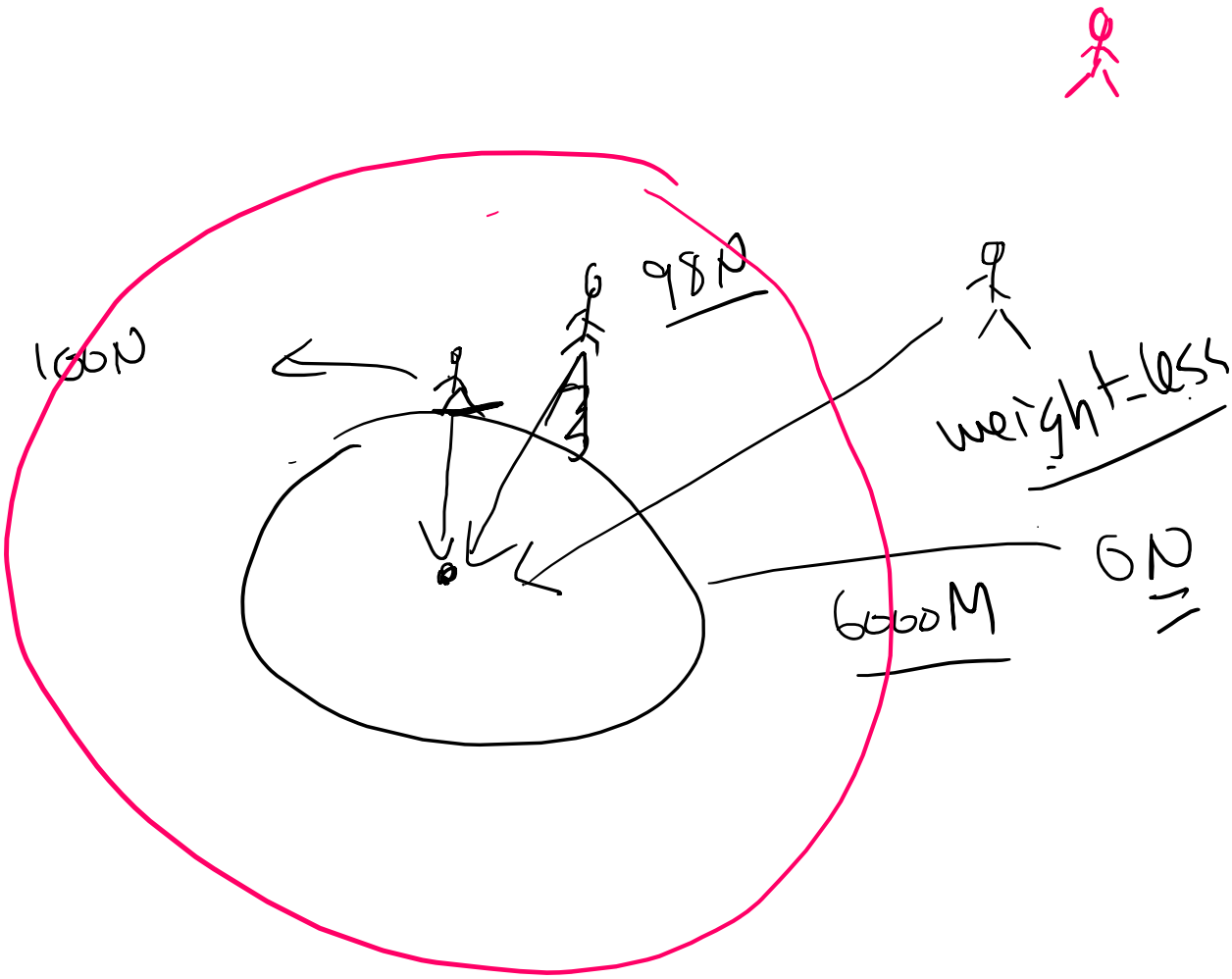
Add or remove particles

we do it or nuclear radiation

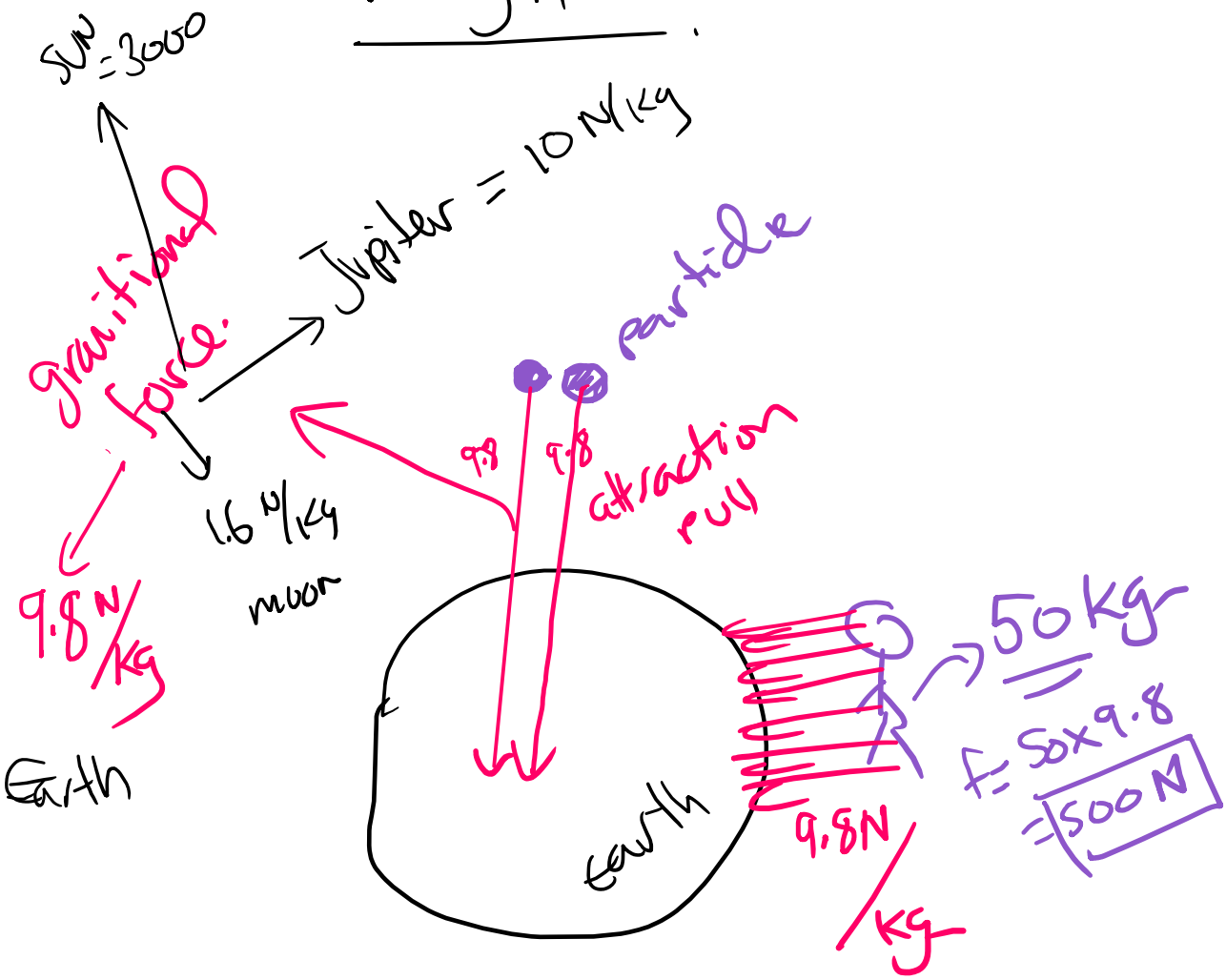
∈ EXAMS

mass does NOT change

MASS : Kilogram (kg)



Weight :

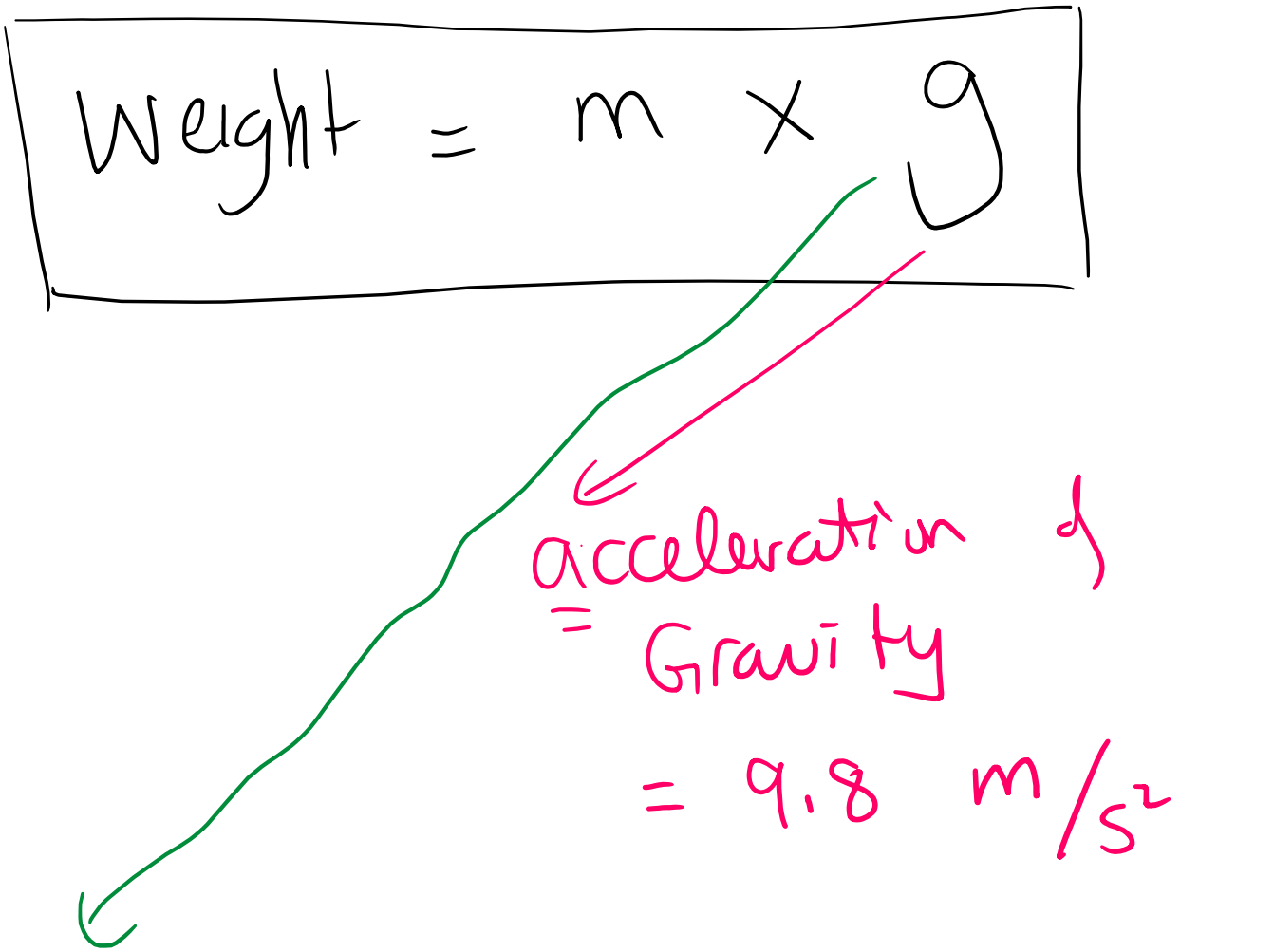


1 Newton = force.

= weight of 1 Apple.

100g = 0.1 kg.

g = 9.8 N/kg F = 9.8 x 0.1 = 0.98 = 1N


Weight = m x g
acceleration of
= Gravity
= 9.8 m/s²
g = weight / mass = force / mass = 9.8 N/kg
Gravitational
Force = 9.8 N/kg.

An astronaut weighs 100 N on the moon, what is his mass and weight on Earth.

$g_{moon} = 1.6$ N/kg $g_{earth} = 9.8$ N/kg.

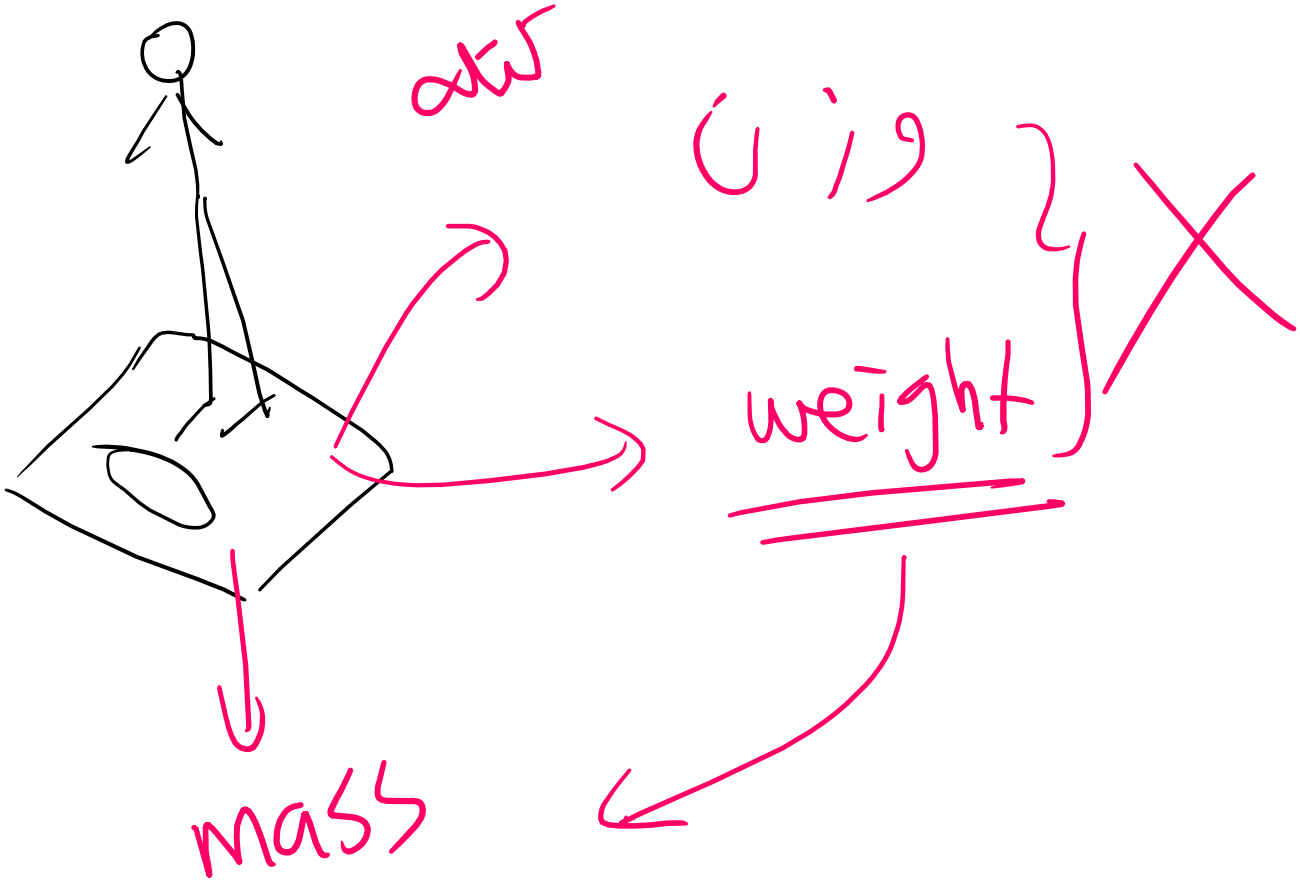
$W = mg$

$W_{moon} = 100 = m \times 1.6$

$m = \frac{100}{1.6} =$ **62.5 kg**

$W_{earth} = m \times g$

$= 62.5 \times 9.8 =$ **612.5 N**



mass

1 kg ⟶ 10 N

10 kg ⟹ 100 N

50 kg → 500 N

Density

density ρ

Rho

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

kg/m^3 g/cm^3

~~kg/cm^3~~ ~~g/m^3~~

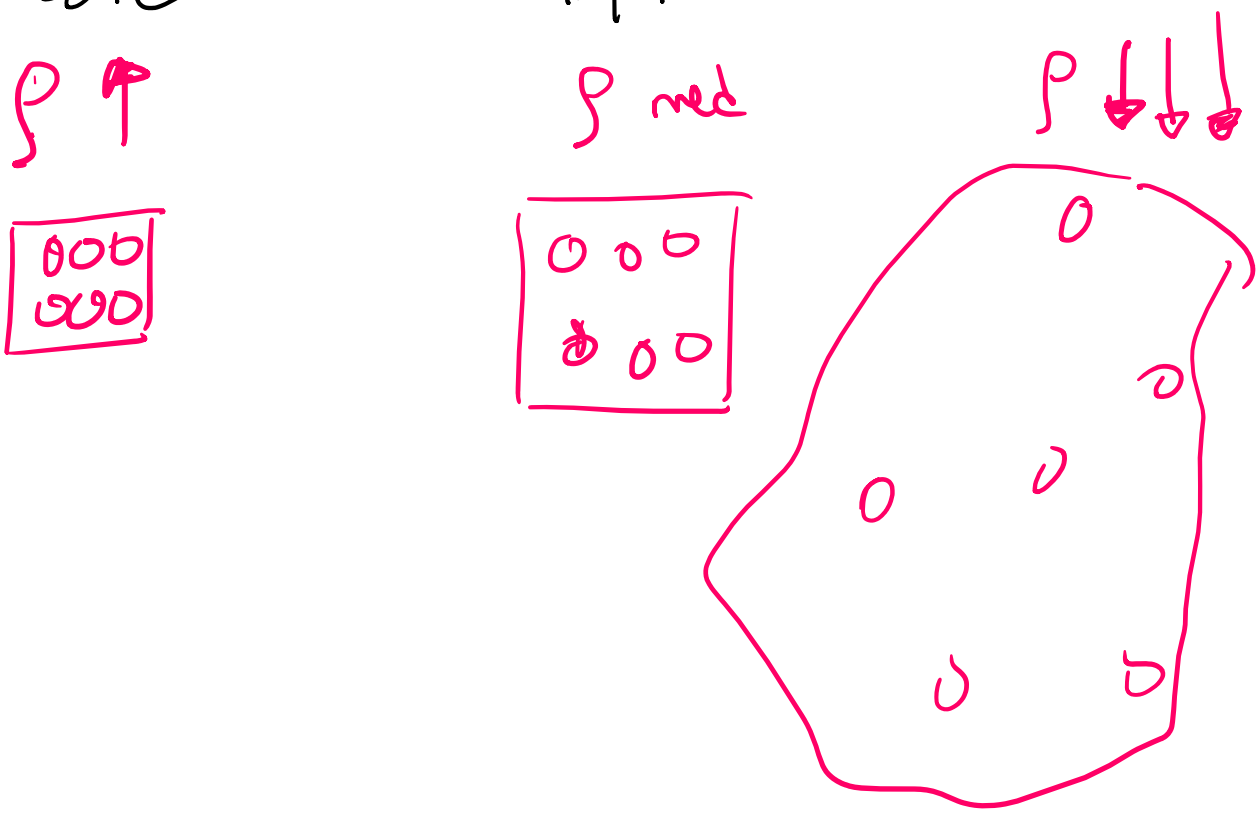
Density: how crowded are the particles in a unit volume of an object.

States of matter

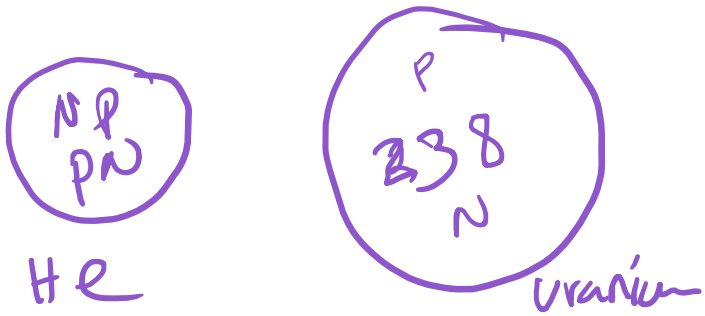
solid

liquid

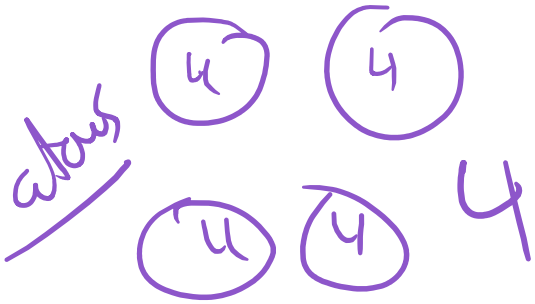
gas



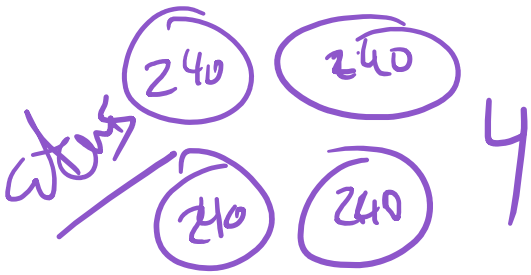
density is how crowded are particles



He



Uranium



16 particles

mass = 4

$\rho = \frac{4}{4} = 4$

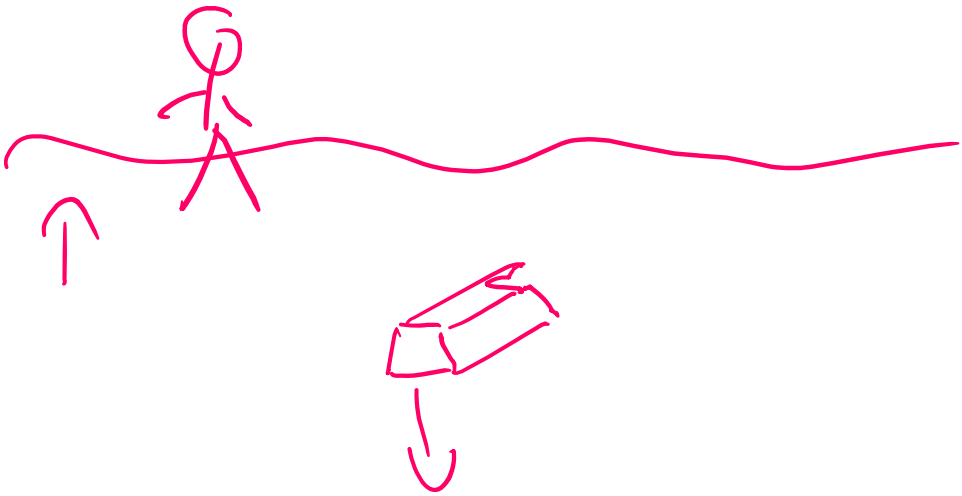
mass = 960

$\rho = \frac{960}{4} = 240$

Density

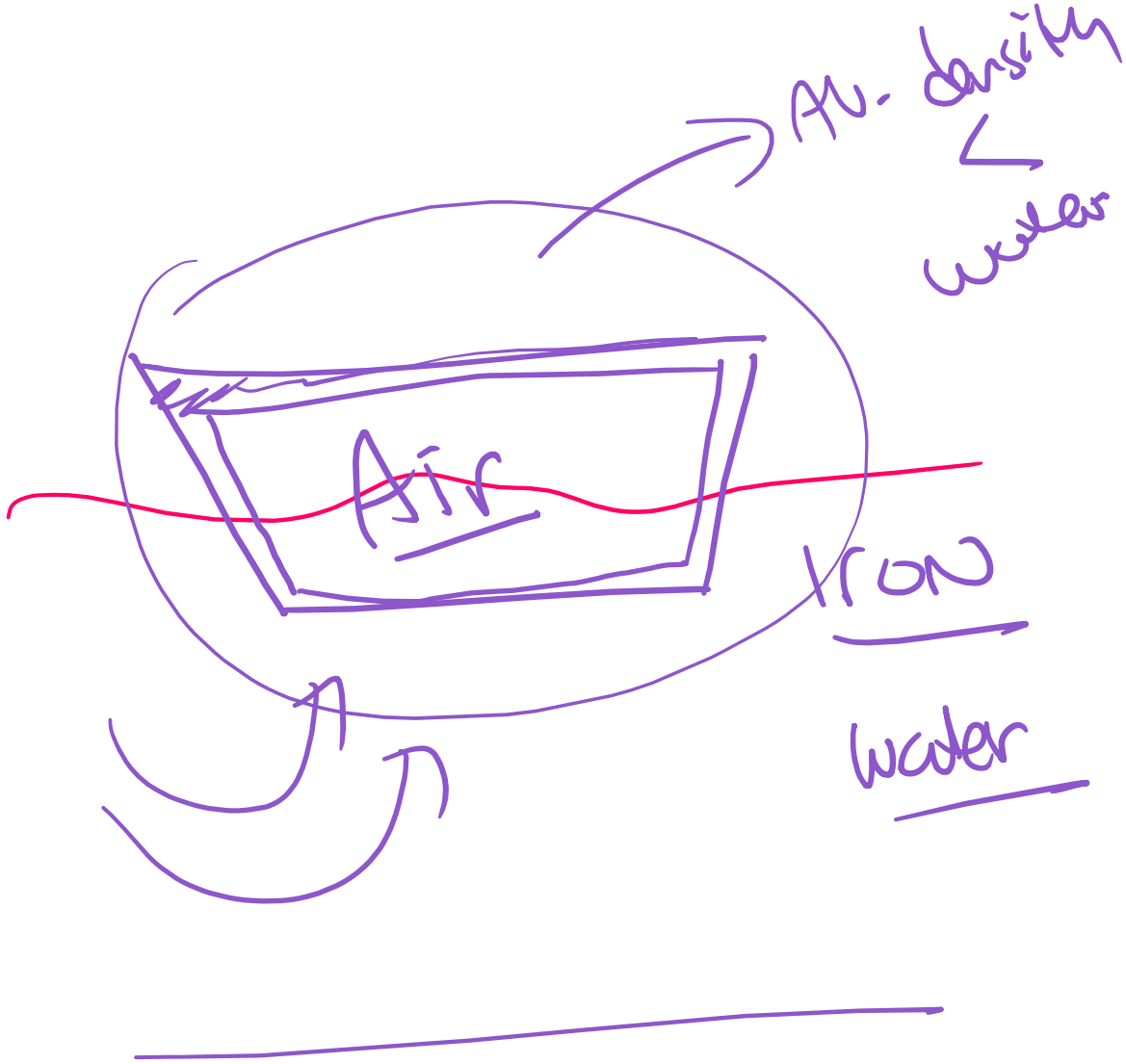
Floating

Sinking



denser objects SINK

less dense objects floats


Av. density
<
water
Air
iron
water

Floating & Sinking

$d = \frac{m}{V}$ ↑

low density ⇒ floats
high density ⇒ sinks

heat causes expansion. ⇒ volume ↑