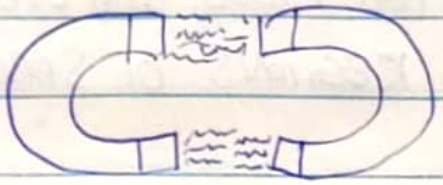
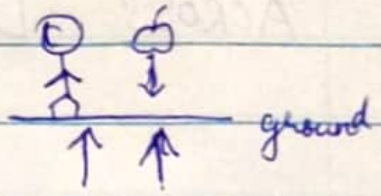
GRAVITY — ? = Attraction between objects





Gravitational Force

↓

It explains (how) massive objects are attracted. to each other.

Cause ? ⟹ UNKNOWN

NEWTON'S LAW OF GRAVITATION

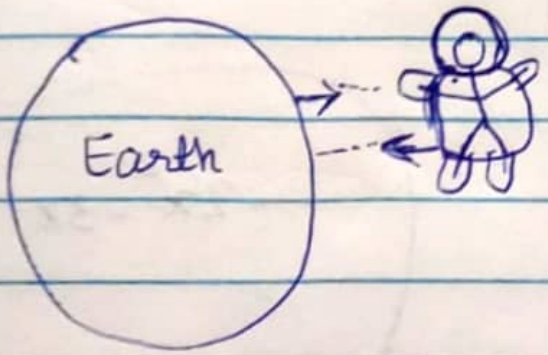
$$F_1 = F_2 = G \times \frac{m_1 \times m_2}{r^2}$$

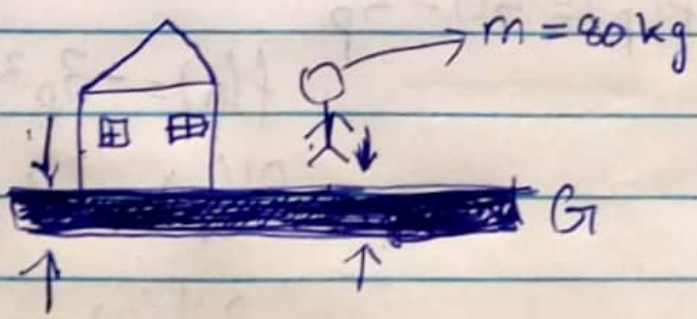
Mass → $F_g \propto m_1 m_2$ direct related/proportional

Distance → $F_g \propto \frac{1}{r^2}$ indirect/inversely related or proportional

FROM VIDEO : **Relation of Mass with Gr. F**

Greater the mass / Heavier the mass of the object . Greater is the force of attraction.





$$m_{earth} = 6 \times 10^{20} \text{ kg}$$

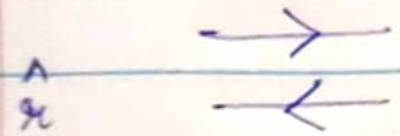
$M_{earth} > m_{man}$

Hence force or pull is > greater

Similarly, greater the distance between objects, lesser the force.

WHY FIELD LINES?

TO SHOW HOW THE FIELD INFLUENCES OBJECTS ACROSS LARGE REGIONS OF SPACE



graphical representations consisting of lines which have magnitude and direction.

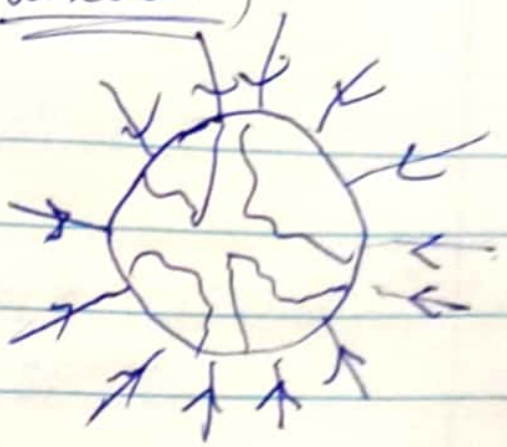
~~The magnitude of~~

INVERSE SQUARE LAW (In Math)

ONE QUANTITY DEPENDS ~~[illegible]~~ INVERSELY UPON THE SQUARE OF THE OTHER QUANTITY.

$$F_{grav} \sim \frac{1}{d^2}$$ d = distance

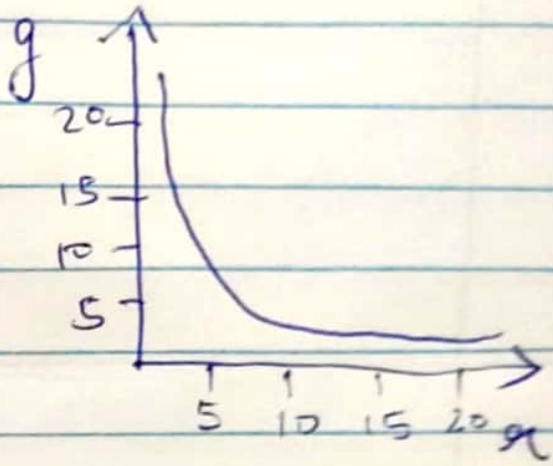
(direction)



Universal :

$$g = \frac{F}{m}$$

$$g \propto \frac{1}{r^2}$$



gravitational field $g = G\frac{M}{r^2}\hat{r}$

$$g = \frac{GM}{r^2}$$

$$M = \frac{g r^2}{G}$$

$$= \frac{9.81 \times (64 \times 10^4)^2}{6.67 \times 10^{-11}}$$

$$= 6.02 \times 10^{24} \text{ kg}$$

CALCULATE ACCELERATION

$$a = \frac{\Delta v}{T}$$ [CHANGE IN SPEED/VELOCITY

$$a = \frac{v_A - v_B}{T}$$

a = acceleration
v_A = speed/velocity of object A
v_B = speed/velocity of object B
T = time

$$a_g = \frac{GM}{r^2}$$

a_g = acceleration of gravity
G = gravitational constant
M = mass
r = distance.