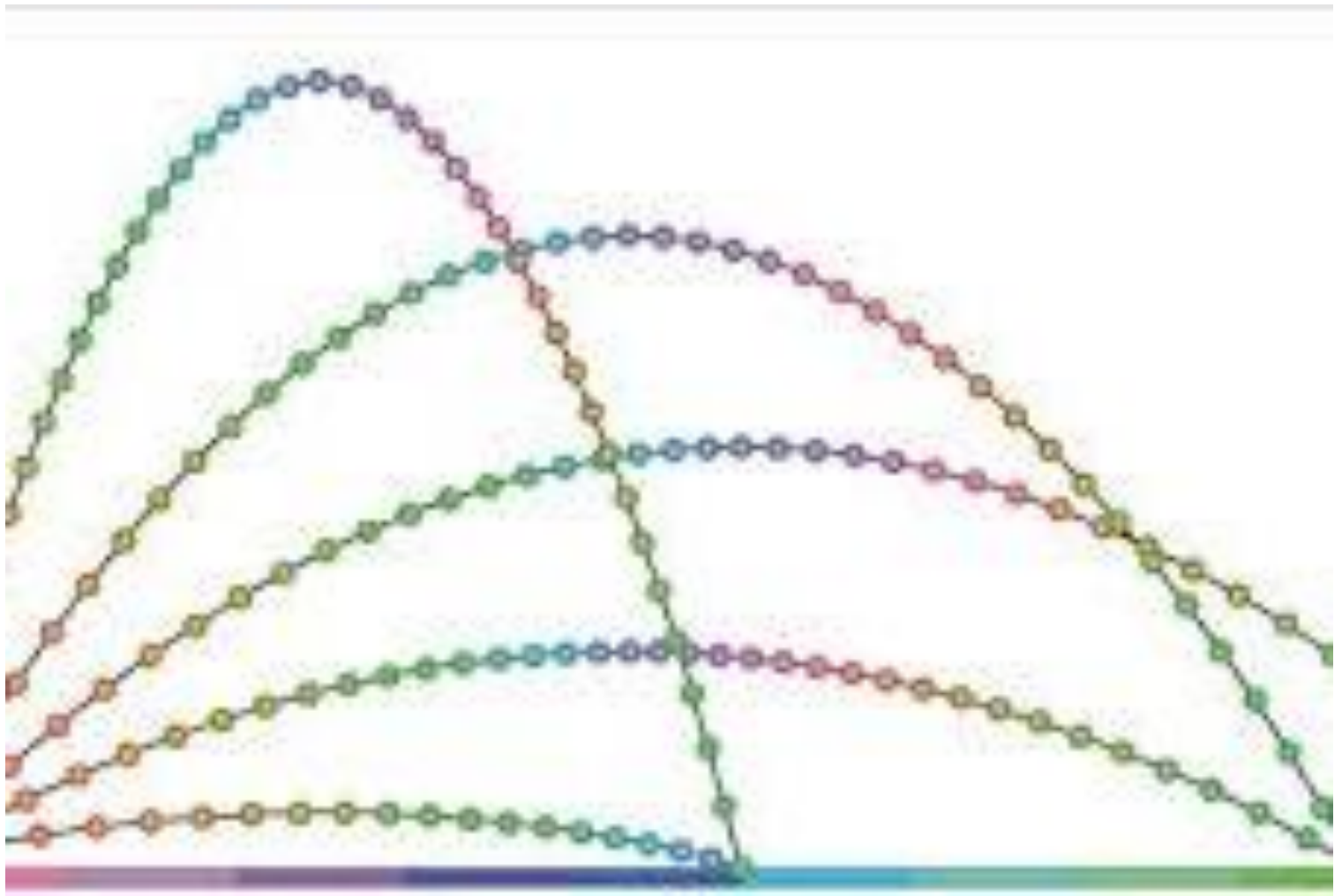


# Experiment # (2) Projectile Motion

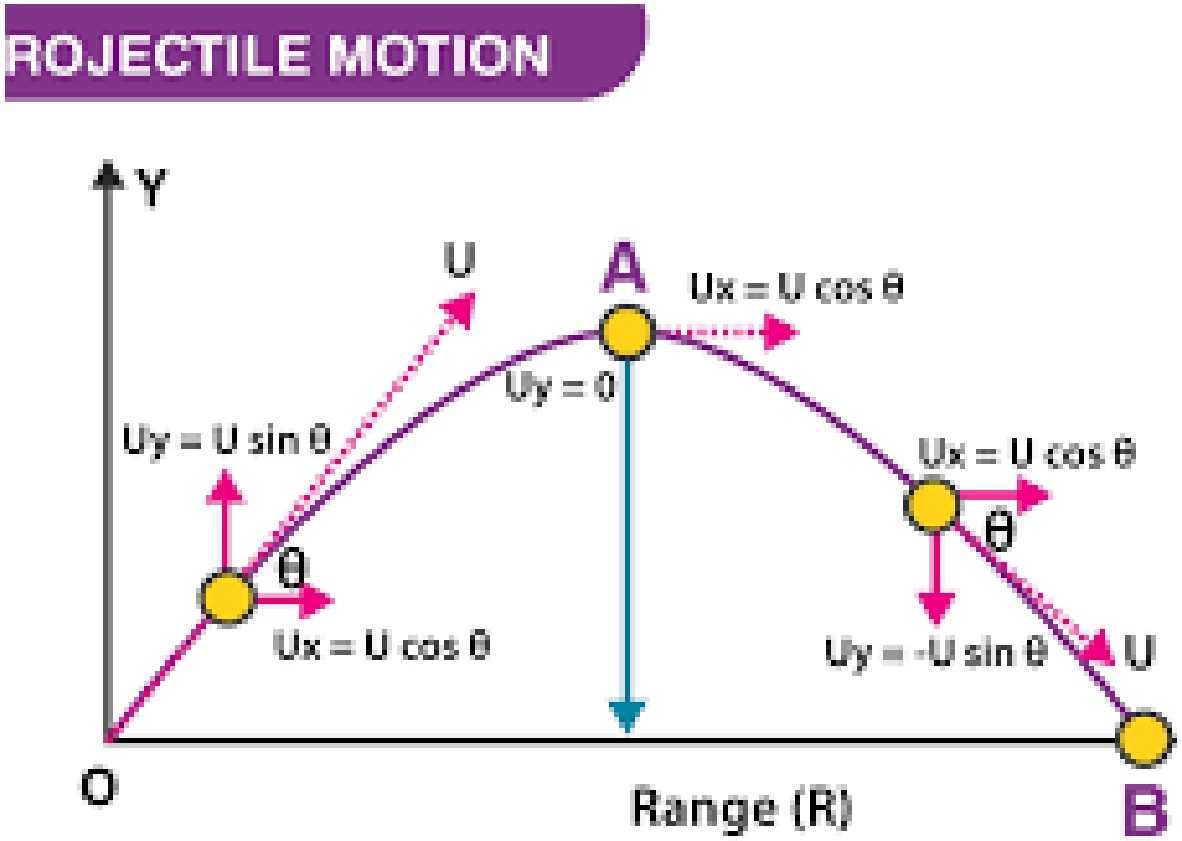
# Mechanics

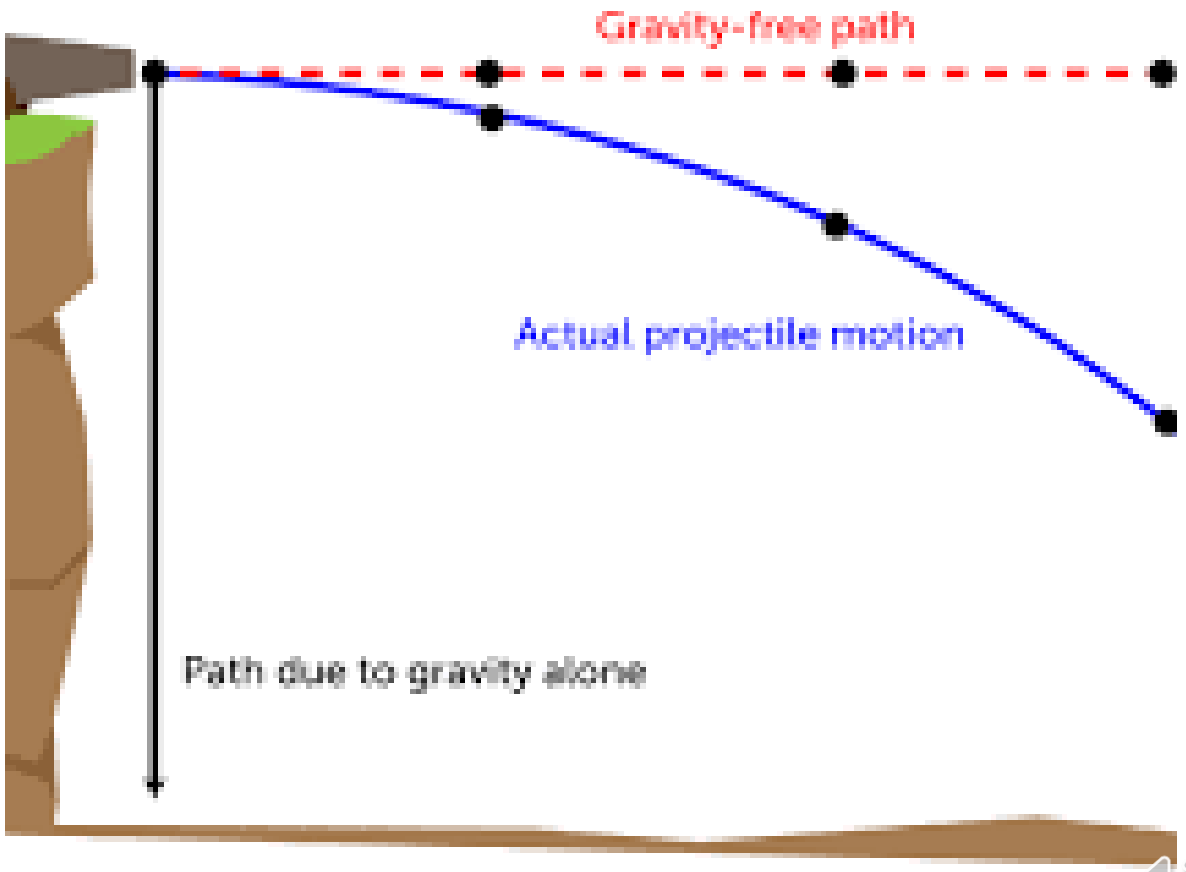
kinematics

Dynamics

statics

# Projectile motion



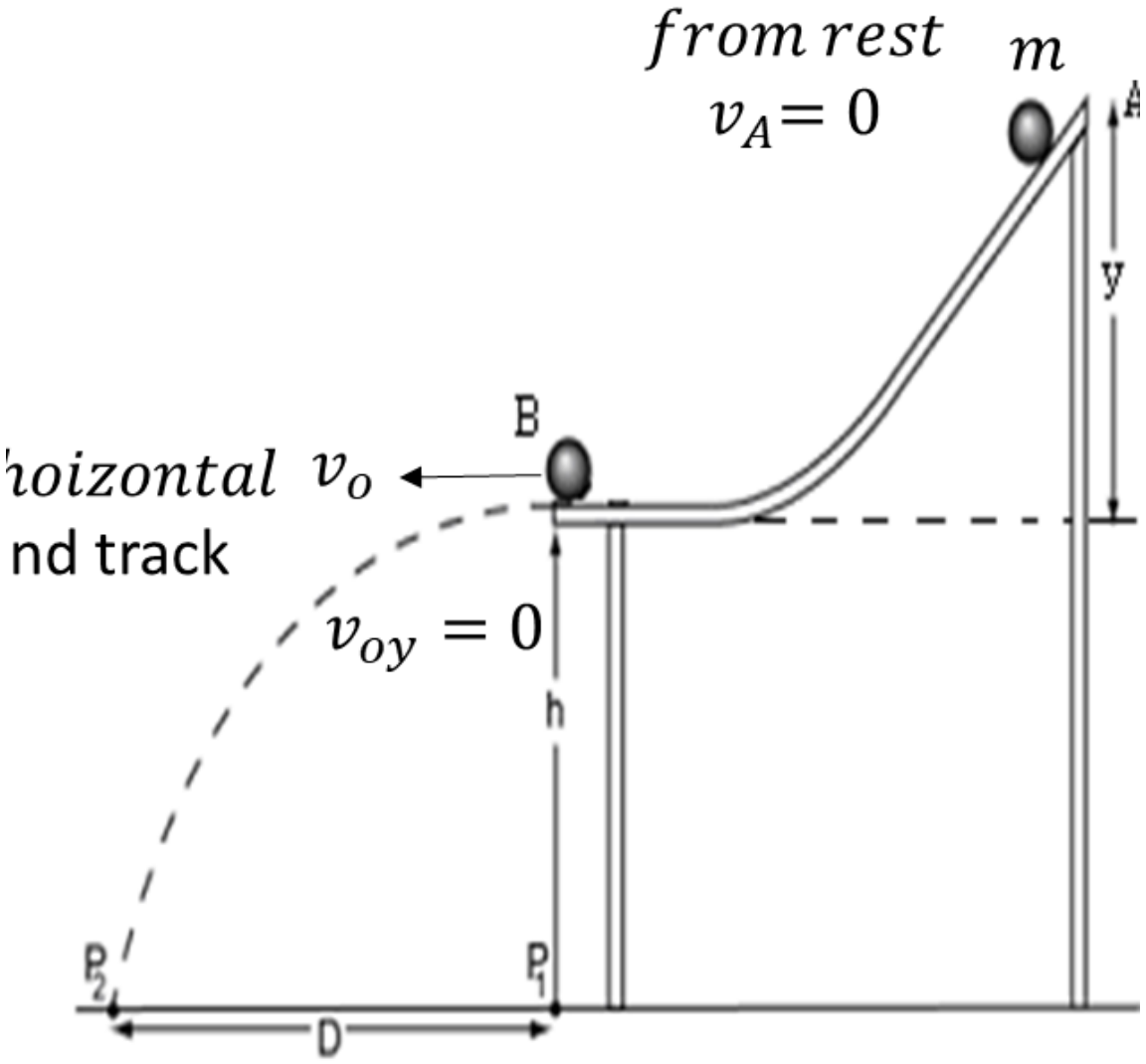



**Projectile motion**: it's a good example of motion in two dimensions, if we know the initial angle of thrown and initial velocity, then we can predict the path of the object moves under the influence of gravity.

- Motion on x-axis: $a_x = 0$ ,
- Motion on y-axis: $a_y = -g$

for projectile starts from B (Θ=0) we can proof:

- $h = (\frac{g}{2v_0^2})D^2$

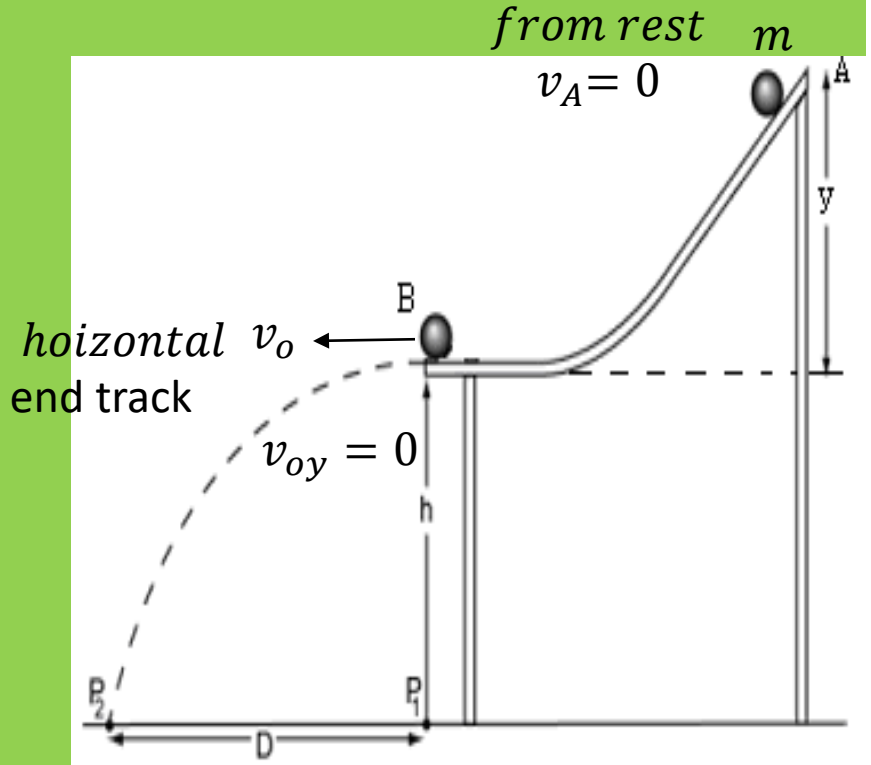


# Now, we need to know the value of $v_0$

- $* E_A = E_B \rightarrow \mathrm{mgy} = \frac{1}{2}\mathrm{mv}^2 + \frac{1}{2}\mathrm{I}\omega^2$ (conservation of energy)
- Where $\mathrm{I} = \frac{2}{5}\mathrm{mR}^2$ ,and $\mathrm{v} = \mathrm{R}\,\omega$
- $v_o = \frac{D}{t}$ , $\mathrm{h} = \frac{1}{2}\mathrm{g}\,\mathrm{t}^2 \rightarrow v_o = \sqrt{\frac{10\,g\,y}{7}}$
- y: the height of m above the horizontal end track.

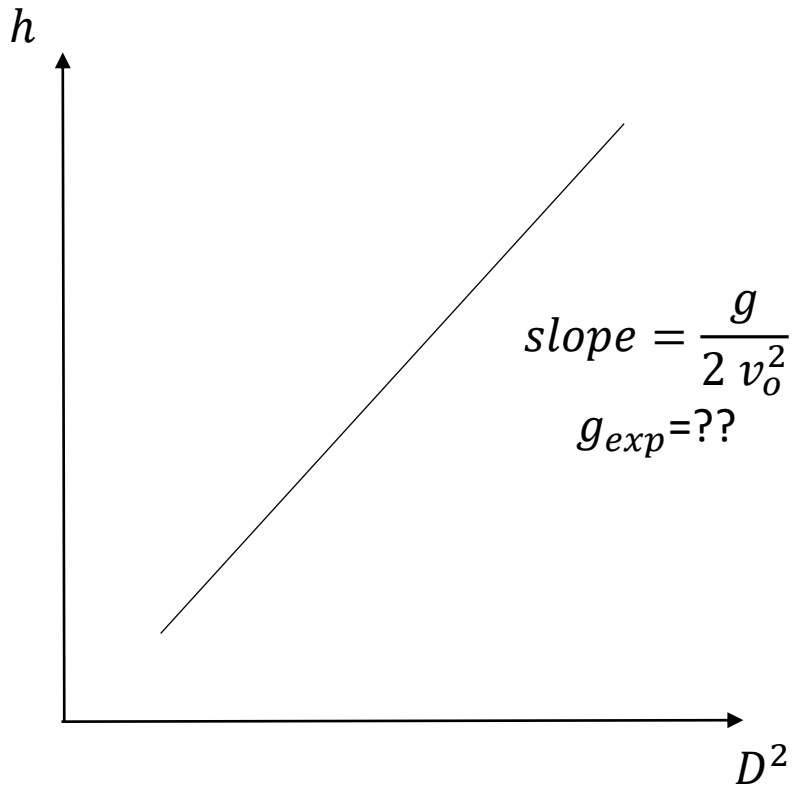
$remember\ h = (\frac{g}{2v_0^2})D^2$

- h: the height of the projectile.
  D: the range of the projectile.



# Procedure

| Trail # | h | D | $D^2$ |
|---|---|---|---|
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |
| 5 | | | |



Thank you