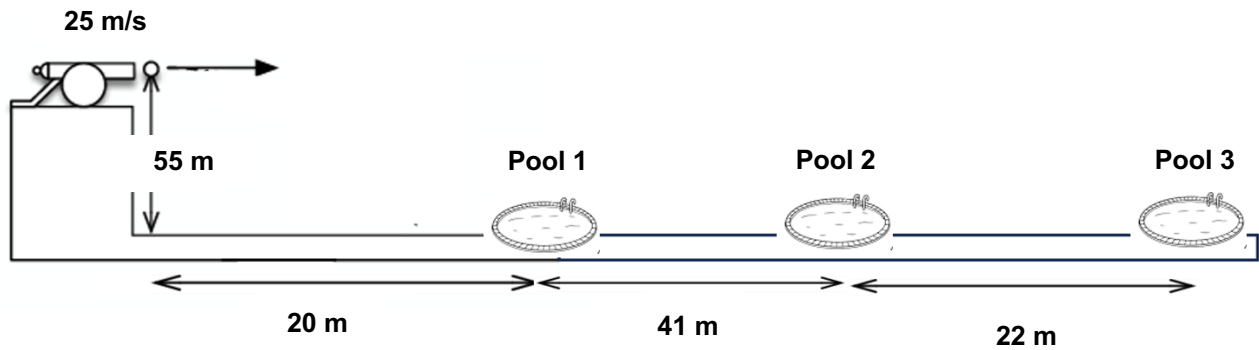


Projectile Motion Puzzle

Match the letter with the number on the board. The pool that it lands in is that number!
(Round to the nearest whole number!)

Letter = A



y-direction:

$$V_i = 0 \text{ m/s}$$

$$a = -10 \text{ m/s}^2$$

$$d = -55 \text{ m}$$

$$t = ?$$

$$V_f = X$$

launched horizontally aka x-direction

Gravity acts in 'y'

Falls 55m down

$$d = V_i t + \frac{1}{2} a t^2$$

$$\downarrow \quad \downarrow \quad \downarrow$$
$$-55 = 0 + \frac{1}{2} (-10) t^2$$

$$-55 = -5 t^2$$

$$11 = t^2$$

$$t = \underline{3.3 \text{ seconds}}$$

x-direction:

$$V_i = 25 \text{ m/s}$$

$$a = 0$$

$$t = 3.3 \text{ s}$$

$$d = ?$$

$$V_f = X$$

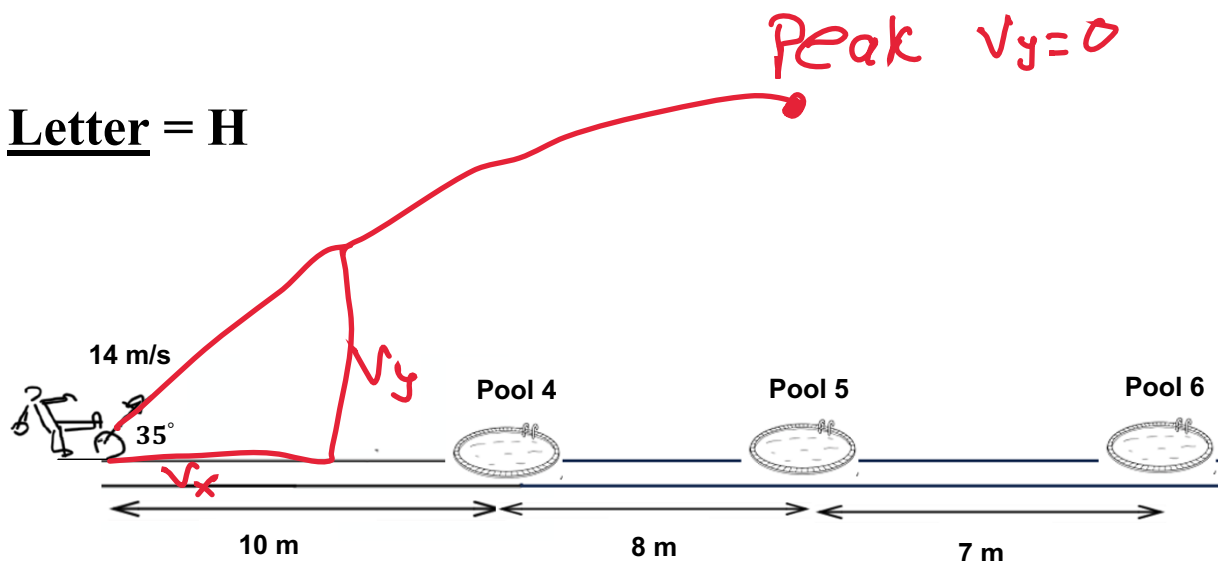
$$d = V_i t + \frac{1}{2} a t^2$$
$$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow$$
$$d = (25)(3.3) + 0$$
$$d = 82.5 \text{ m}$$

$$\boxed{d = 83 \text{ m}}$$

Lands
in
Pool 3!

Projectile Motion Puzzle

Letter = H



$$V_x = (14) \cos 35 = 11.5 \text{ m/s}$$

$$V_y = (14) \sin 35 = 8 \text{ m/s}$$

y-direction:

$$V_i = 8 \text{ m/s}$$

$$V_f = 0 \text{ m/s}$$

velocity at peak!

$$a = -10 \text{ m/s}^2$$

$$t = ?$$

$$d = x$$

x-direction:

$$V_i = 11.5 \text{ m/s}$$

$$a = 0$$

$$t = 1.6 \text{ s}$$

$$d = ?$$

$$V_f = X$$

$$V_f = V_i + at$$

$$0 = 8 + (-10)t$$

$$-8 = -10t \quad t = 0.8$$

Double it!

$$t = 1.6 \text{ seconds}$$

$$d = V_i t + \frac{1}{2} a t^2$$

$$d = (11.5)(1.6) + 0$$

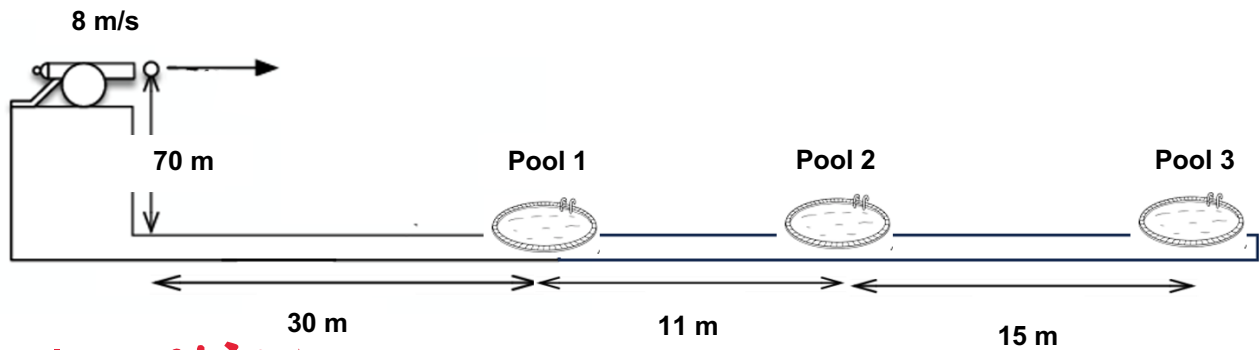
$$d = 18.4 \text{ m} \quad \boxed{d = 18 \text{ m}}$$

Lands in Pool 5!

Projectile Motion Puzzle

Match the letter with the number on the board. The pool that it lands in is that number!
(Round to the nearest whole number!)

Letter = T



y-direction:

$$v_i = 0$$

$$a = -10 \text{ m/s}^2$$

$$d = -70 \text{ m}$$

$$t = ?$$

$$v_f = X$$

$$d = v_i t + \frac{1}{2} a t^2$$

$$\downarrow \quad \downarrow \quad \downarrow$$
$$-70 = 0 + \frac{1}{2} (-10) t^2$$

$$-70 = -5 t^2$$

$$t^2 = 14$$

$$t = 3.7 \text{ seconds}$$

x-direction:

$$v_i = 8 \text{ m/s}$$

$$a = 0$$

$$t = 3.7 \text{ s}$$

$$d = ?$$

$$v_f = X$$

$$d = v_i t + \frac{1}{2} a t^2$$

$$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow$$
$$d = (8)(3.7) + 0$$

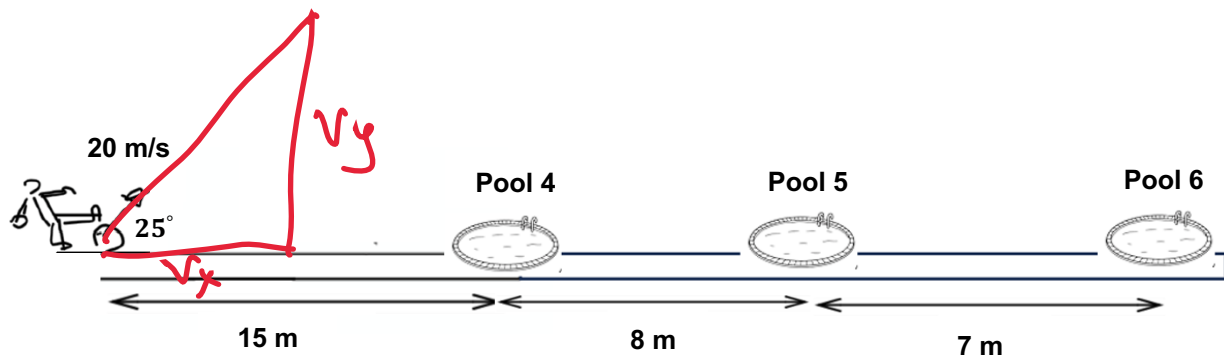
$$d = 29.6 \text{ m}$$

$$d = 30 \text{ m}$$

Lands in
pool 1!

Projectile Motion Puzzle

Letter = P



$$v_x = (20 \text{ m/s}) \cos 25 = 18.1 \text{ m/s}$$

$$v_y = (20 \text{ m/s}) \sin 25 = 8.5 \text{ m/s}$$

y-direction:

$$v_i = 8.5 \text{ m/s}$$

$$v_f = 0$$

$$a = -10 \text{ m/s}^2$$

$$t = ?$$

$$d = x$$

$$v_f = v_i + at$$

$$0 = 8.5 + (-10)t$$

$$-8.5 = -10t$$

$$t = 0.85 \text{ DOUBLE IT!}$$

x-direction:

$$v_i = 18.1 \text{ m/s}$$

$$a = 0$$

$$t = 1.7 \text{ s}$$

$$d = ?$$

$$v_f = x$$

$$d = v_i t + \frac{1}{2} a t^2$$

$$d = (18.1)(1.7) + 0$$

$$d = 30.77$$

$$d = 31 \text{ m}$$

Lands in
pool 6

$$t = 1.7 \text{ seconds}$$