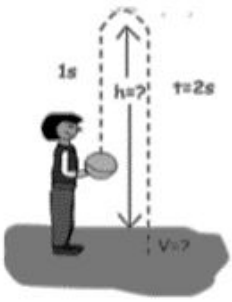
SUVA SANGAM COLLEGE

YEAR 11

PHYSICS

WORKSHEET 9

STRAND 1 MECHANICS

NO.	**CONCEPT IN BRIEF: PROJECTILE MOTION** **Objects Dropped From A Height** • If an object is merely dropped (as opposed to being thrown) from an elevated height, **then the initial velocity *(V_i)* of the object is 0 m/s.** • **Acceleration (a) = 10m/s^2** **Steps to solving for the unknown** **1: identify the known and the symbol of the unknown** **2: identify the best equation to use** **3: plug in the known and solve for the unknown**
1	A small object is dropped from rest from a tall building. After what time will the object have a velocity of 40 m/s? A. 1 s B. 2 s C. 3 s D. 4 s
	CONCEPT IN BRIEF: PROJECTILE MOTION **Object Projected Vertically Upwards** • If an object is projected upwards in a perfectly vertical direction, then it will slow down as it rises upward. The instant at which it reaches the peak of its trajectory, **its velocity is 0 m/s. (vf = 0)** • Acceleration **(a) = -10m/s^2**
2.	A ball is thrown upwards with an initial speed of 20 m/s. (a) How far does the ball rise in 1 second? (b) How long does it take to reach the highest point in its motion? (c) How high above the ground is the highest point in its motion?
	CONCEPT IN BRIEF: KINEMATICS **OBJECTS PROJECTED UPWARDS THEN DOWNARDS**  **Example** John throws the ball straight upward and after 1 second, it reaches its maximum height then it does free fall motion which takes 2 seconds. Calculate (a) the balls initial velocity **Step 1: identify the known and the symbol of the unknown** **The ball is thrown up thus,** $v_f = 0m/s$ $a = -10\mathrm{m/s^2}$ $t = 1s$ $v_i = ??$

Step 2: identify the best equation to use

$v_f = v_i + at$

Step 3: plug in the known and solve for the unknown

$\boldsymbol{v_f = v_i + at}$

$0 = v_i + (-10)(1)$

$0 = v_i - 10$

$0 + 10 = v_i - 10 + 10$

$\boldsymbol{10\ m/s = v_i}$

(b) The maximum height (h) traveled by the ball before it hits the ground

Step 1: identify the knowns and the symbol of the unknown	Step 2: identify the best equation to use	Step 3: plug in the known and solve for the unknown
The ball is coming down thus, $a = 10\text{m/s}^2$ $t = 2s$ $v_i = 0\ m/s$ $d = ??$	$d = v_i t + \frac{1}{2}at^2$	$d = v_i t + \frac{1}{2}at^2$ $d = 0(2) + \frac{1}{2}(10)(2^2)$ $d = 0 + (5)(4)$ $\boldsymbol{d = 20\ m}$

(c) The velocity of the ball before it crashes the ground. (a = 10m/s²)

Step 1: identify the knowns and the symbol of the unknown	Step 2: identify the best equation to use	Step 3: plug in the known and solve for the unknown
The ball is coming down thus, $a = 10\text{m/s}^2$ $t = 2\ s$ $v_i = 0\ m/s$ $v_f = ??$	$v_f = v_i + at$	$v_f = v_i + at$ $v_f = 0 + 10(2)$ $\boldsymbol{v_f = 20m/s}$

3	A tennis ball is thrown straight up at a speed of 40 m/s and caught at the same level. Calculate: (a) The maximum height reached by the ball. (b) The time of flight of ball.