

IB Physics SL — Theme A.1 Kinematics Checklist

Name/Student ID: _____

Class: _____

How to use this checklist: Review each learning objective during your study. Mark [✓] when you can comfortably solve exam-style questions related to that standard. Pay close attention to the Command Terms (Define, Calculate, Determine, Explain, etc.), as they dictate how marks are awarded in Paper 1 and Paper 2.

Syllabus Coverage & Assessment Objectives

Syllabus Code & Learning Objective	Required Skills & IB Command Terms	Data Booklet Reference	Status
A.1.1 Displacement, Velocity & Acceleration	• Define displacement, velocity, and acceleration. • Distinguish between scalar (distance, speed) and vector (displacement, velocity) quantities. • Determine instantaneous and average values from x-t, v-t, and a-t graphs. • Calculate displacement using the area under a v-t graph.	$v = \Delta x / \Delta t$ $a = \Delta v / \Delta t$	[]
A.1.2 Uniformly Accelerated Motion (SUVAT)	• Select and apply the SUVAT equations to solve 1D motion problems. • Identify situations where acceleration is not constant (where SUVAT equations cannot be applied). • Derive kinematic equations algebraically or graphically.	$v = u + at$ $s = ut + \frac{1}{2}at^2$ $v^2 = u^2 + 2as$ $s = \frac{1}{2}(v + u)t$	[]

Syllabus Code & Learning Objective	Required Skills & IB Command Terms	Data Booklet Reference	Status
A.1.3 Projectile Motion (2D Motion)	• Analyze two-dimensional motion by resolving initial velocity vectors into horizontal and vertical components. • State and apply the independence of horizontal ($a_x = 0$) and vertical ($a_y = -g$) motions (ignoring air resistance). • Determine maximum height, time of flight, range, and final impact velocity vector (magnitude and angle).	$v_x = u \cos\theta$ $v_y = u \sin\theta$	[]
A.1.4 Fluid Resistance & Terminal Velocity	• Describe the qualitative effect of air resistance on the trajectory of a projectile (reduced range and maximum height, asymmetric path). • Explain how falling objects reach terminal velocity ($F_{\text{drag}} = W \Rightarrow a = 0$). • Interpret and sketch a-t and v-t graphs for motion subject to fluid resistance.	(No direct formula; conceptual & graphical analysis)	[]

Command Terms Reference for Kinematics

- **State:** Give a specific name, value, or other brief answer without explanation or calculation.
- **Define:** Give the precise meaning of a word, phrase, concept, or physical quantity.
- **Calculate:** Obtain a numerical answer showing the relevant stages in the working.
- **Determine:** Obtain the only possible answer (often by reading from a graph or performing a quick calculation).
- **Sketch:** Represent by means of a diagram or graph (labeled axes, key points, and correct qualitative shape).
- **Explain:** Give a detailed account including reasons or causes.