

## Physics 12 Learning Goals : Kinematics

### *Vocabulary*

acceleration, acceleration due to gravity, average velocity, constant acceleration, displacement, final velocity, horizontal motion, horizontal velocity, initial velocity, kinematics, maximum height, projectile motion, projectile velocity, range, relative velocity, time, velocity, vertical motion, vertical velocity

### *Knowledge*

- velocity: initial, average, final, horizontal, vertical
- navigation problems
- displacement
- acceleration due to gravity
- constant acceleration due to gravity
- shape of the path taken by a projectile fired at some angle above the horizon
- independence of horizontal and vertical motion of a projectile
- projectile motion

### *Skills and Attitudes*

- conduct appropriate experiments
- systematically gather and organize data from experiments
- use graphical methods to analyse results of experiments
- produce and interpret graphs (e.g., slope and intercept)
- verify relationships (e.g., linear, inverse, square, and inverse square) between variables
- use models (e.g., physics formulae) to solve problems
- construct vector diagrams
- use appropriate units and metric prefixes

C1 apply vector analysis to solve practical navigation problems

- describe relative velocity
- determine velocities, displacement, and time of travel for navigation problems (e.g., airplanes, boats, swimmers)

Goal C2 on next page...

C2 apply the concepts of motion to various situations where acceleration is constant

- solve a variety of kinematic problems involving
  - displacement
  - initial velocity
  - final velocity
  - average velocity
  - acceleration
  - time
- describe the shape of the path taken by a projectile fired at some angle above the horizon if friction is negligible
- with teacher support, conduct an experiment to establish the independence of a projectile's horizontal and vertical motion
- draw conclusions about a projectile's horizontal velocity and downward acceleration due to gravity if friction is discounted
- resolve a projectile's velocity into horizontal and vertical components
- solve projectile motion problems involving
  - range
  - maximum height
  - time of flight
  - displacement
  - velocity
  - acceleration due to gravity