

Topic 2A: Accelerated Motion – Single Axis

Skill 12: Recognizing Acceleration

Acceleration is the change in velocity of an object over time

$$a = \frac{\Delta v}{t}$$

in other words an accelerating object speeds up
Slows-down
or changes direction

Acceleration is caused by a NET FORCE (ie unbalanced force)

★ Whatever happens to the Net Force also happens to acceleration ★

Ex: If an object moving right slows down, the net force must be to the left... acceleration is directed left

If an object moving right speeds up, the net force must be to the right... acceleration is directed right.

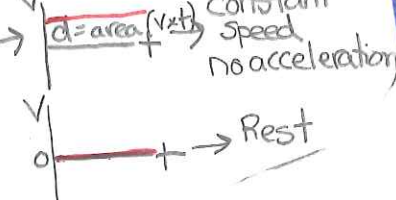
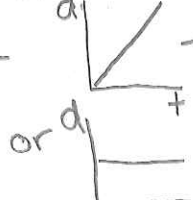
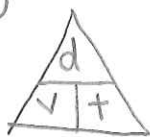
In this course we work with uniform (constant) acceleration

If acceleration is zero
net force is zero
(and vice-versa)

Zero acceleration / No Net force
is called Equilibrium

Recall unit 1: Dot diagram becomes

$$v = d/t$$



If acceleration is constant
net force is constant
(and vice-versa)

• on a dot diagram for uniform acceleration the distance between dots changes at the same rate

$t=0$
 $d=0$ Speeding up going away (A)

$t=0$
 $d=0$ Slowing down going away (B)

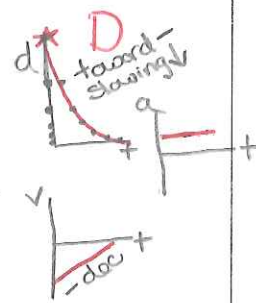
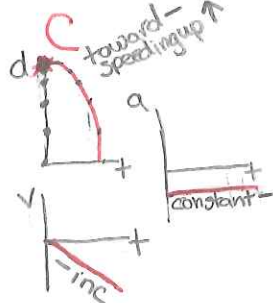
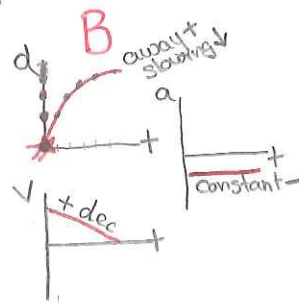
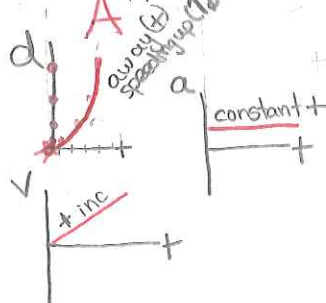
$t=0$
 $d=0$ Speeding up toward (ref pt) $d=0$ (C)

$t=0$
 $d=0$ Slowing down toward $d=0$ (D)

- Position vs time graphs show dot diagrams expanded over equal time intervals
- a changing slope (ie curve) means acceleration is present

- the direction of the acceleration depends on what happens to the slope of d vs t (direction

away = + (positive) ; trend = slowing (dec) → toward or speeding up (inc) → away from



These are all non-equilibrium (uniform acc & uniform force) is present