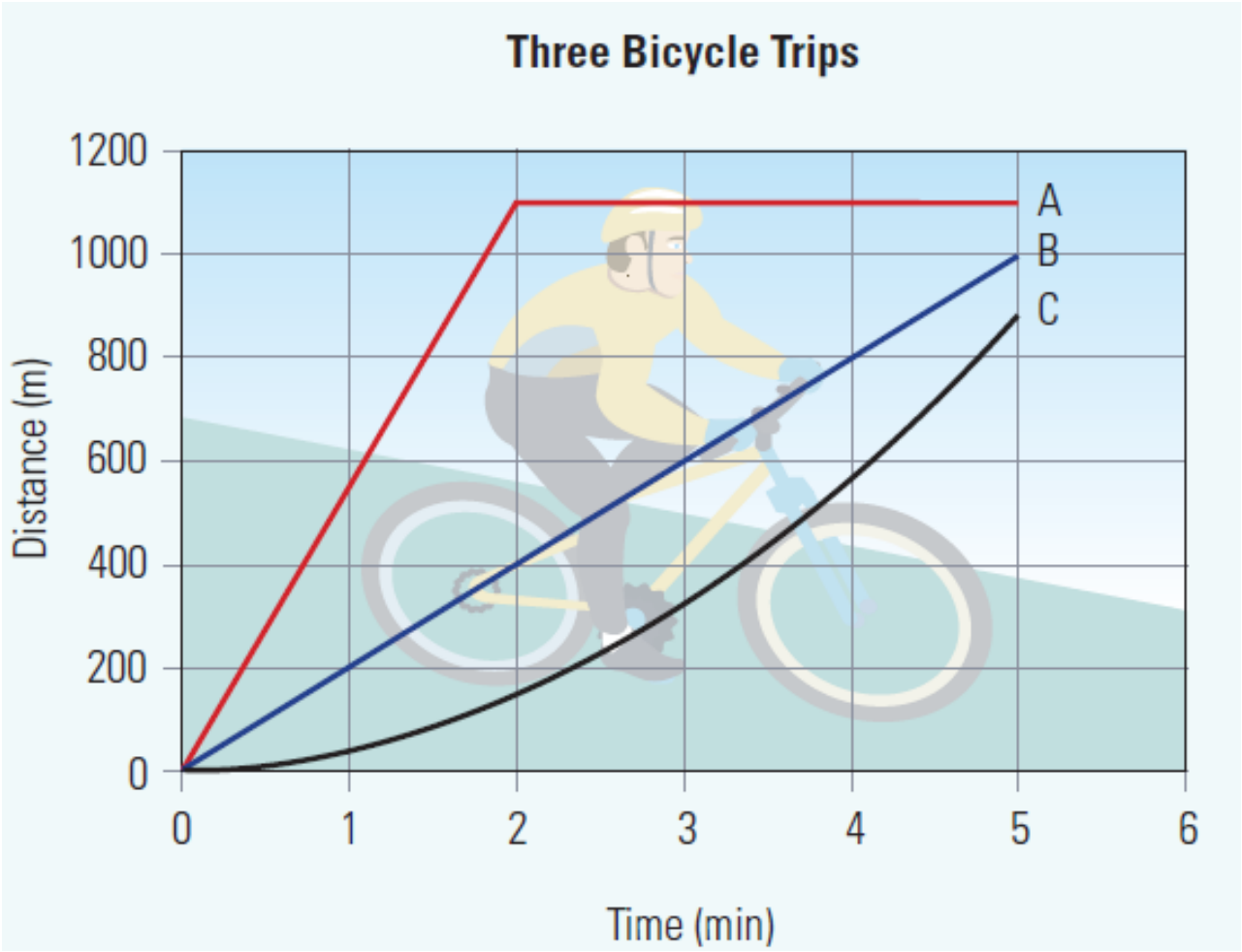
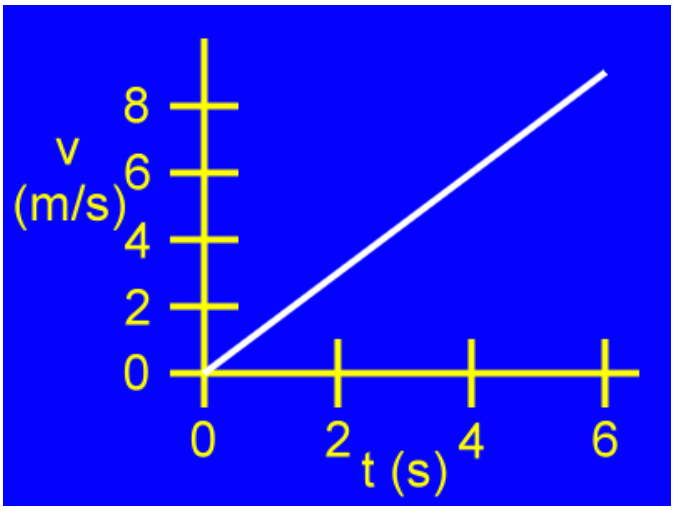
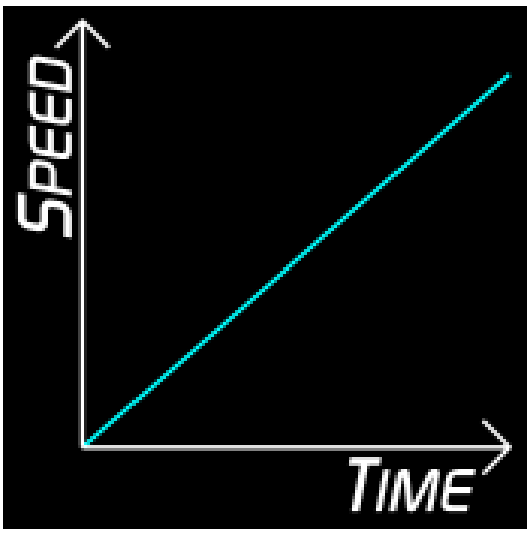

Three Bicycle Trips
1200
1000
800
600
400
200
0
Distance (m)
0
1
2
3
4
5
6
Time (min)
A
B
C

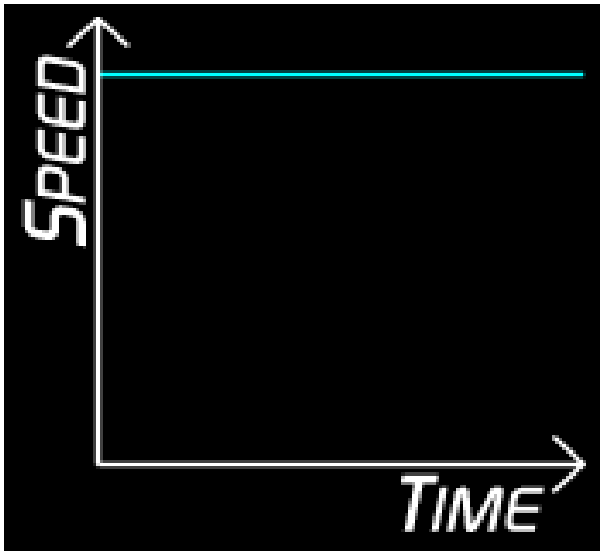
Similar to Distance (d) vs Time (t) graphs, there are Speed (v) vs. Time (t)graphs used to represent the speed of an object. Plotting data on these graphs is very similar to plotting data on a position (d) vs time (t) graph.



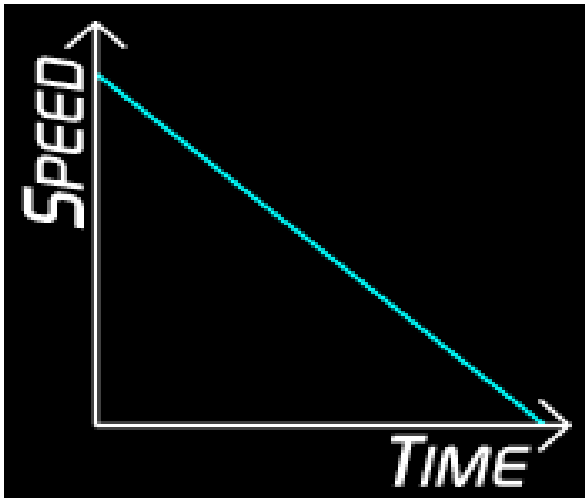
However the line/slope on a (v) vs (t) graph represents **acceleration**

Describe the motion of the objects:





Describe the motion of the object:



Which object has the greatest acceleration, the line represented in yellow or blue?

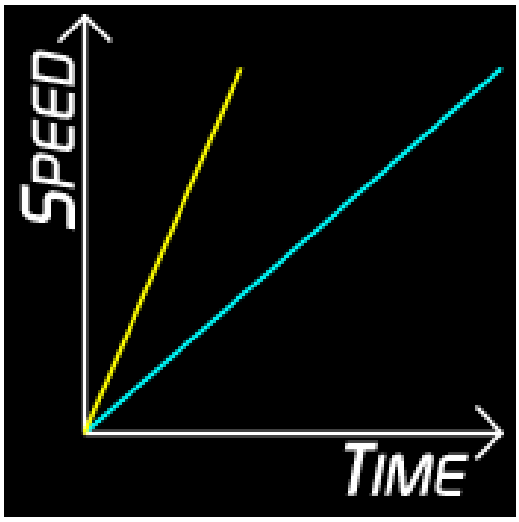
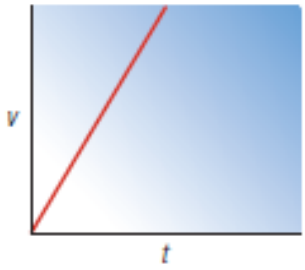
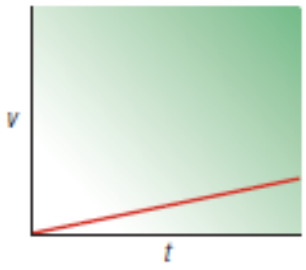
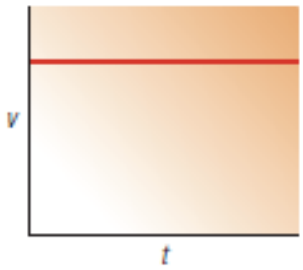
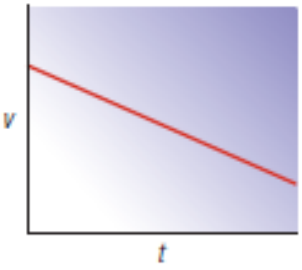
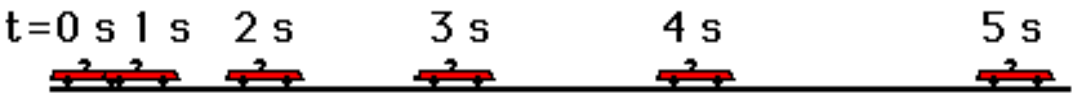


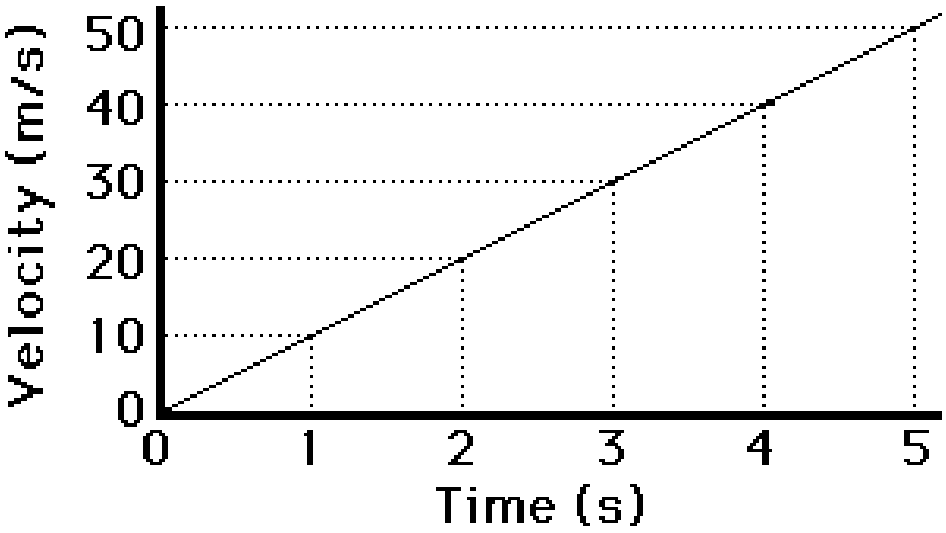
Table 1 **Relationship Between Slope and Acceleration**

Slope	Sample Speed–Time Graph	Interpretation
high positive value		high positive acceleration (rapidly increasing speed)
low positive value		low positive acceleration (slowly increasing speed)
zero		zero acceleration (constant speed)
negative value		moderate negative acceleration (decreasing speed)

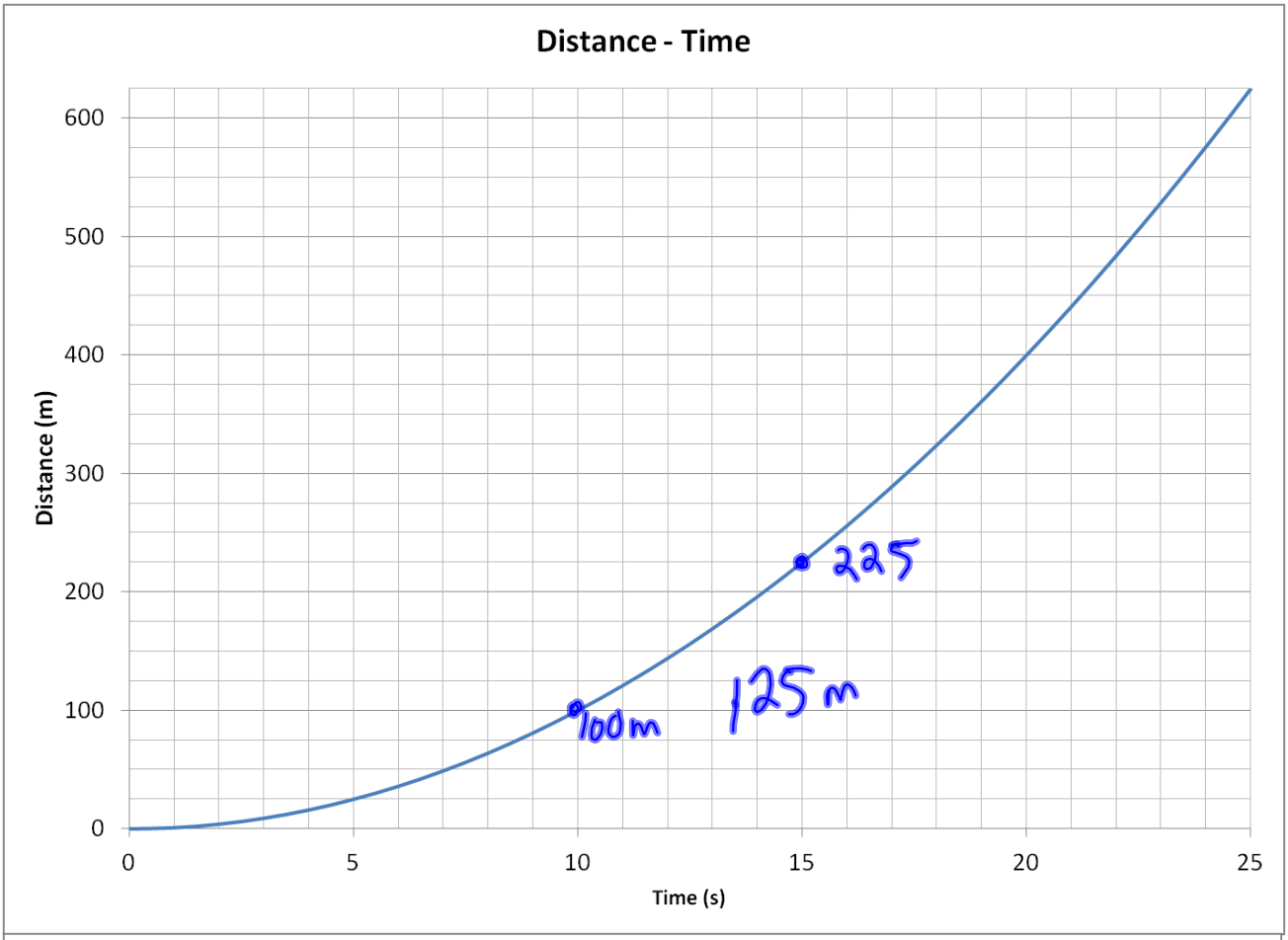
Speed - Time Graphs

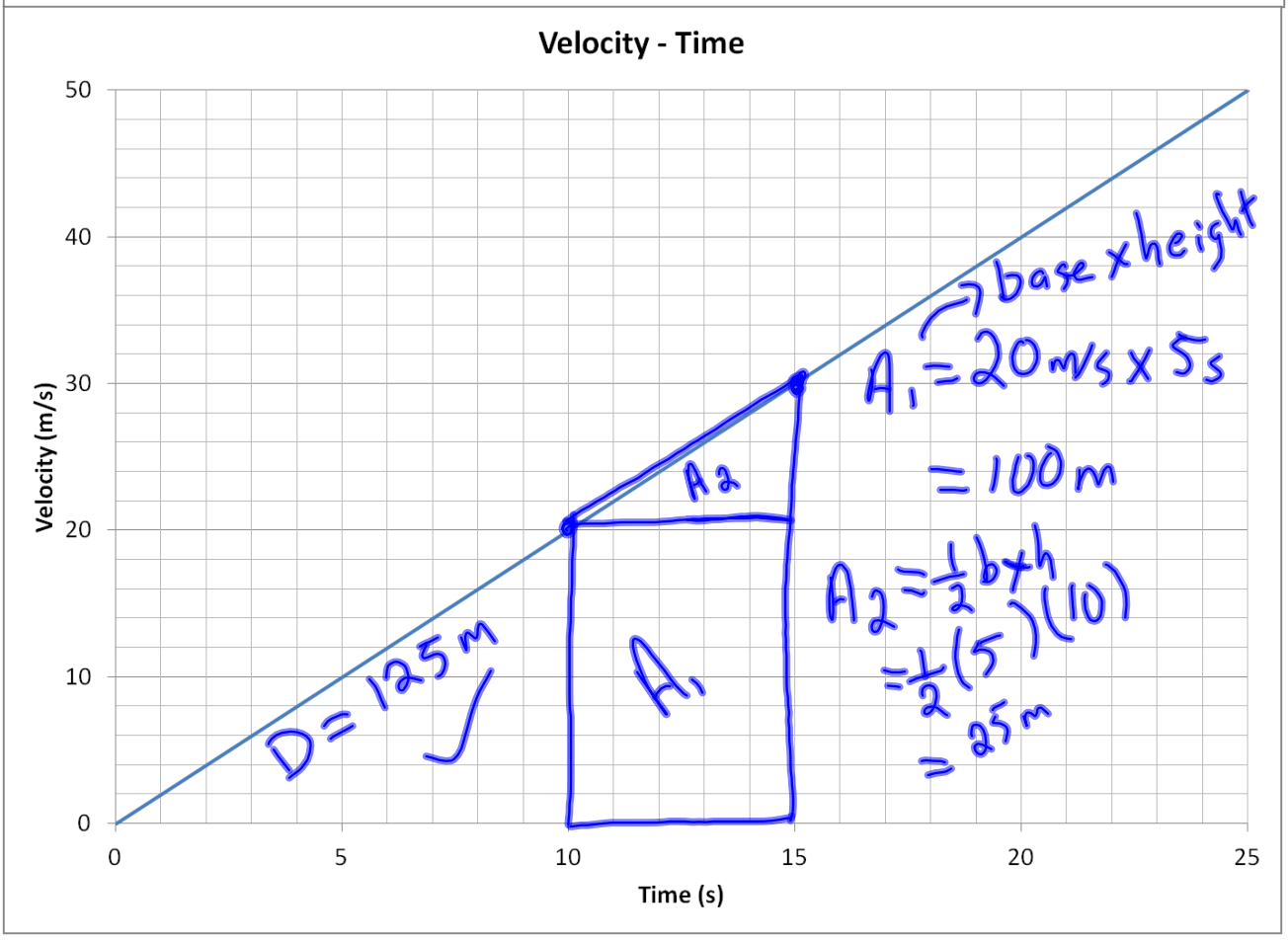
A speed-time graph can give you information about the acceleration of an object. You can find acceleration the same as finding velocity from a d - t graph (find the slope)





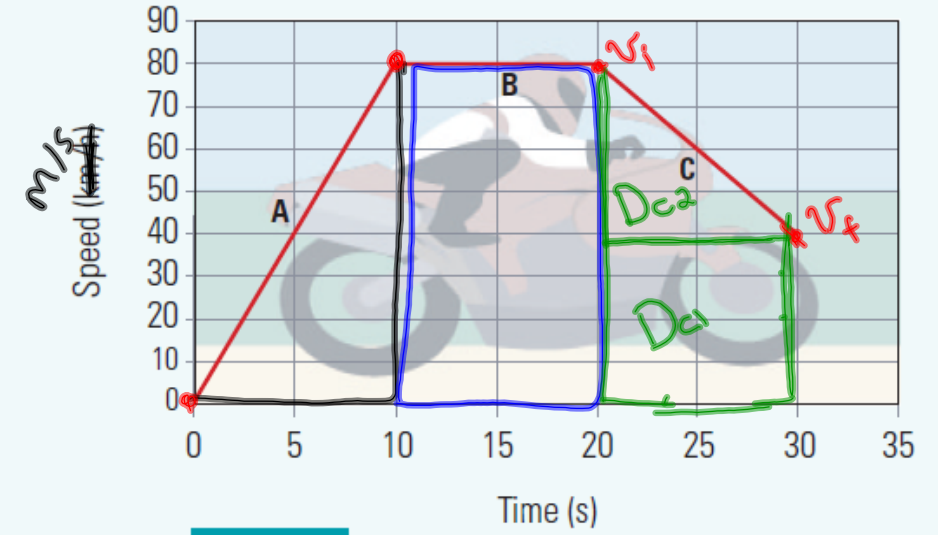
Velocity - Time graphs also communicate information about the distance traveled by the object. The area between the graph and the time-axis is the distance traveled. The next page shows that relationship through an example.


Distance - Time
Distance (m)
600
500
400
300
200
100
0
0
5
10
15
20
25
Time (s)
225
100m
125 m


Velocity - Time
Velocity (m/s)
50
40
30
20
10
0
0
5
10
15
20
25
Time (s)
A2
A1
D = 125 m
base x height
A1 = 20 m/s x 5s
= 100 m
A2 = 1/2 b x h
= 1/2 (5)(10)
= 25 m

p. 393 #1, 4, 5, 11

Analyzing Velocity - Time Graph Example



What is the acceleration during the first 10 seconds? Final 10 seconds?

(A) $a = \text{slope} = \frac{80-0}{10-0}$

$a = 8\ m/s^2$

(c) $v_f = 40\ m/s$ $a = ?$

$v_i = 80\ m/s$ $a_t = v_f - v_i$

$t = 10s$ $a(10) = 40 - 80$

$a = \frac{-40}{10} = -4\ m/s^2$

Calculate the distance traveled during each time interval.

(A) $D_A = \frac{1}{2}\text{base} \times \text{height}$

$= \frac{1}{2}(10)(80)$

$D_A = 400m$

(B) $D_B = \text{base} \times \text{height}$

$= (10)(80)$

$= 800m$

(c) $D_{c1} = 10 \times 40$

$= 400m$

$D_{c2} = \frac{1}{2}(10)(40)$

$= 200m$

$D_c = 600\ m$

Calculate the average velocity for the full 30 seconds.

$d = vt$ $t = 30$ $1800 = v(30)$

$d = 1800m$ $v_{avg} = ?$ $60\ m/s = v_{avg}$

Attachments

Answers Extra Practice Acceleration WS.notebook

answers acceleration worksheet.notebook