

W-PS Physical Science Week 9

Displacement(m) 0 12 20 36

time (s) 0 2 4 6

Instantaneous Velocity

between $t = 2 \rightarrow 4$ $t = 4 \rightarrow 6$

Instantaneous Velocity

$$t = 0 - 2$$

$$V = \frac{x_f - x_i}{t_f - t_i} = \frac{12 - 0}{2 - 0}$$

$$\frac{12}{2} = \boxed{6 \text{ m/s}}$$

Average Velocity start @ $t = 0$
at $t = 2$ $t = 4$ $t = 6$

$$\bar{V} = \frac{20 - 0}{4} = \frac{20}{4} = \boxed{5 \text{ m/s}}$$

$t = 4$

Displacement(m) 0 12 20 36

time (s) 0 2 4 6

speeding up

accelerating

Inst. Vel $t = 2 \rightarrow 4$
with constant acceleration

$$V = \frac{x_f - x_i}{t_f - t_i} = \frac{20 - 12}{4 - 2} = \frac{8}{2} = \boxed{4 \text{ m/s}}$$

$t = 2$

$t = 4 \rightarrow 6$

$$V = \frac{x_f - x_i}{t_f - t_i} = \frac{36 - 20}{6 - 4} = \frac{16}{2} = \boxed{8 \text{ m/s}}$$

$$\bar{V} = \frac{12 - 0}{2} = \frac{12}{2} = \boxed{6 \text{ m/s}}$$

$$\bar{V} = \frac{36 - 0}{6} = \boxed{6 \text{ m/s}}$$

$t = 6$

$$D = rt \quad \text{distance} = (\text{rate})(\text{time})$$

$$\text{displacement} = (\text{velocity})(\text{time})$$

$$d = vt$$

How far did Gertie travel in they exhibited a velocity of 24 mi/hr for 3 hours.

$$d = (24 \text{ mi/hr})(3 \text{ hr}) = \boxed{72 \text{ mi}}$$

What is the velocity experienced if you travel 300 m in 12 seconds?

$$\left\{ \frac{d}{t} = \frac{vt}{t} \right\}$$

$$v = \frac{d}{t} = \frac{300 \text{ m}}{12 \text{ s}} = \boxed{25 \text{ m/s}}$$

Acceleration — change in velocity over time

$$a = \frac{v_f - v_i}{t_f - t_i}$$

Rate of change in velocity

Velocity 12 m/s

Acceleration of $\boxed{3 \text{ m/s}^2}$
 $3 \text{ m/s} / \text{s}$

t	0	1	2	3	4
v	12	15	18	21	24
		+3	+3	+3	+3

① Acceleration = 7 m/s^2

initial velocity = 23 m/s

Every second you increase your velocity by 7 m/s

What is my velocity after 8 s?

$$v_i + at$$
$$23 + (7)(8)$$

initial velocity

$$23 \text{ m/s}$$

t = 0

$$v = 23 \text{ m/s}$$

+7

$$30 \text{ m/s}$$

+7

$$37 \text{ m/s}$$

$$23 + 56$$

$$23 \text{ m/s} + (7 \text{ m/s}^2)(8 \text{ s})$$

$$23 \text{ m/s} + 56 \text{ m/s}$$

$$79 \text{ m/s}$$

$$V_f = V_i + at$$

Acceleration = -2 m/s^2

② initial velocity = 12 m/s

What is my velocity after 9 s?

$$V_f = V_i + at$$

$$12 \text{ m/s} + (-2 \text{ m/s}^2)(9 \text{ s})$$

$$12 \text{ m/s} + (-18 \text{ m/s}) = \boxed{-6 \text{ m/s}}$$

traveling in the opposite direction

velocity →

Speeding up!

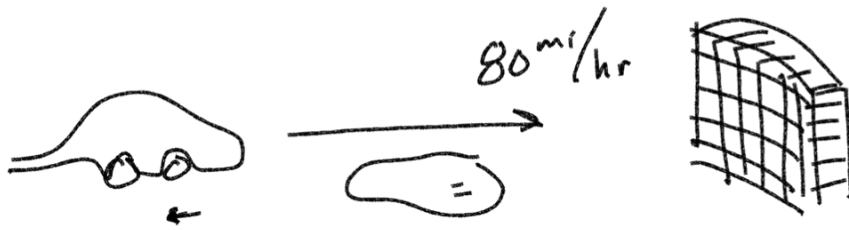
→
acceleration

velocity and acceleration vectors
going in the same direction

velocity →

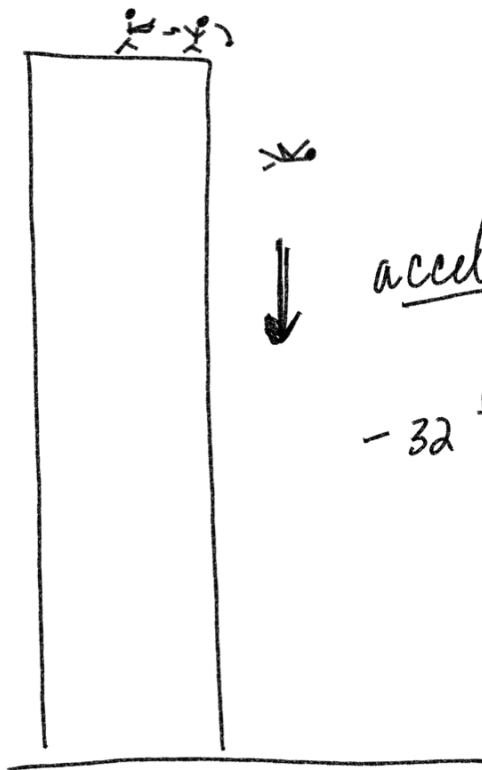
slowing
down

←
acceleration



brake - tires → friction
have acceleration in the opposite direction

Free Fall

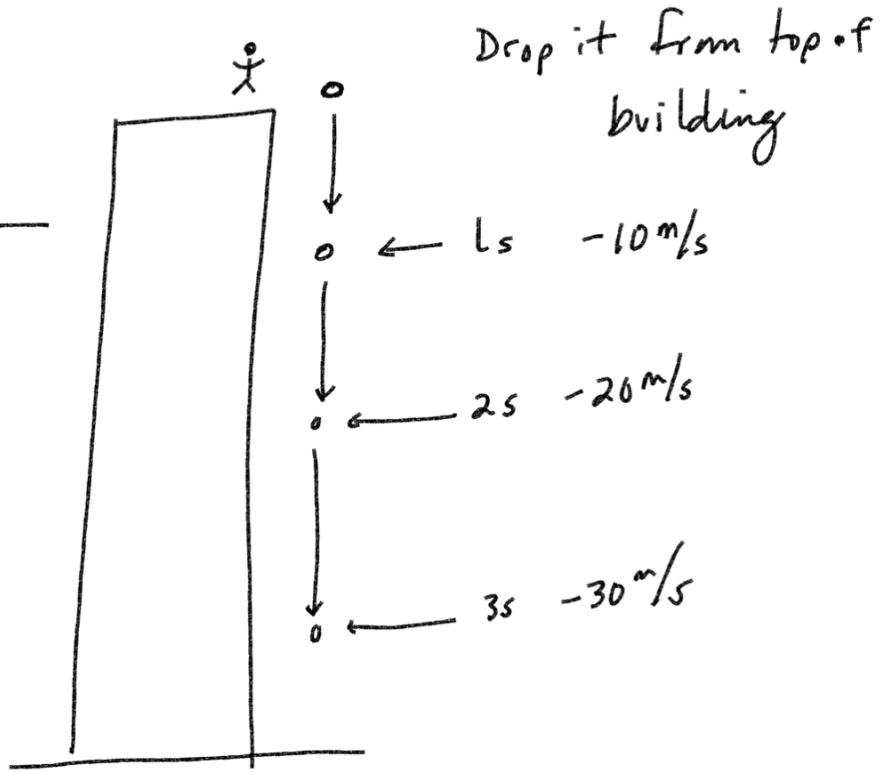


acceleration
downward

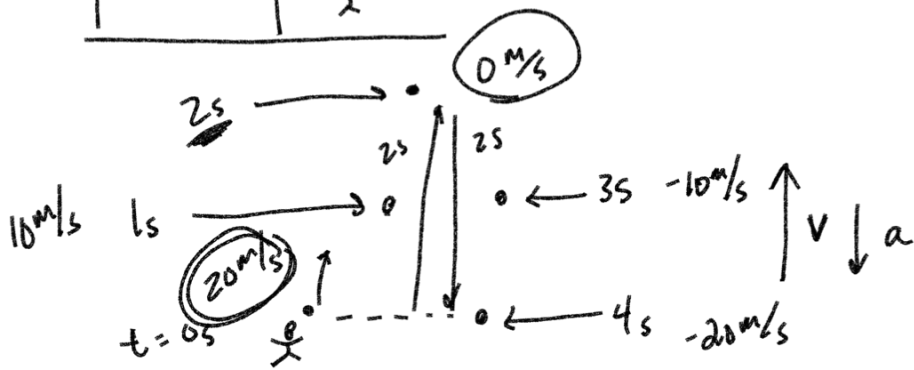
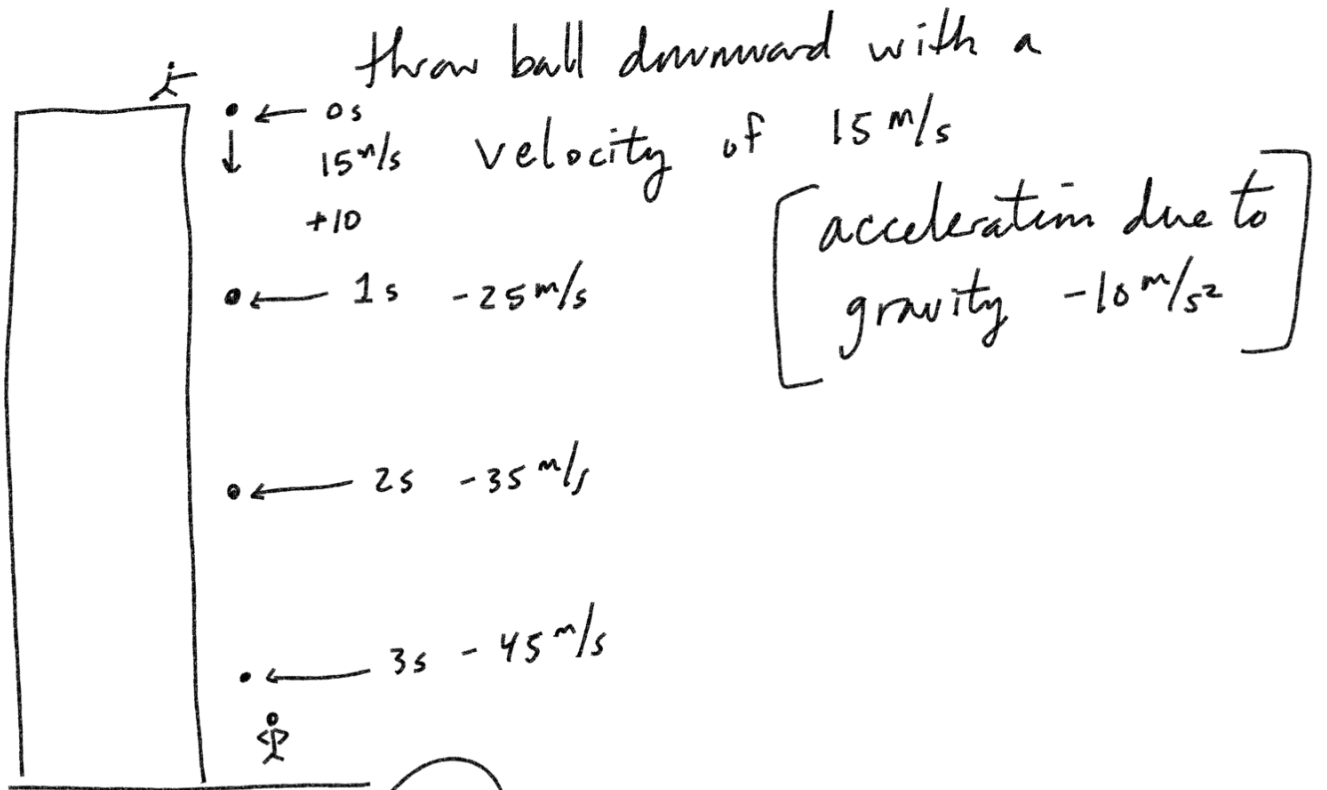
vector quantity
due to gravity

both magnitude
+
direction

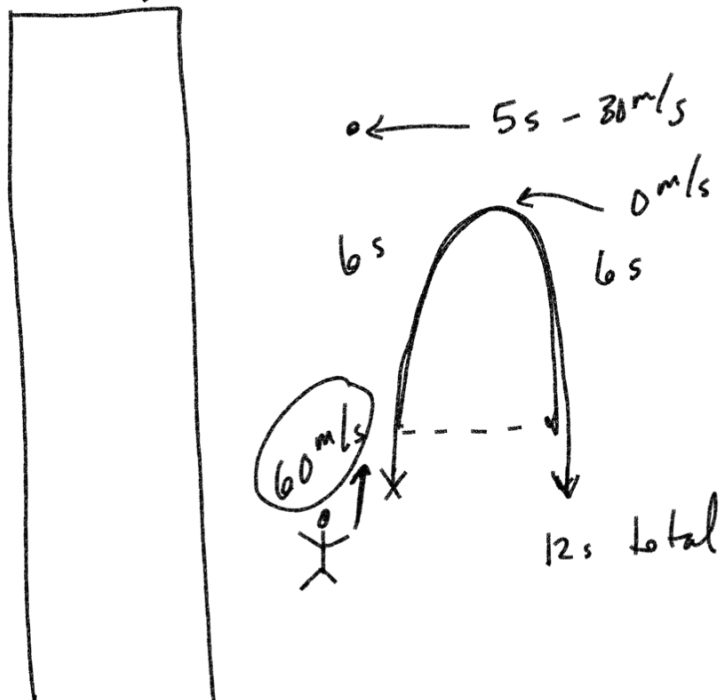
-32 ft/s^2 or -10 m/s^2



Drop it from top of
building



Throw the ball upwards at 20 m/s



velocity	time
$+20 \text{ m/s}$	0 s
$+10 \text{ m/s}$	1 s
0 m/s	2 s
-10 m/s	3 s
-20 m/s	4 s
-30 m/s	5 s

Next Pre-Test
or Game
Review

HW

Online HW 9 (Sat)

Quiz 9 (Sat)

Quiz 7
due tonight

Quiz 8
due Nov 11th

due Nov 18th