4.29.20

Motion Equations: Fired Up Problems

Today's Objectives:

- Fired Up Shortcuts
- Learn V and A during fired up problems
- Solve Fired Up Problems

1. What is the acceleration on Earth for all objects that are dropped or fired up?

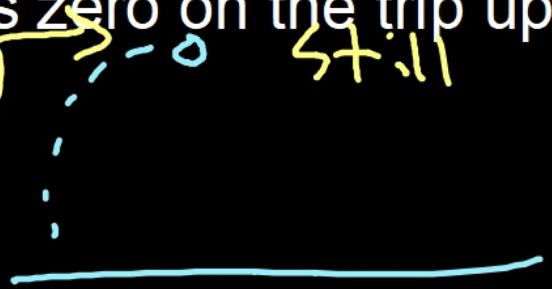
$a = -9.8\ m/s^2$ ← Never changes!

2. What can we set to zero when we drop something?

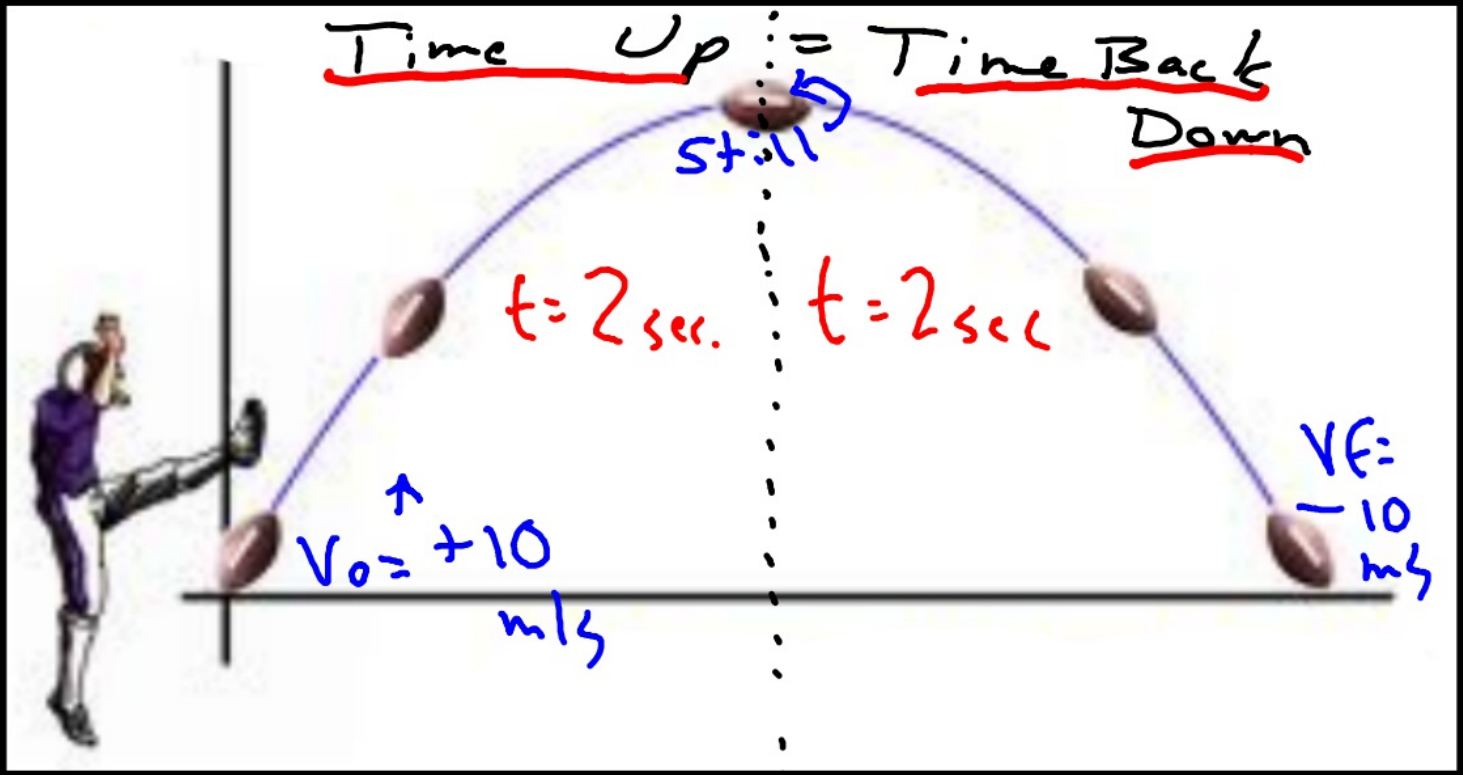
$V_0 = 0$ (dropped from rest)

3. What variable is always zero on the trip up ?

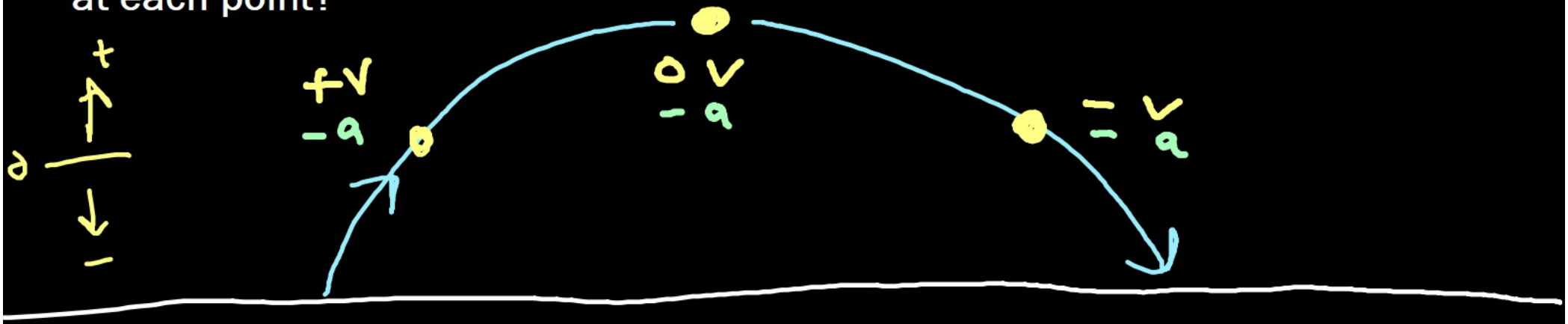
$V_f = 0$ — 0 still



Fired Up Shortcuts No Air Resistance !



When a tennis ball is thrown up, what are its velocity and acceleration at each point?



	on the way up	at the top	on the way back down
Velocity	+	0	−
Acceleration	−9.8	−9.8	−9.8

Earth's Gravity Never Changes !!!

A rocket is launched upwards, and it comes to a stop at a height of 2500 m.

(Fired Up) 1) ~~v = a/t~~ Not CV

$V_o = ?$ $V_f = 0$

$a = -9.8$ $d = 2500$

a) How fast was it launched?

$V_f^2 = V_o^2 + 2ad$

$0^2 = V_o^2 + 2(-9.8)(2500)$

$\sqrt{V_o^2} = \sqrt{49000}$

$V_o = 221.36$ m/s

b) How long did it take to reach its highest point?

$t = ?$ $V_f = V_o + at$

$0 = 221.36 + (-9.8)t$

$t = 22.58$ s

2) $V_f = V_o + at$

3) $a = (V_f - V_o)/t$

4) $d = v_o t + 1/2 a t^2$

5) $d = 1/2(v_o + v_f)t$

6) $v_f^2 = v_o^2 + 2ad$