Dynamics II

1. Practice midterm exam
2. Roll for workbook collection: ch 5 & 6
3. Dynamics worksheets

Use the dynamics worksheets for Chapter 5 & 6 problems.

DYNAMICS WORKSHEET Name _____ St No __ __ __ __ __- __ __ __ __ Prob:__

1) Pictorial Representation

a. sketch showing important points in the motion
b) coordinate system
c. symbols for knowns and unknowns

known:

find:

2) Physical Representation

a. motion diagram
b. force identification
c. free-body diagram

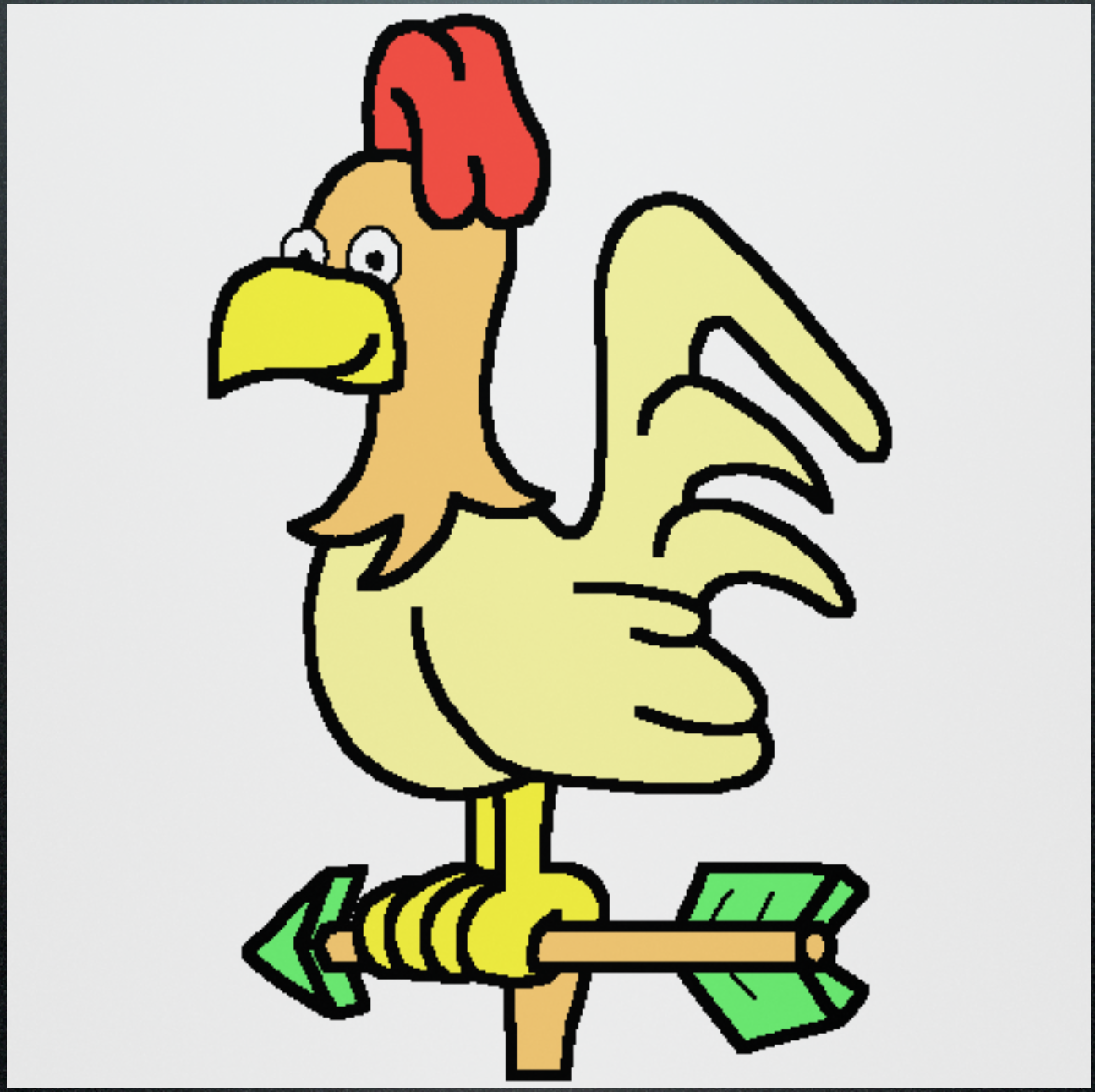
3) Mathematical Representation

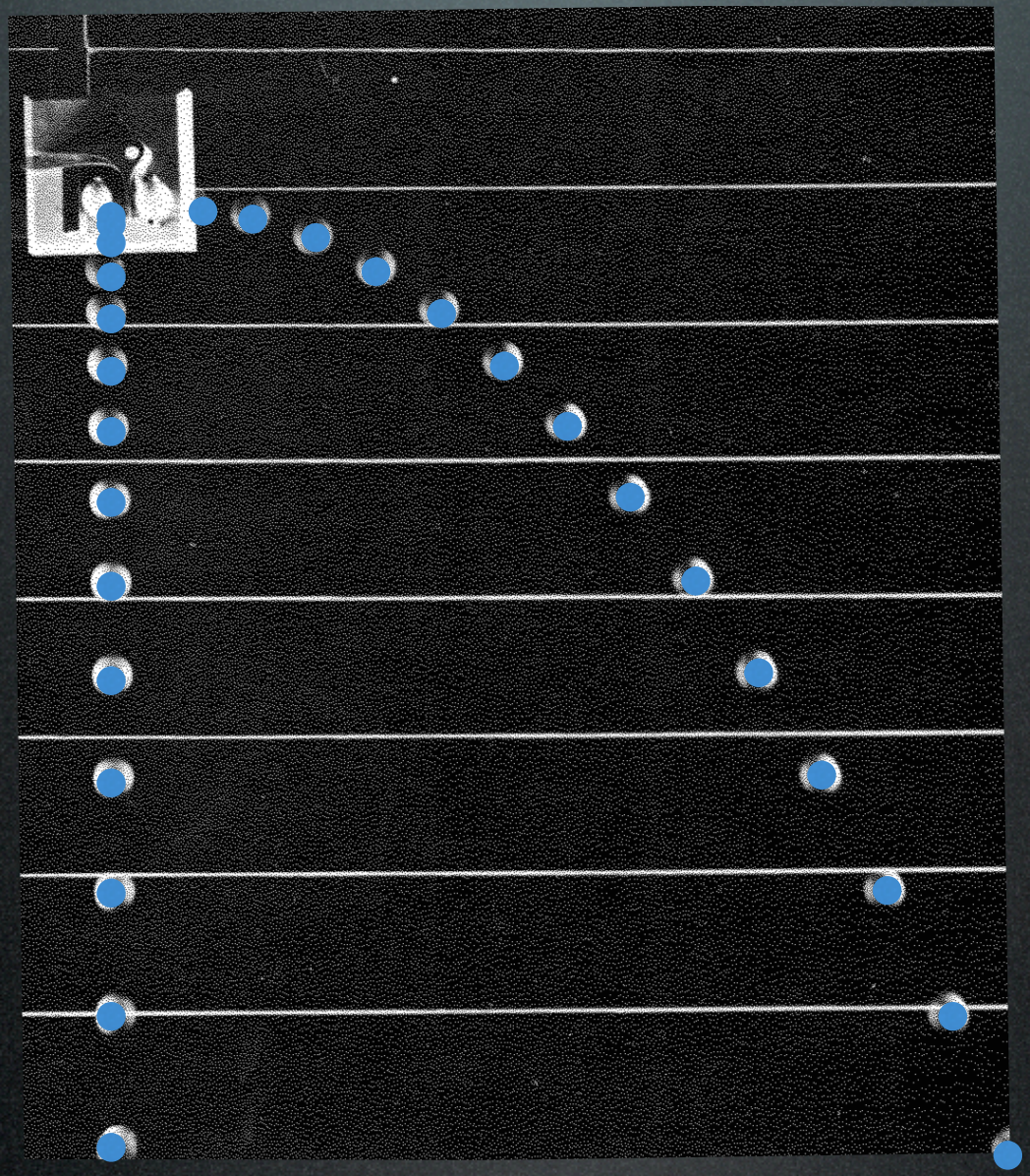
a. start with Newton's first of second law
b. include other information as needed
c. solve.

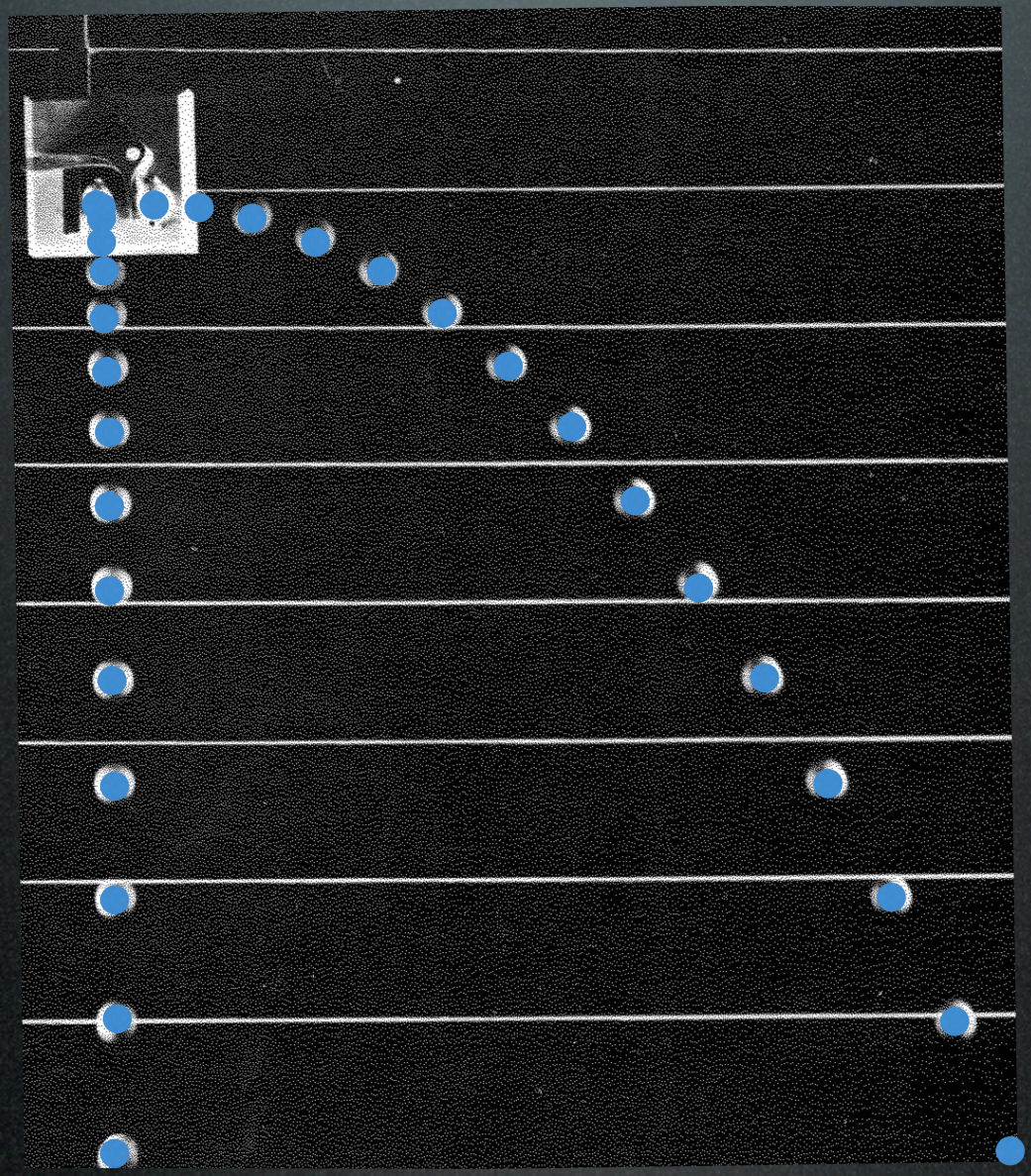
4) Assess

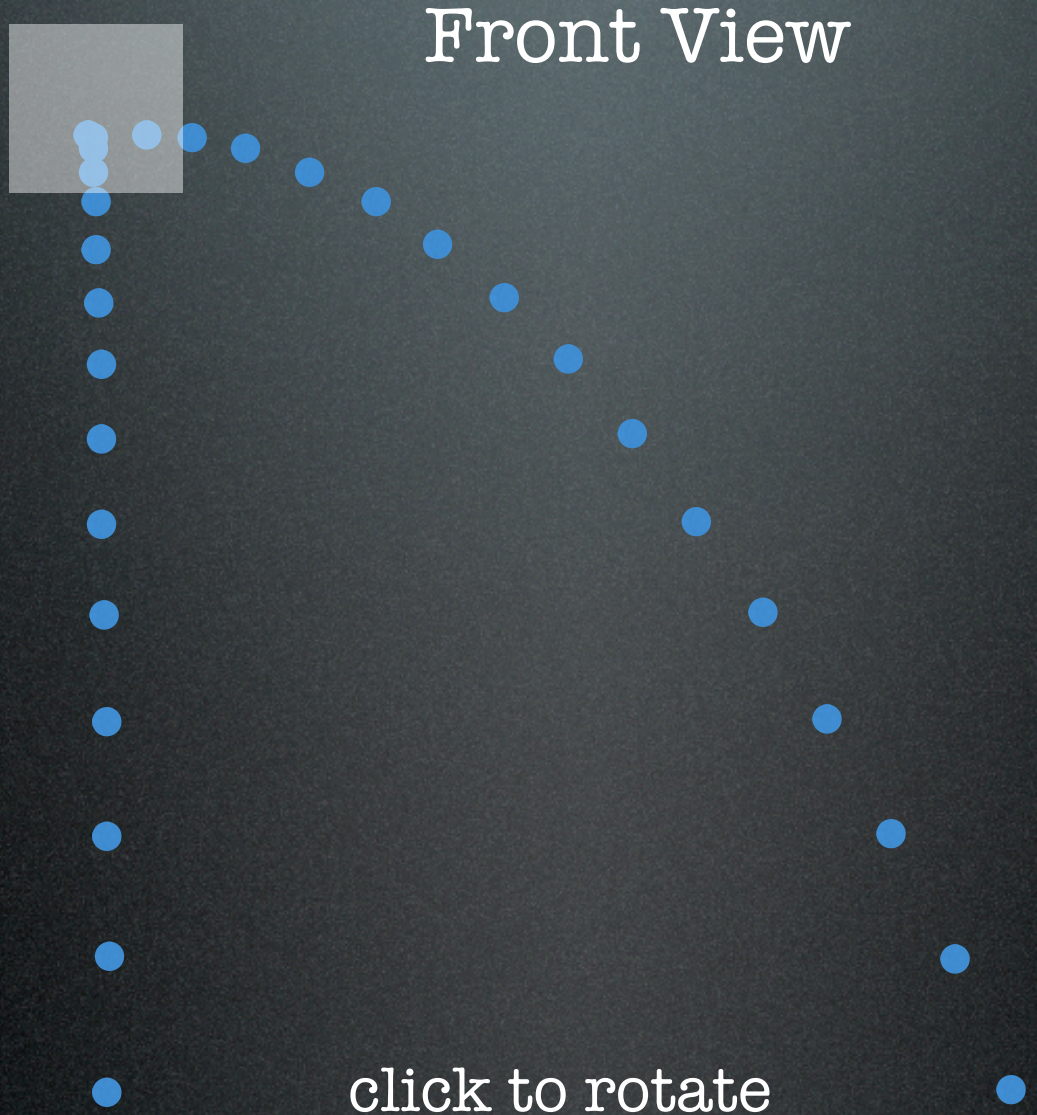
a. units?
b. reasonable?

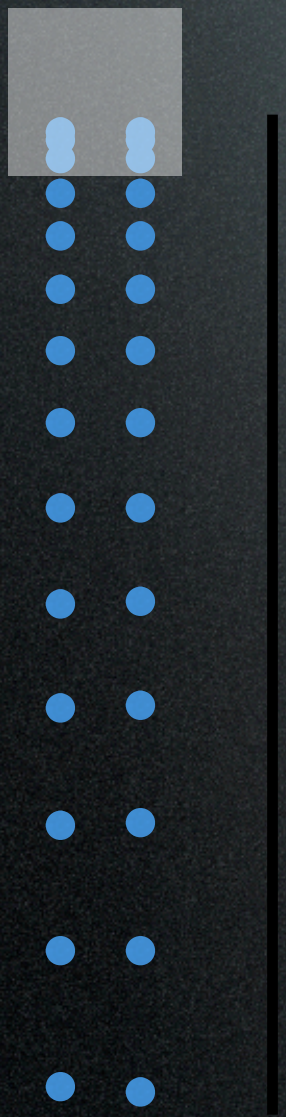
Class Rooster







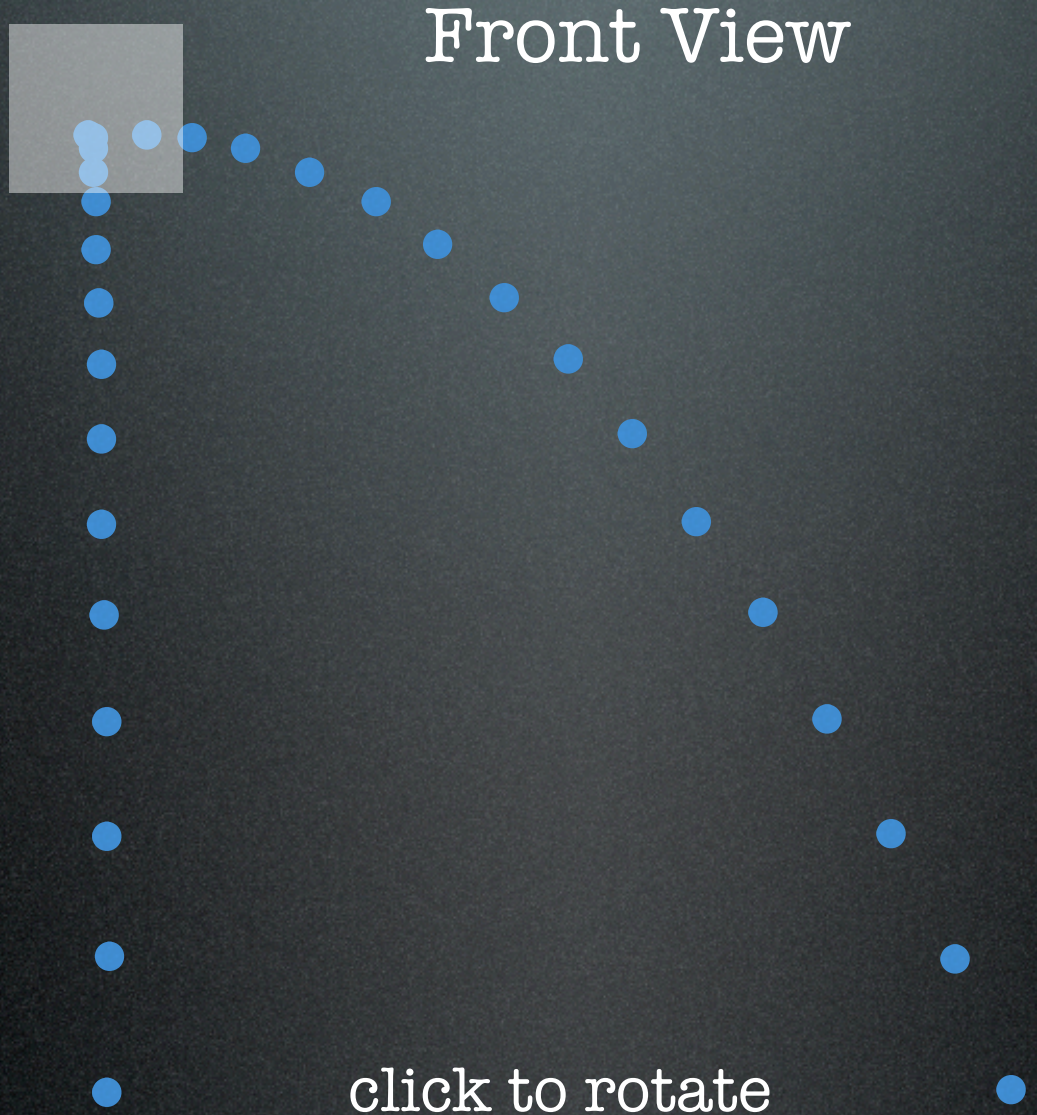

Front View
click to rotate



Side View

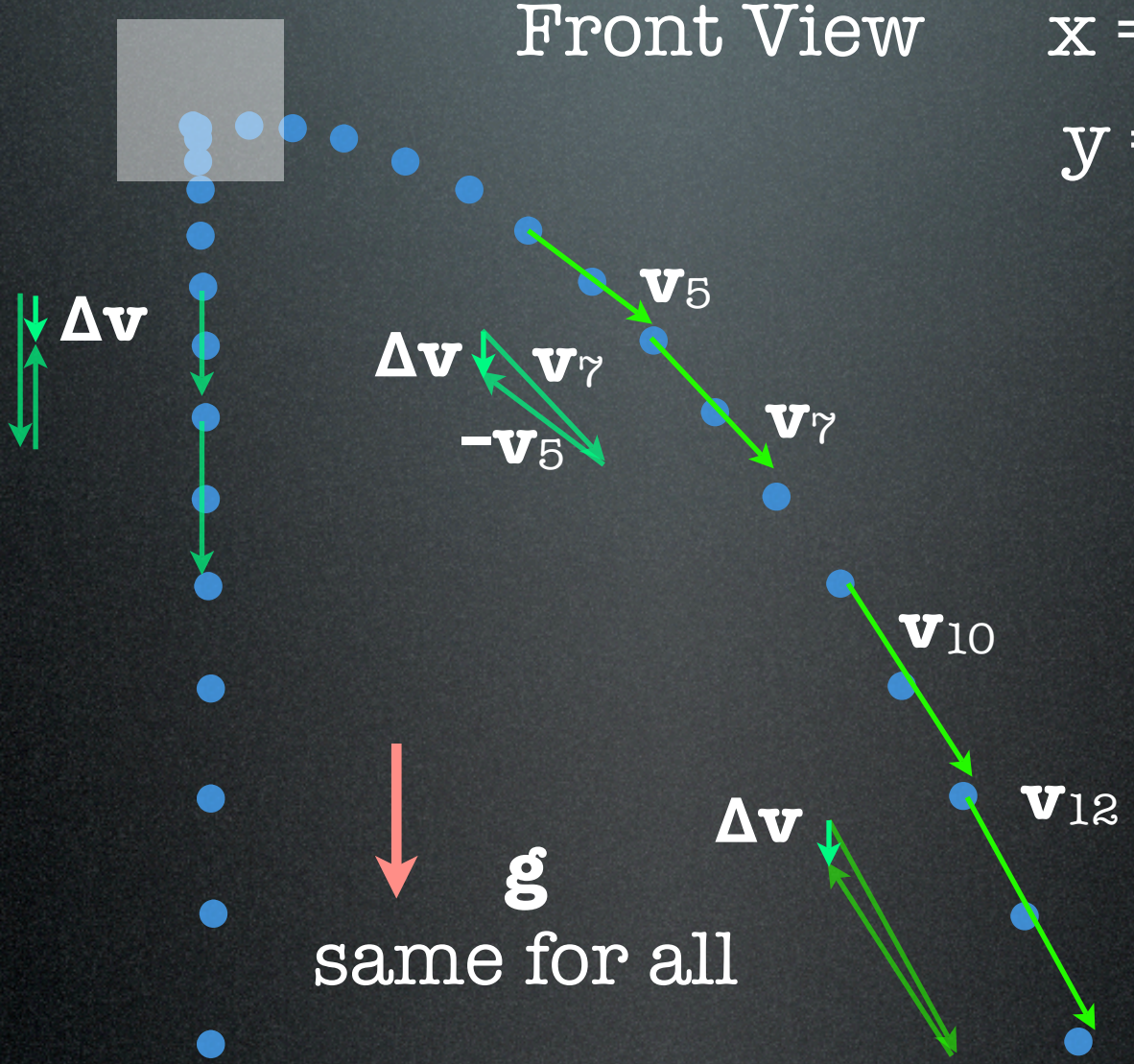
v_y increases downward

a_y constant, = $-g$


Front View
click to rotate

Top View

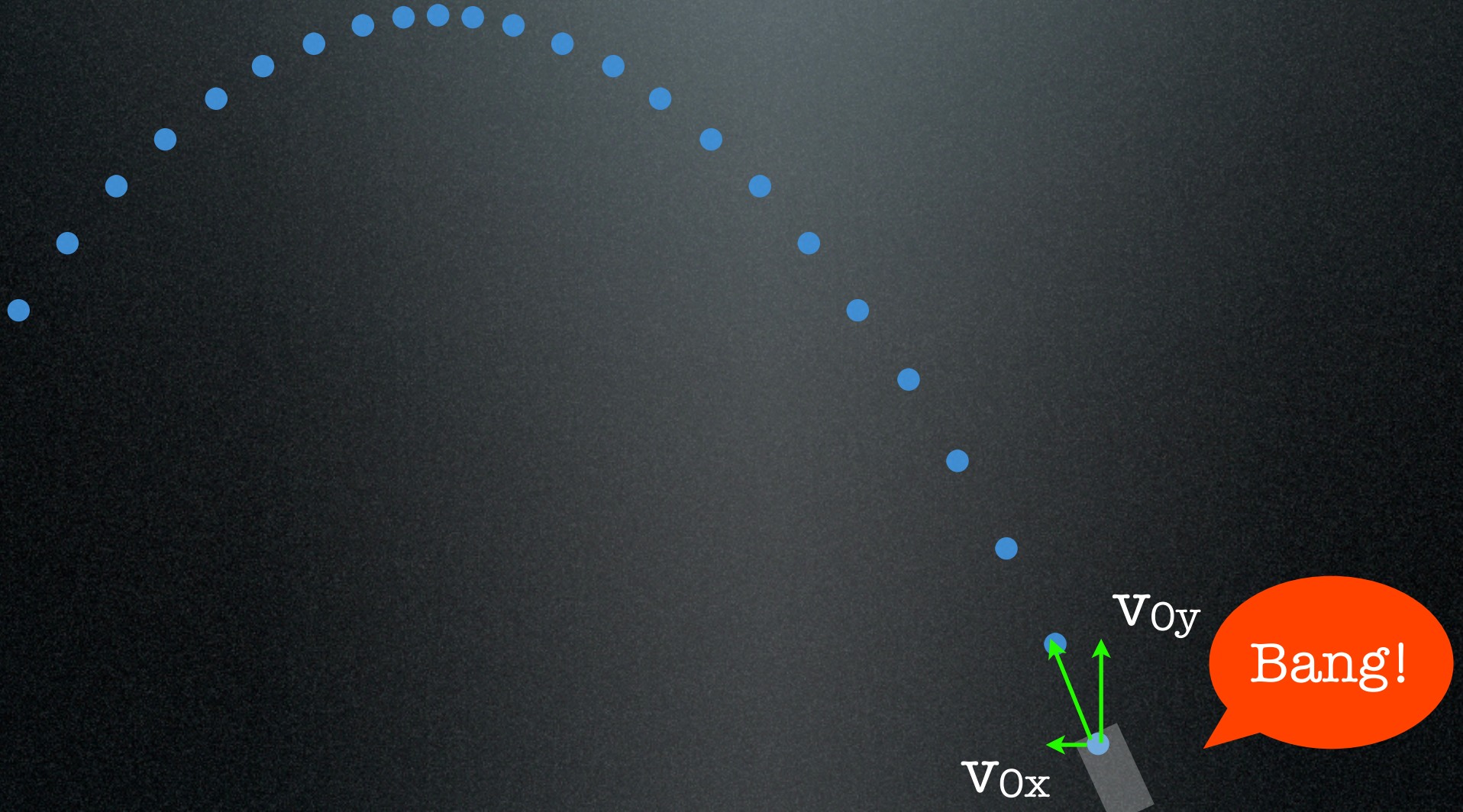
v_x is constant
v_x is 0


Front View
$x = x_0 + v_x t$
$y = y_0 - \frac{1}{2}gt^2$
Δv
v_5
Δv
v_7
$-v_5$
v_7
v_{10}
v_{12}
Δv
g
same for all

Cannon

$$x = x_0 + v_{0x}t$$

$$y = y_0 + v_{0y}t - \tfrac{1}{2}gt^2$$



go ballistic!

$$x = x_0 + v_{0x}t$$

$$y = y_0 + v_{0y}t - \tfrac{1}{2}gt^2$$

highest: $dy/dt = v_y = 0$

$$v_y = v_{0y} - gt_{max} = 0$$

$$t_{max} = v_{0y}/g$$

$(m/s)/(m/s^2) = s$

$$y_{max} = y_0 + v_{0y}^2/g - \tfrac{1}{2} v_{0y}^2/g$$

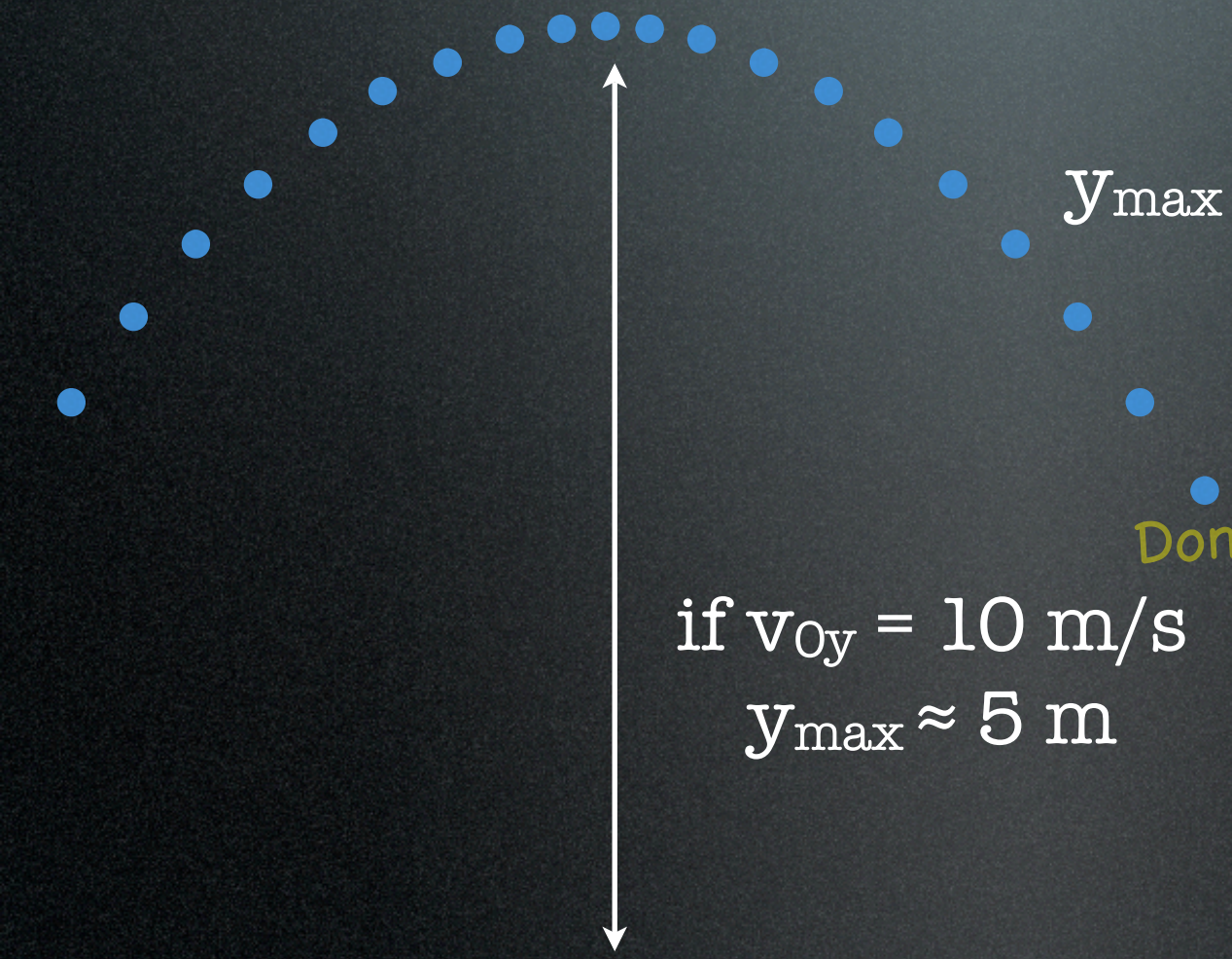
$$y_{max} = y_0 + \tfrac{1}{2} v_{0y}^2/g$$

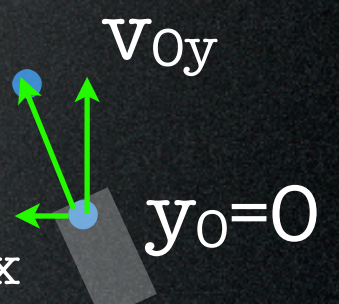
$(m/s)^2/(m/s^2) = m$

Don't memorize these equations.
Remember the logic.

if $v_{0y} = 10$ m/s

$y_{max} \approx 5$ m





Check units!

go ballistic!

$x = x_0 + v_{0x}t$

$y = y_0 + v_{0y}t - \frac{1}{2}gt^2$

range: find when y =0

trick $t_{final} = 2t_{max}$

$t_{final} = 2v_{0y}/g$

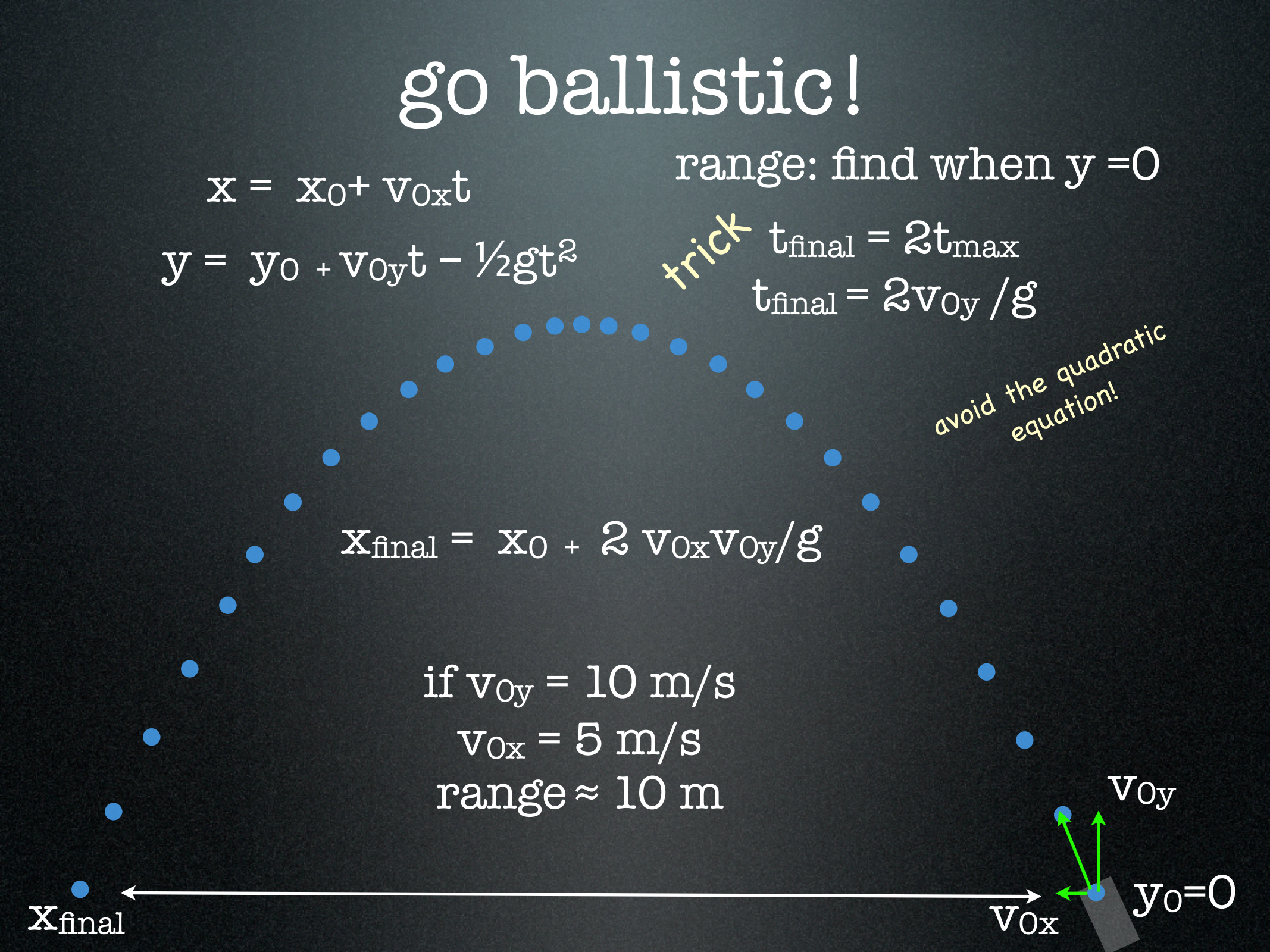
avoid the quadratic equation!

$x_{final} = x_0 + 2\,v_{0x}v_{0y}/g$

if v_{0y} = 10 m/s

v_{0x} = 5 m/s

range ≈ 10 m



different strokes