

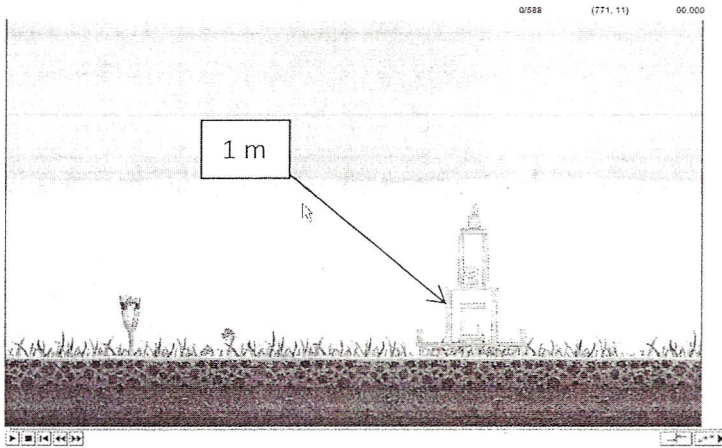
# Projectile Motion Video Analysis: The Physics of Angry Birds

Name: \_\_\_\_\_

Period: \_\_\_\_\_

Directions:

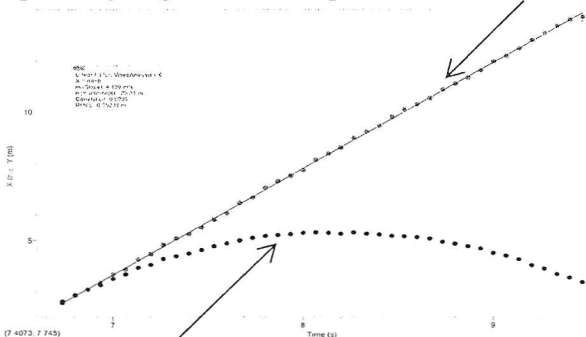
1. Open LoggerPro. Click on the INSERT tab and click on movie. Open the RED BIRD movie from the video analysis folder on the desktop. It should now appear on the LoggerPro screen. Click the three red dots at the bottom of the screen to enable video analysis.



2. Set the scale of the video so that the longest beam is 1 m.
3. Click the **Add Point** tool ( $\oplus$ ) near the top right side of the movie window. Advance the video frame-by-frame until the bird is at the point where it is ready to launch. Then click on the red bird--a dot should appear on the film and it should advance one frame. Keep adding dots until the bird has completed its flight. **Note:** If you mess up, just close and re-open the movie and start over.

## Analysis

4. For the x-column, what kind of a line is it? Choose an analysis to perform from the analyze menu. Write down the equation you get and the slope of the line. What does it represent?



Equation:

Slope:

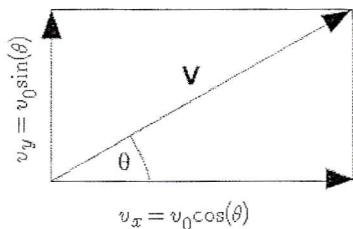
It represents:

5. For the y-column, what kind of a line is it? What kind of analysis should we use for this line? Write down the equation you get. What could the variables mean?

Equation:

### Extension

- The equation you chose for the y-axis should have three terms in it. It should be some form of  $y=ax^2 + bx + c$ . What is the name of this function?
- The equation can also be written  $y= \frac{1}{2} at^2 + vt + y$ . The “a” term represents the simulated gravity of the game. Looking at your values from #5 above and the equation  $y= \frac{1}{2} at^2 + vt + y$ , what is the gravity of the angry birds game? (Hint: the “a” term has been multiplied by  $\frac{1}{2}$  in the equation!)
- The “v” term is the velocity in the y-direction. Using this information and trig, calculate the magnitude and direction of the launch velocity of the bird. (Remember, this is an angle problem! )



- What is the total time the bird is in the air?

- What is the maximum height the bird reaches?