Bronson Kobayashi
09/14/08
Period F
Physics

Projectile Motion

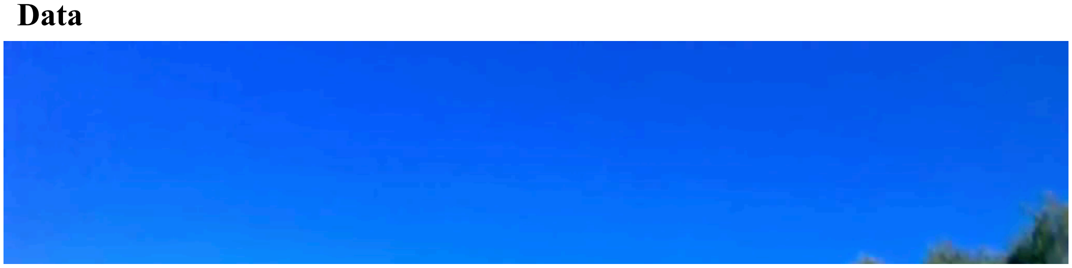
Purpose - To analyze projectile motion using video analysis

Background - Projectile motion refers to an object being projected into the air at an angle. Projectile motion is defined as motion without wings, propulsion, or friction (air resistance) under the influence of gravity.

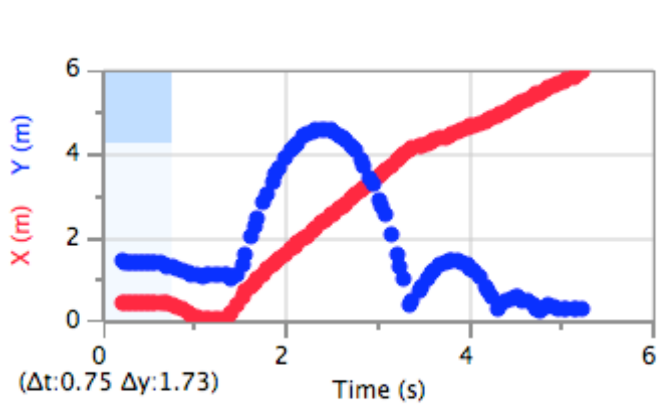
Materials
- Video Camera
- Logger Pro Application for Mac OSX
- Ball
- Meter Stick

Procedure
1. First set up your laptop. Open the Logger Pro application on Mac OSX and set it to video capture, make sure you have a lot of space to film. Point the camera towards the person throwing the ball.
2. Lay the meter stick at the feet of the person throwing the ball and mark the ends of it with the two Arizona Green Tea cans or anything that can be used as markers.
3. Start recording and throw the basketball into the air so it lands about 4-5 meters in front of you. When it stops bouncing stop recording and clean up your materials.
4. Depending on weather you were inside or outside take your laptop back to your desk and analyze your data.
5. Now to find the data of the arc of the ball click on the trace button and trace the path of your ball. Now you will want to find the exact distance it went so you will want to click on the measuring stick and measure your meter stick you placed on the ground in front of you. This will give you accurate data and take out the variable of how far you were from the camera.

Data



	VideoAnalysis				
	Time (s)	X (m)	Y (m)	Vx (m/s)	Vy (m/s)
8	0.4417	0.4842	1.432	0.000	0.000
9	0.4750	0.4842	1.432	0.000	0.000
10	0.5067	0.4842	1.432	0.000	-0.019
11	0.5400	0.4842	1.432	0.000	-0.091
12	0.5733	0.4842	1.432	0.000	-0.299
13	0.6383	0.4842	1.406	-0.054	-0.493
14	0.6717	0.4842	1.380	-0.203	-0.709
15	0.7050	0.4842	1.345	-0.708	-0.587
16	0.7717	0.3987	1.345	-0.885	-0.833
17	0.8033	0.3902	1.259	-0.910	-0.998
18	0.8700	0.3219	1.224	-1.109	-0.771
19	0.9350	0.2450	1.172	-1.275	-0.688
20	0.9683	0.1766	1.146	-1.085	-0.405
21	1.035	0.1254	1.138	-0.718	-0.270
22	1.102	0.09123	1.112	-0.427	-0.141
23	1.133	0.08269	1.120	-0.021	0.109
24	1.167	0.09977	1.129	0.088	0.074
25	1.233	0.09977	1.129	0.034	0.025
26	1.265	0.09977	1.129	0.091	-0.060
27	1.332	0.09977	1.129	0.451	-0.195
28	1.365	0.09977	1.129	1.828	-0.609
29	1.398	0.2279	1.025	2.971	0.776
30	1.463	0.4414	1.155	2.996	2.558
31	1.530	0.6208	1.354	2.891	4.357
32	1.563	0.7404	1.605	2.524	6.161
33	1.628	0.8600	2.037	2.300	6.593
34	1.662	0.9540	2.271	2.332	6.428
35	1.695	1.022	2.470	2.204	5.973



Observations

The weather outside was perfect for this experiment. No wind or rain to change the acceleration of the ball. If we had a better camera with a faster frame rate then the data might be more accurate, but nonetheless our data came out sufficiently accurate showing that the acceleration of the ball was the speed it should be.

Analysis

The meter stick in front of the ball was a great factor in making our data more accurate. By putting the meter stick in front of the ball we were able to measure the actual distance the ball traveled with logger pro. We know it is accurate because the half-acceleration of the ball was 4.9 which is half of 9.8, which is the number for acceleration.

Conclusion

We were able to analyze projectile motion using video analysis. The video we captured and data we accumulated on logger pro showed that the acceleration number was the exact rate it should be. We found the height, velocity, and correct acceleration we wanted to know.