Fan Car Acceleration Lab

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Honors Physics F
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Purpose: To graph the fan car's acceleration when put in different positions.

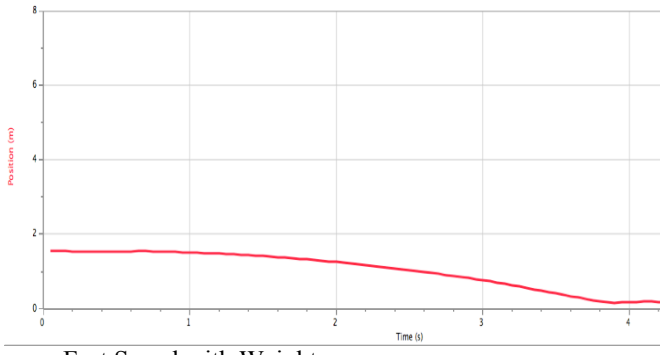
Back ground: Each group was given a Fan car, and was to choose a weight to put on the car, and sound reflector when we let the fan go in the different slopes. We recorded this on a graph using a sonar system that showed the speed, distance, velocity and acceleration.

Materials: Computer attached laptop
- Logger Pro Software
- Fan Cart
- Stapler (used for weight) 198grams
- Sonar System
- Inclined Plane
- Floor
- Sound Reflector

Procedure: We were to take a fan car and an inclined plane, or the floor to let it roll on when the fan was activated. We put the fan car on different slopes, high or low, with weight or without weight, and with an inclined plane or not. We then let the fan go, depending on what was affecting the fan car, the car moved in different speeds. We recorded the movement, with a sonar system that drew a graph on the logger pro. Finally to analyze the graph by looking at the different angles and sounds, compare them with other graphs.

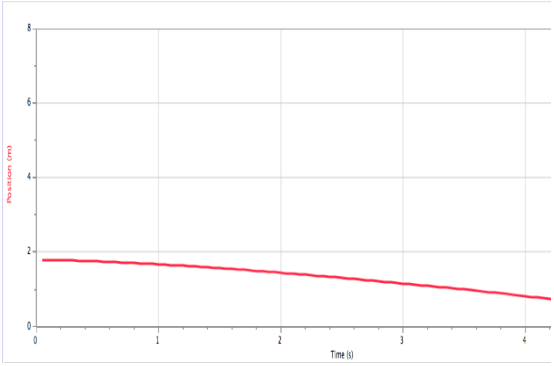
Data:

	Latest		
	Time (s)	Position (m)	Velocity (m/s)
1	0.05	1.548	−0.011
2	0.10	1.547	−0.011
3	0.15	1.548	−0.025
4	0.20	1.545	−0.034
5	0.25	1.544	−0.034
6	0.30	1.541	−0.030
7	0.35	1.541	−0.014
8	0.40	1.540	0.001
9	0.45	1.540	0.025
10	0.50	1.544	0.025
11	0.55	1.544	−0.004
12	0.60	1.540	0.020
13	0.65	1.547	0.026
14	0.70	1.545	−0.016
15	0.75	1.545	−0.051
16	0.80	1.541	−0.101
17	0.85	1.534	−0.124
18	0.90	1.528	−0.129
19	0.95	1.521	−0.136
20	1.00	1.514	−0.146
21	1.05	1.507	−0.163
22	1.10	1.498	−0.174
23	1.15	1.489	−0.173
24	1.20	1.482	−0.194
25	1.25	1.469	−0.217
26	1.30	1.459	−0.223
27	1.35	1.447	−0.233
28	1.40	1.435	−0.228
29	1.45	1.424	−0.221
30	1.50	1.415	−0.246
31	1.55	1.400	−0.287
32	1.60	1.385	−0.304
33	1.65	1.369	−0.302
34	1.70	1.355	−0.304
35	1.75	1.339	−0.317
36	1.80	1.323	−0.333
37	1.85	1.306	−0.342



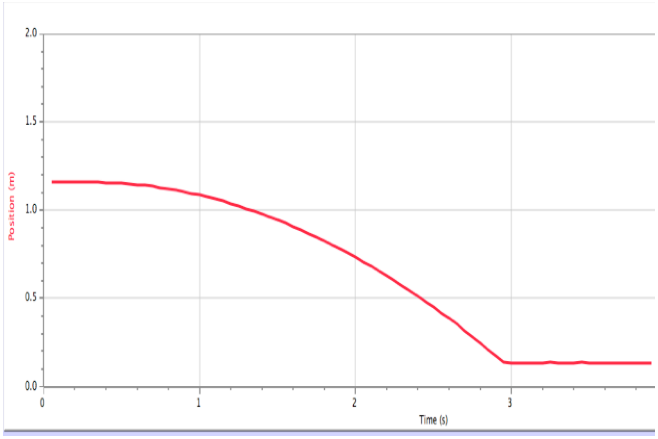
Fast Speed with Weight

	Latest		
	Time (s)	Position (m)	Velocity (m/s)
1	0.05	1.792	−0.106
2	0.10	1.784	−0.064
3	0.15	1.788	−0.068
4	0.20	1.778	−0.082
5	0.25	1.777	−0.056
6	0.30	1.776	−0.083
7	0.35	1.769	−0.102
8	0.40	1.764	−0.097
9	0.45	1.760	−0.105
10	0.50	1.754	−0.126
11	0.55	1.747	−0.137
12	0.60	1.740	−0.145
13	0.65	1.732	−0.149
14	0.70	1.725	−0.152
15	0.75	1.717	−0.158
16	0.80	1.709	−0.162
17	0.85	1.701	−0.163
18	0.90	1.693	−0.170
19	0.95	1.684	−0.178
20	1.00	1.675	−0.182
21	1.05	1.666	−0.184
22	1.10	1.657	−0.191
23	1.15	1.647	−0.199
24	1.20	1.637	−0.205
25	1.25	1.626	−0.208
26	1.30	1.616	−0.209
27	1.35	1.606	−0.214
28	1.40	1.594	−0.223
29	1.45	1.583	−0.225
30	1.50	1.572	−0.230
31	1.55	1.560	−0.239
32	1.60	1.548	−0.241
33	1.65	1.536	−0.245
34	1.70	1.524	−0.253
35	1.75	1.510	−0.255
36	1.80	1.498	−0.257
37	1.85	1.485	−0.263



Slow Speed with Weight

	Latest		
	Time (s)	Position (m)	Velocity (m/s)
1	0.05	1.160	0.000
2	0.10	1.159	0.001
3	0.15	1.160	0.000
4	0.20	1.160	−0.003
5	0.25	1.159	−0.003
6	0.30	1.160	−0.011
7	0.35	1.159	−0.025
8	0.40	1.157	−0.035
9	0.45	1.155	−0.045
10	0.50	1.152	−0.059
11	0.55	1.149	−0.072
12	0.60	1.145	−0.084
13	0.65	1.141	−0.099
14	0.70	1.136	−0.123
15	0.75	1.129	−0.152
16	0.80	1.119	−0.158
17	0.85	1.112	−0.150
18	0.90	1.106	−0.179
19	0.95	1.094	−0.206
20	1.00	1.084	−0.210
21	1.05	1.074	−0.223
22	1.10	1.062	−0.238
23	1.15	1.050	−0.253
24	1.20	1.037	−0.267
25	1.25	1.023	−0.281
26	1.30	1.009	−0.295
27	1.35	0.994	−0.308
28	1.40	0.978	−0.325
29	1.45	0.961	−0.341
30	1.50	0.944	−0.352
31	1.55	0.926	−0.364
32	1.60	0.907	−0.379
33	1.65	0.888	−0.394
34	1.70	0.868	−0.410
35	1.75	0.847	−0.423
36	1.80	0.826	−0.436
37	1.85	0.804	−0.451



Low Inclined Slope

	Latest		
	Time (s)	Position (m)	Velocity (m/s)
1	0.05	1.548	−0.011
2	0.10	1.547	−0.011
3	0.15	1.548	−0.025
4	0.20	1.545	−0.034
5	0.25	1.544	−0.034
6	0.30	1.541	−0.030
7	0.35	1.541	−0.014
8	0.40	1.540	0.001
9	0.45	1.540	0.025
10	0.50	1.544	0.025
11	0.55	1.544	−0.004
12	0.60	1.540	0.020
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36	1.80	1.323	−0.333
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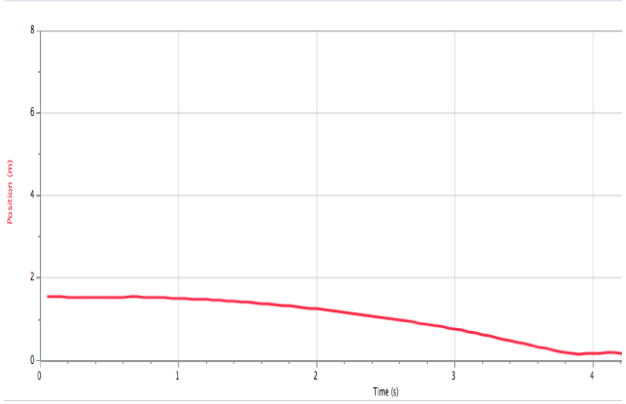
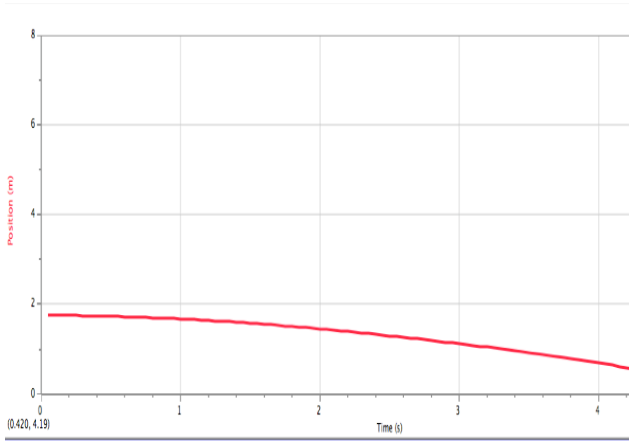


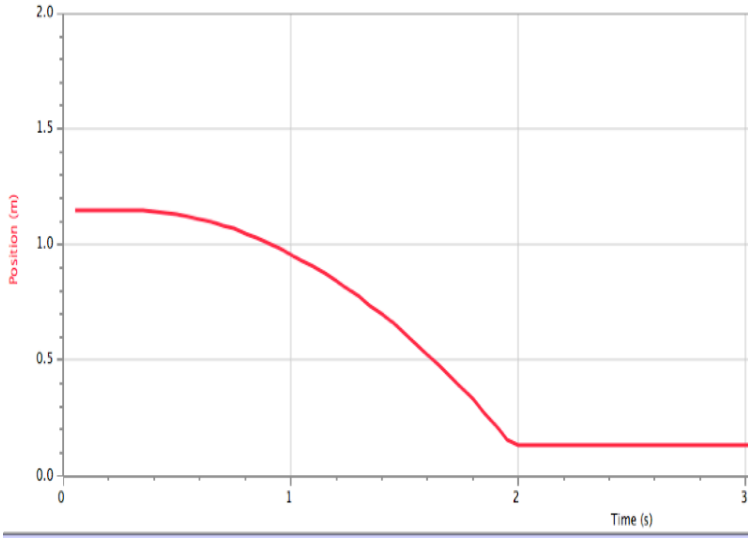
Fast Without the Weight

	Latest		
	Time (s)	Position (m)	Velocity (m/s)
1	0.05	1.759	-0.026
2	0.10	1.758	-0.031
3	0.15	1.756	-0.038
4	0.20	1.754	-0.045
5	0.25	1.752	-0.051
6	0.30	1.749	-0.058
7	0.35	1.746	-0.065
8	0.40	1.742	-0.069
9	0.45	1.739	-0.076
10	0.50	1.735	-0.084
11	0.55	1.730	-0.091
12	0.60	1.726	-0.097
13	0.65	1.721	-0.102
14	0.70	1.716	-0.109
15	0.75	1.710	-0.116
16	0.80	1.704	-0.120
17	0.85	1.698	-0.126
18	0.90	1.692	-0.135
19	0.95	1.684	-0.148
20	1.00	1.676	-0.154
21	1.05	1.669	-0.157
22	1.10	1.661	-0.163
23	1.15	1.653	-0.169
24	1.20	1.644	-0.175
25	1.25	1.635	-0.183
26	1.30	1.626	-0.190
27	1.35	1.616	-0.199
28	1.40	1.606	-0.214
29	1.45	1.594	-0.222
30	1.50	1.583	-0.225
31	1.55	1.572	-0.233
32	1.60	1.560	-0.242
33	1.65	1.548	-0.246
34	1.70	1.536	-0.257
35	1.75	1.522	-0.271
36	1.80	1.508	-0.278
37	1.85	1.494	-0.279



Slow Without the Weight

	Latest		
	Time (s)	Position (m)	Velocity (m/s)
1	0.05	1.150	0.018
2	0.10	1.152	0.009
3	0.15	1.151	0.001
4	0.20	1.151	-0.004
5	0.25	1.151	-0.015
6	0.30	1.150	-0.034
7	0.35	1.148	-0.063
8	0.40	1.144	-0.098
9	0.45	1.139	-0.137
10	0.50	1.131	-0.187
11	0.55	1.119	-0.218
12	0.60	1.108	-0.223
13	0.65	1.098	-0.254
14	0.70	1.084	-0.303
15	0.75	1.067	-0.343
16	0.80	1.049	-0.380
17	0.85	1.029	-0.417
18	0.90	1.007	-0.452
19	0.95	0.984	-0.488
20	1.00	0.959	-0.529
21	1.05	0.930	-0.546
22	1.10	0.904	-0.567
23	1.15	0.874	-0.611
24	1.20	0.843	-0.647
25	1.25	0.810	-0.682
26	1.30	0.775	-0.717
27	1.35	0.738	-0.752
28	1.40	0.699	-0.788
29	1.45	0.659	-0.828
30	1.50	0.617	-0.877
31	1.55	0.571	-0.907
32	1.60	0.525	-0.921
33	1.65	0.479	-0.947
34	1.70	0.431	-0.978
35	1.75	0.382	-1.019
36	1.80	0.330	-1.075



High Inclined Slope

Observations: Looking at the way the fan car speed or slowed down according to what was on the fan car, we saw that the car was moving the fastest when there was nothing on the car. Also when the car went down from the high slope it moved faster because, the speed of the slope makes the object go down faster than at a

normal 180degree surface. When the stapler was on the cart, the acceleration was slower because of the interfered weight of the object.

Analysis: Looking at our graphs, I think that our experiment went pretty well, and the sonar system was able to pick up the motions pretty well. Throughout our experiment we also found out that when the car was experimented on the floor the sonar system worked better away from the glass window, and from other moving objects that caught the sonar system's attention.

Conclusion: In conclusion we were able to determine the fan car's acceleration when put into different positions. Also the next time we do this, I would choose to work with the same place throughout the whole experiment that way we may be able to have a more accurate graph. I think that when we measured near the window there was other interference involved in the graph.

Questions:
1. How was the acceleration of the inclined cart related to g? How should it be related?
The acceleration is related to gravity, because it is/should be 9.8 at all times.
2. Determine the force from the fan on low and high speeds
3. If you allowed the ramp to bounce, what would the v/t graph look like and why?
The graph would start to decrease, and go from positive and negative.
4. If the fan cart had another identical cart hooked to it, what would this do to the three curves: x/t v/t a/t?
The x/t curves would have a less of a curve, and the v/t curve would be straight and the a/t curve would be a decreased line.