Post-IGCSE Physics Course: Experimental Physics using Data Loggers and Computers

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Windows PC running **CAPSTONE** software



Ren Capacione Suite de Suite d

PASCO USB datalogger hub





Searching for wireless devices...





Data Summary



Calibration



Calculator



Associate force plate and position sensor with hub.

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It might happen automatically! If not, click on the ports and choose the sensors from a menu.

Force Platform



About 1kHz appears to be appropriate for the force plate. Too low, and the ball bounce event may not be captured with many samples.



In CAPSTONE, choose multiple Table and Graph displays. For the table, choose force vs time, acceleration vs time, velocity vs time and position vs time.

Record a ball drop (perhaps three bounces) and then copy and paste the recorded data to a text file. Save this.

You may wish to have a single table and change the property (e.g. velocity) vs time before copying.

Import the text file data (probably tab delimited – i.e. with tab spacing between the columns) into **Excel**.









Vertical Force (N)	Time (s)	1										
0.08	0					F	orce vs	time				
0	0.05	7	,									
0	0.1											
2.05E-04	0.15	6	;				- de	and a second				
-0.16	0.2											
-0.03	0.25	5	;				•					
-0.22	0.3											
4.98E-04	0.35	4	l									
-0.11	0.4	z					•					
0.14	0.45	8 3	. –				•					
-0.05	0.5	For										
-0.08	0.55	2	2 +									
-0.08	0.6											
-0.05	0.65	1	. –									
-0.25	0.7											
-0.14	0.75	0		i fin	نية. مرتبع المرار							
-0.08	0.8		Q	ļ	5	10		15	2	0	25	30
-0.08	0.85	-1										
0	0.9						ti	me /s				
-0.11	0.95											
0.16	1											
0.22	1.05	M	lass m	easure	d using	mass	s baland	e /kg				
-0.16	1.1	0.	625									
0.03	1.15											
-0.11	1.2	W	eight ,	/N								
-0.08	1.25	6.	13									
0.19	1.3											
-0.08	1.35	Pe	erhaps	a sligh	t under	-read	ing for I	Force?				
-0.08	1.4											



is about **3.78Ns**

-18.42

-30.85

-0.024635

3.78

2.365



For the first bounce, the velocity change was about **6.1ms**⁻¹.

So if the mass was 0.625kg, this means an impulse of $0.625 \times 6.1 = 3.8$ Ns, which is in agreement to the area under the force vs time graph for the duration of the bounce.