Modeling Motion With Excel – Part I
AP Physics C

Name _____
1 2 3 4 5 6 7 8

1. Create a basic template in Excel that looks like this:

	A	B	C	D
1	Initial x			
2	Initial v			
3	a			
4				
5	Time	x	v	a
6	0			

2. Use $ symbols, as appropriate, to fill in values for x, v, and a at time t = 0:

	A	B	C	D
1	Initial x	0		
2	Initial v	10		
3	a	0		
4				
5	Time	x	v	a
6	0	0	10	0

3. Set the value of time for cell A7 to =A6+0.001, the value of acceleration for cell D7 to =D6+0, then create functions in cells B7 and C7 that will automatically compute the cell value based on the row above.

	A	B	C	D
1	Initial x	0		
2	Initial v	10		
3	a	0		
4				
5	Time	x	v	a
6	0	0	10	0
7	0.001	10	10	0

4. Select rows A6:D7, and use the pulldown square to propagate your functions down for at least 20 more rows.

	A	B	C	D
1	Initial x	0		
2	Initial v	10		
3	a	0		
4				
5	Time	x	v	a
6	0	0	10	0
7	0.001	10	10	0
8	0.002	20	10	0
9	0.003	30	10	0
10	0.004	40	10	0
11	0.005	50	10	0
12	0.006	60	10	0
13	0.007	70	10	0
14	0.008	80	10	0
15	0.009	90	10	0
16	0.01	100	10	0
17	0.011	110	10	0
18	0.012	120	10	0
19	0.013	130	10	0
20	0.014	140	10	0
21	0.015	150	10	0
22	0.016	160	10	0

Modeling Motion With Excel – Part II
AP Physics C

Name _____
1 2 3 4 5 6 7 8

Using the skills you learned in Part I, a basic knowledge of Newton's 2nd Law, and the following model for the force due to air drag:

$$F_{air\ drag} = \frac{1}{2}\rho A C_d v^2$$

1. Create a numeric model for acceleration, velocity, and position of an object falling from a height of 1 meter. The model should match the model shown below:

	A	B	C	D
1	Initial y	1		
2	Initial v	0		
3	g	9.8		
4	mass	1		
5	drag coefficient	1		
6	X-sectional area	0.02		
7	air density	1.3		
8				
9	Time	x	v	a
10	0	1	0	-9.8
11	0.001	1	-0.0098	-9.8
12	0.002	0.9999902	-0.0196	-9.799998751
13	0.003	0.9999706	-0.029399999	-9.799995006
14	0.004	0.9999412	-0.039199994	-9.799988763
15	0.005	0.999902	-0.048999983	-9.799980024
16	0.006	0.999853	-0.058799963	-9.799968787
17	0.007	0.9997942	-0.068599931	-9.799955053
18	0.008	0.9997256	-0.078399886	-9.799938823
19	0.009	0.9996472	-0.088199825	-9.799920095
20	0.01	0.999559	-0.097999745	-9.79989887
21	0.011	0.999461001	-0.107799644	-9.799875149
22	0.012	0.999353201	-0.117599519	-9.79984893
23	0.013	0.999235602	-0.127399368	-9.799820215
24	0.014	0.999108202	-0.137199188	-9.799789002
25	0.015	0.998971003	-0.146998977	-9.799755293
26	0.016	0.998824004	-0.156798733	-9.799719087
27	0.017	0.998667205	-0.166598452	-9.799680384
28	0.018	0.998500607	-0.176398132	-9.799639184
29	0.019	0.998324209	-0.186197771	-9.799595488
30	0.02	0.998138011	-0.195997367	-9.799549295
31	0.021	0.997942014	-0.205796916	-9.799500605
32	0.022	0.997736217	-0.215596417	-9.799449419
33	0.023	0.99752062	0.00979092	-9.799395736