**Data Collection with a PC-II** Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Partner(s):\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Day/Time:\_\_\_\_\_\_
 **A. Introduction:** PASCO’s 850 interface and Capstone software.
1. Open PASCO Capstone software from the desktop.



2. Double click “Graph” under Displays, on the far-right column.

Pasco Capstone display:



3. You will use some of the above (numbered) menus to manipulate the data. Describe the functions of the following menus:

|  |  |
| --- | --- |
| Menu | Description |
| 1 |  |
| 4 |  |
| 6 |  |
| 7 |  |
| 8 |  |
| 9 |  |

B. Equations of Kinematics for constant acceleration and Newton’s second law are given below:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 1. | 2. |  3. | 4. | 5. | Newton’s 2nd Law |
| $$y=\overbar{v} t$$ | $$y=\frac{1}{2}\left(v\_{0}+v\right)t$$ | $$v=v\_{0}+at$$ | $$y=v\_{0}t+\frac{1}{2}at^{2}$$ | $$v^{2}=v\_{0}^{2}+2ay$$ | $$\sum\_{}^{}\vec{F}=m\vec{a}$$ |

For the Atwood Machine experiment shown in the video, calculate the acceleration using,
a. Kinematic Equations b. Newton’s second law
<http://www.youtube.com/watch?v=4ovhEkSIqV0>

C. Purpose: Determine the acceleration due to gravity.

*v* vs. *t*:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ *x* vs. *t*:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |  |  |
| --- | --- | --- | --- |
| Trial | Measured Acceleration due to gravity | Accepted (m/s2) | % Error |
| *v* vs. *t*(linear fit) | *x* vs. *t*(Quadratic fit) | Average |
| 1. |  |  |  | 9.8 |  |
| 2. |  |  |  | 9.8 |  |
| 3. |  |  |  | 9.8 |  |
| 4. With 50-g mass |  |  |  | xxxxxxxxxxxx | xxxxxxxxxxxx |
| 5. With 50-g mass |  |  |  | xxxxxxxxxxxx | xxxxxxxxxxxx |
| 6. With 50-g mass |  |  |  | xxxxxxxxxxxx | xxxxxxxxxxxx |

# D. Newton’s Second Law (Conclusion is required for this part only)Data A: Keeping the mass difference (m1-m2) constant, measure the acceleration as you change the total mass, starting from the lowest possible total mass, m1+ m2. Tabulate your data in excel, plot an appropriate graph to verify Newton’s second law.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| m1 (gram) | m2 (gram) | m1-m2 (gram) | a (m/s2) | m1 + m2 (gram) |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

Data B: Keeping the total mass = M = m1+ m2 constant, measure the acceleration as you change the net force (m1-m2)g. Collect multiple sets of data, starting from the lowest possible m1-m2. Tabulate your data in excel, plot an appropriate graph to verify Newton’s second law, and obtain the total mass from the graph.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| m1 (gram) | m2 (gram) | m1 + m2 (gram) | a (m/s2) | (m1-m2)\*9.8 (gram.m/s2) |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |