



## Manipulating Vertical Acceleration

Name \_\_\_\_\_

Using only the parts given to you, design a marble path that runs all the way to your desktop. You can only use the parts supplied in your box – you may not trade or give/take parts from other groups.

Your marble will be timed from its release until the moment it comes in contact with your desktop.

The group with the highest average travel time of the marble will be the winner. You are competing against the groups in the room with you as well as the groups in the other lab session. Points will be awarded as follows:

- 1<sup>st</sup> place – 30 points
- 2<sup>nd</sup> place – 25 points
- 3<sup>rd</sup> place – 20 points
- 4<sup>th</sup> place – 18 points
- 5<sup>th</sup> place – 16 points
- 6<sup>th</sup> place – 15 points

This lab assignment is worth 20 points, the top two groups will receive extra credit.

Each marble pathway will be timed three times. The worst of the three times will be thrown out, and the average time will be calculated by dividing the sum of your two longest times by two.

### **Please follow the rules listed below:**

1. You can ONLY use the plastic pieces supplied in your box. You may not use any foreign material (tape, etc.).
2. The plastic pieces must be connected as they were intended to be connected. Do not force, prop or balance parts in your maze.
3. If, during a marble run, your marble falls off the track or stalls, a time of zero will be entered for that run.
4. You cannot use any outside force to propel your marble, including but not limited to blowing, tilting, bumping or other means of getting your marble through the maze.
5. You are not allowed to touch another group's maze, nor use another group's parts.
6. The order of timing a run is at the discretion of the instructor. All teams will have one timed run before another team has a second run. Adjustments can be made between runs.
7. Any team that breaks or loses a plastic part will be severely penalized or disqualified.

### **Here's a Hint!**

Don't get greedy. The losing groups usually have their marbles get stuck on the way down. If your marble is not successful at least 80% of your runs, it's time to simplify your pathway! Make large scale changes at the beginning of class, and only minor adjustments as the time of testing approaches. Remember Murphy's Law – "Anything that can go wrong will go wrong!"