**FPS – Bubble Tube Lab**

Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period\_\_\_\_\_\_\_\_\_\_

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| I can… |
| *Calculate speed by measuring the slope & create distance-time graphs.* |

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| Pre-Lab |
| 1. Image result for speed formula triangleWhat is the speed of an object if it travels 20 centimeters in 12 seconds? 2. What is the difference between ***velocity*** and ***speed***? 3. What could affect an object’s speed during motion through fluid? |

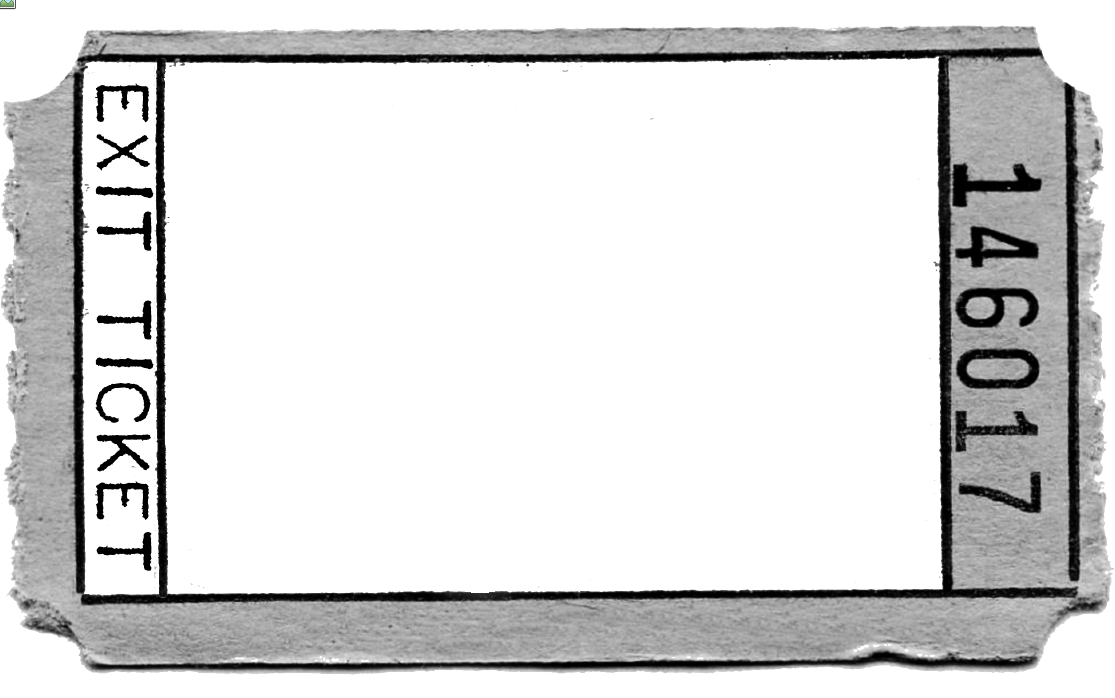
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| SAFETY |
| Bubble tubes are **fragile** and anyone who breaks or damages a bubble tube will receive a ZERO on the lab, end of story. At all times while holding the bubble tube, ***have both hands on the tube with your hands far apart!*** DO NOT lean them against the wall or leave them unattended on the table. DO NOT use them in anyway other than what is specified for the lab.  Careless behavior with the tubes will result in a ZERO. |

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| ***Bubble Tube lab*** | | | | |
| *Materials*  -stopwatch -red tube -blue tube -green tube -meter stick | | | | |
| *Procedure*   1. Measure the length of each tape mark on each tube. 2. Select a tube to start with. One person should hold the tube with ***both hands far apart at all times***. 3. Hold the tube so that the bubble is at the bottom end of the tube. 4. The group members should be timing with the stopwatch, watching the bubble, and recording the times. When the group is ready to time, they should hold the tube **upright**, with the bubble at the **bottom** and start the stopwatch. 5. When the **bottom** of the bubble passes the first mark, stop the timers. Record the time. Record the distance to the first mark. Do this for all 4 marks on the tubes. 6. Repeat two trials for each color tube. | | | | |
| ***Bubble Tube color:*** | | | | |
|  | ***Distance (cm)*** | ***Time Trial #1*** | ***Time Trial #2*** | ***Average time*** |
| 1 |  |  |  |  |
| 2 |  |  |  |  |
| 3 |  |  |  |  |
| 4 |  |  |  |  |
| ***Bubble Tube color:*** | | | | |
|  | ***Distance (cm)*** | ***Time Trial #1*** | ***Time Trial #2*** | ***Average time*** |
| 1 |  |  |  |  |
| 2 |  |  |  |  |
| 3 |  |  |  |  |
| 4 |  |  |  |  |
| ***Bubble Tube color:*** | | | | |
|  | ***Distance (cm)*** | ***Time Trial #1*** | ***Time Trial #2*** | ***Average time*** |
| 1 |  |  |  |  |
| 2 |  |  |  |  |
| 3 |  |  |  |  |
| 4 |  |  |  |  |

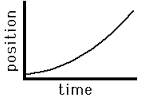
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| --- |
| Create a graph with your data below. Title your graph. Label the x-axis “**Average** **Time (s)**” and the y-axis “**Distance (cm)**”. The y-axis scaled should be by 2, the x-axis scale should be by 1.  Plot your points in **different** **colors** for each bubble tube. Use a ruler to do a ***best-fit line* for each color**. Try to fit the data, but it might not go through any point! It should start at (0,0). |
| http://www.classroomjr.com/wp-content/uploads/2010/05/25-inch-grid-paper.gif |
| **Analysis & Calculations** |
| 1. In which tube was the bubble traveling the fastest? 2. Which color line had the steepest slope? 3. What is the connection between question 1 and 2? 4. Using your graph, find how far did the bubble in the **red** tube traveled in 6.5 seconds. 5. Using your graph, find how far did the bubble in the **blue** tube traveled in 6.5 seconds. 6. Using your graph, find how far did the bubble in the **green** tube traveled in 6.5 seconds.   ***BONUS:***  What does viscosity mean?  How would temperature affect the thickness of a fluid? |

Complete the exit ticket below independently, cut it along the dotted line, and turn into the tray!





Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Pd:\_\_\_\_\_\_\_

1. What would it say about the data is the lines were all steeper   
   on the graph?
2. What do you think would happen if the graph were curved   
   as shown below?