**Plotting Position**

**Purpose**

How to interpret position data as, visual, numerical, graphical and symbolic.

**Curriculum Outcome(s):**

**S2-3-01** Analyze the relationship among displacement, time, and velocity for an object in uniform motion.

*Include: visual, numeric, graphical, symbolic (velocity = Δd/Δt).*

**Part A – Visual**

Using the data page, answer the following questions

1. Do all objects start at the same point? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   1. If any, which object(s) have a “head start”? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Which object(s) traveled for the longest period of time? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Which objects would have the same origin? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. Which object has traveled the farthest?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. Which object(s) is traveling the fastest? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   1. How can you tell? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
6. Which object(s) is traveling the slowest? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   1. How can you tell? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
7. Draw a series of positions that would use 4 seconds of time in total, at 0.5 second intervals and reaches a final position of 18cm from an origin.

**Part B – Numerical**

For each object, measure the position of each dot, relative to the origin (the bottom dot is the origin for each object). **Make sure the zero of your ruler stays on the origin for each measurement.**

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| **Object U** | |  | **Object V** | |  | **Object W** | |
| **Time (s)** | **Position (cm)** | **Time (s)** | **Position (cm)** | **Time (s)** | **Position (cm)** |
| 0.0 | 0.00 |  |  |  |  |
| 0.5 |  |  |  |  |  |
| 1.0 |  |  |  |  |  |
| 1.5 |  |  |  |  |  |
| 2.0 |  |  |  |  |  |
| 2.5 |  |  |  |  |  |
| 3.0 |  |  |  |  |  |
| 3.5 |  |  |  |  |  |
| 4.0 |  |  |  |  |  |
| 4.5 |  |  |  |  |  |
| 5.0 |  |  |  |  |  |
|  | |  | |  | |
| **Object X** | | **Object Y** | | **Object Z** | |
| **Time (s)** | **Position (cm)** | **Time (s)** | **Position (cm)** | **Time (s)** | **Position (cm)** |
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Using the tables above, answer the following questions

1. Why is it important to measure on the same location of the dot each time? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Why must you always measure each position from the origin? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. How do values support your findings from Part A? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Part C – Graphical**

Using the tables of **Part B**, create a graph for each object of position vs. time

* Place time on the x-axis
* Place Position on the y-axis
* All 6 graphs need to use the same x & y-axis
  + All need to use the same number scales for time and position
  + Helpful to use different colours and/or solid and dotted lines
* Draw a line for each graph (connect the dots)
* Include the appropriate labels in all locations

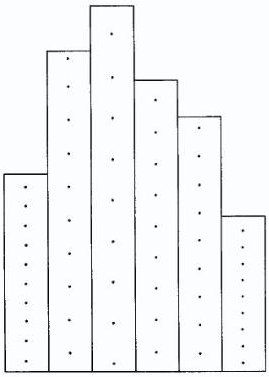
Use the graphs you created to answer the following questions

1. Are the lines straight, or curved? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. What does a straight line mean? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. What would a flat, straight line mean? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. How can you tell which object is traveling the fastest? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. Which line(s) are the steepest? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   1. How could you determine a value to the steepness of the line?
      1. (For example, you may think that line ***W*** is 2 times as steep as line ***Z***. How could you use numbers to prove/disprove this?)

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1. For each graph, is there anything that is remaining constant? If yes, what is it? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Data**

****Each “strip” represents dots left behind by a moving object. The dots occur at regular time intervals of 0.5 seconds.

**Objects:**

**W**

**U**

**V**

**X**

**Y**

**Z**

*Origin*