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? ______________________
    a. 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? _____________________
    a. How can you tell? ____
6) Which object(s) is traveling the slowest? ____________________
    a. 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.**

Object U	
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 V	
Time (s)	**Position (cm)**

Object W	
Time (s)	**Position (cm)**

Object X	
Time (s)	**Position (cm)**

Object Y	
Time (s)	**Position (cm)**

Object Z	
Time (s)	**Position (cm)**

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? ____

    a. How could you determine a value to the steepness of the line?

        i. (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?)

    ____

    ____

    ____

    ____

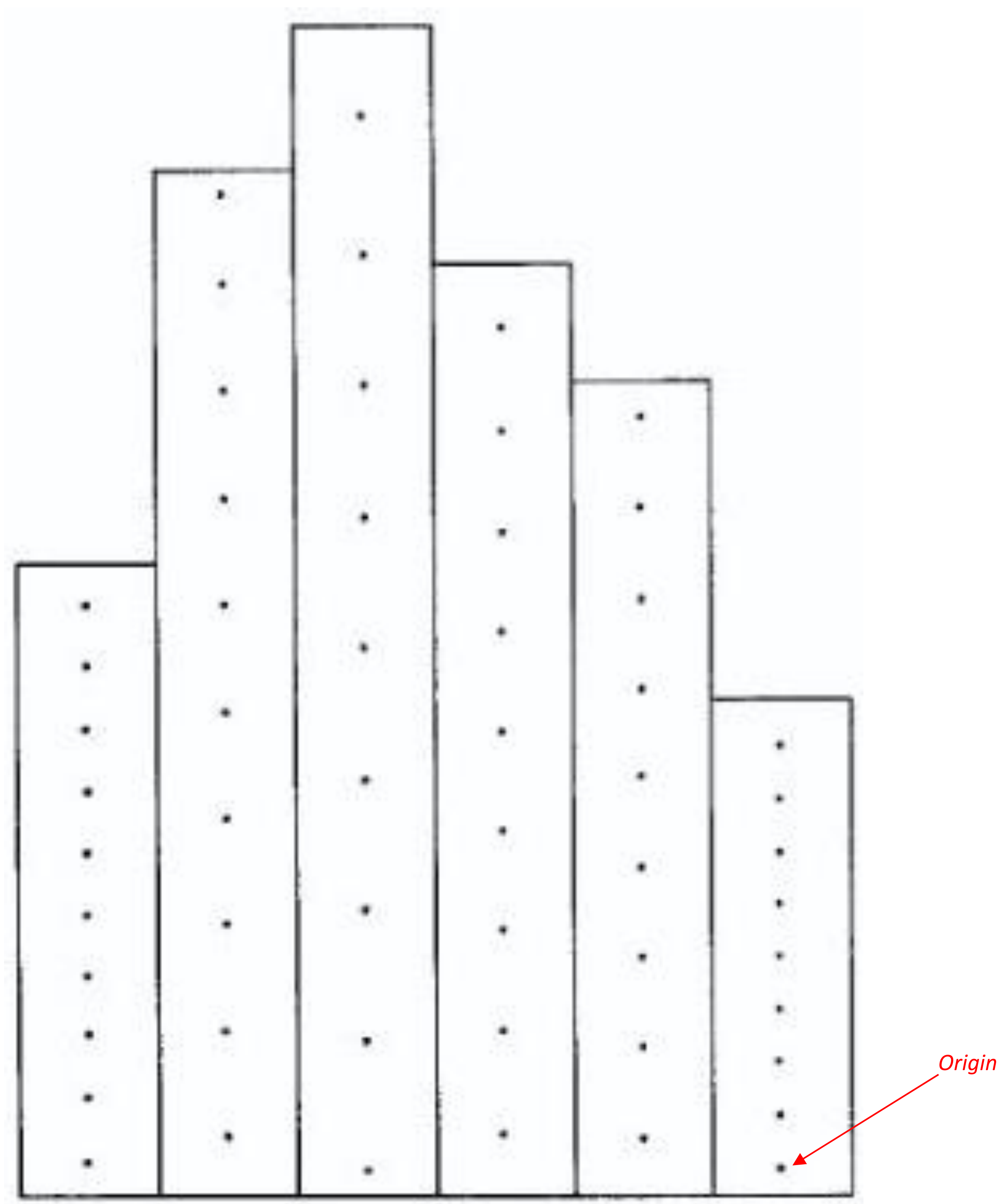
6) For each graph, is there anything that is remaining constant? If yes, what is it?

    ____

    ____

Data

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



Objects: U V W X Y Z