Dozer Challenge

This is an activity write up. Not a formal laboratory.

7 points for write up

3 points for meeting the challenge!

Sept. 12, 2005

Notes

Displacement and Time Activity

Goals

- How are displacement and time related for a moving object?
- Find your groups own mathematical model that describes the motion of the object.
- Predict the displacement of the Dozer at a time given by your instructor.

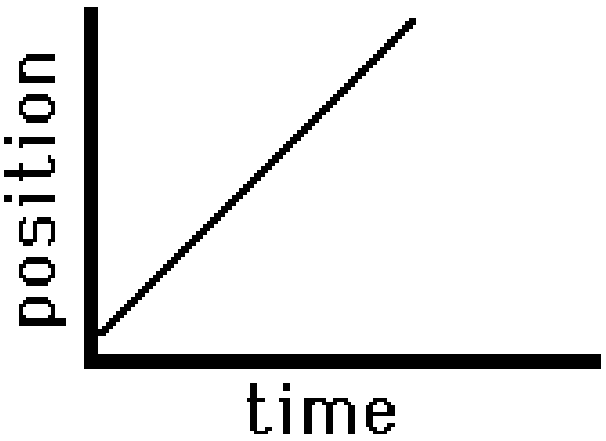
Notes

Process

- Goal i.e. Problem?
- Collect data
- Graph data on computer
- Calculate the equation, mathematical model, for the line. (This is the "hidden" relationship for the dozers motion.)
- What does the slope mean in the real world?
- Summarize your findings including a written interpretation of what the mathematical model means in the real world!

Analysis

d [cm]	t [s]
d_1	t_1
d_2	t_2
.	.
.	.
d_{10}	t_{10}



- Graph the position (displacement) vs time graph.
- Run a trendline
- Y=mX + b
- Did you measure position 0 [cm] at 0 [s] ?
- Yes,... So it is a data point. If not it is not a data point.

Analysis

d [cm]	t [s]
d_1	t_1
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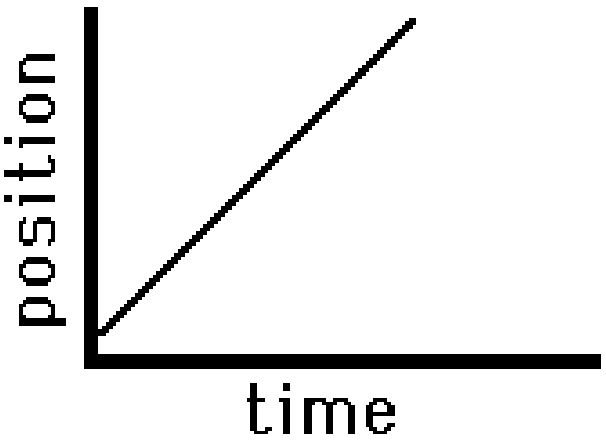
.	.
.	.
d_{10}	t_{10}



$$Y = mX + b$$

$$D = m\,t + b$$

Slope is $\dfrac{\text{rise}}{\text{run}}$

$$\frac{\Delta Y}{\Delta X}$$

$$\frac{\Delta d\ [cm]}{\Delta t\ [s]}$$

[cm/[s] centimeters per second
Is distance per time. Speed!

Make a graph of velocity vs time

- Graph the velocity vs. time graph.
- Find the slope between each of the two data points, this is the velocity at ½ second intervals.
- V is the slope and the time is 0.5 [s], 1.5 [s], etc.
- Plot the v vs. t graph
- Run a trend line
- Y=m X + b
- Write the real world equation for the trend line
- What does the equation mean in the real world?

Dozer activity hand in.

- Write up summary page
  - Purpose
  - Data and notes
  - Conclusion
- Include a computer generated graph of d vs t
  - Trend line
  - Equation for the line with the correct labels
    - Give supporting discussion.
    - What does the line mean in the real world?
- Include a computer generated graph of v vs t