Constructing and Intrepreting a Line Graph

Variables are measured..

Time paper towel submerged (s)	Distance the liquid rose in towel (mm) Trials			Mean Distance (mm)	Mean speed
IV	1	2	3	**DV**	
10					
15					
20					
30					
35					
40					

What is the independent variable?

Time paper towel submerged (time).

What is the dependent variable?

Mean distance the liquid rose (distance).

Variables are measured..

Time paper towel submerged (s)		Mean Distance the liquid rose in towel (mm)	Mean speed
X		y	
10		11	
15		14	
20		14	
25		15	
30		16	
35		17	
40		19	

What is the x axis label?

The IV, the time paper towel submerged (time).

What is the y axis label?

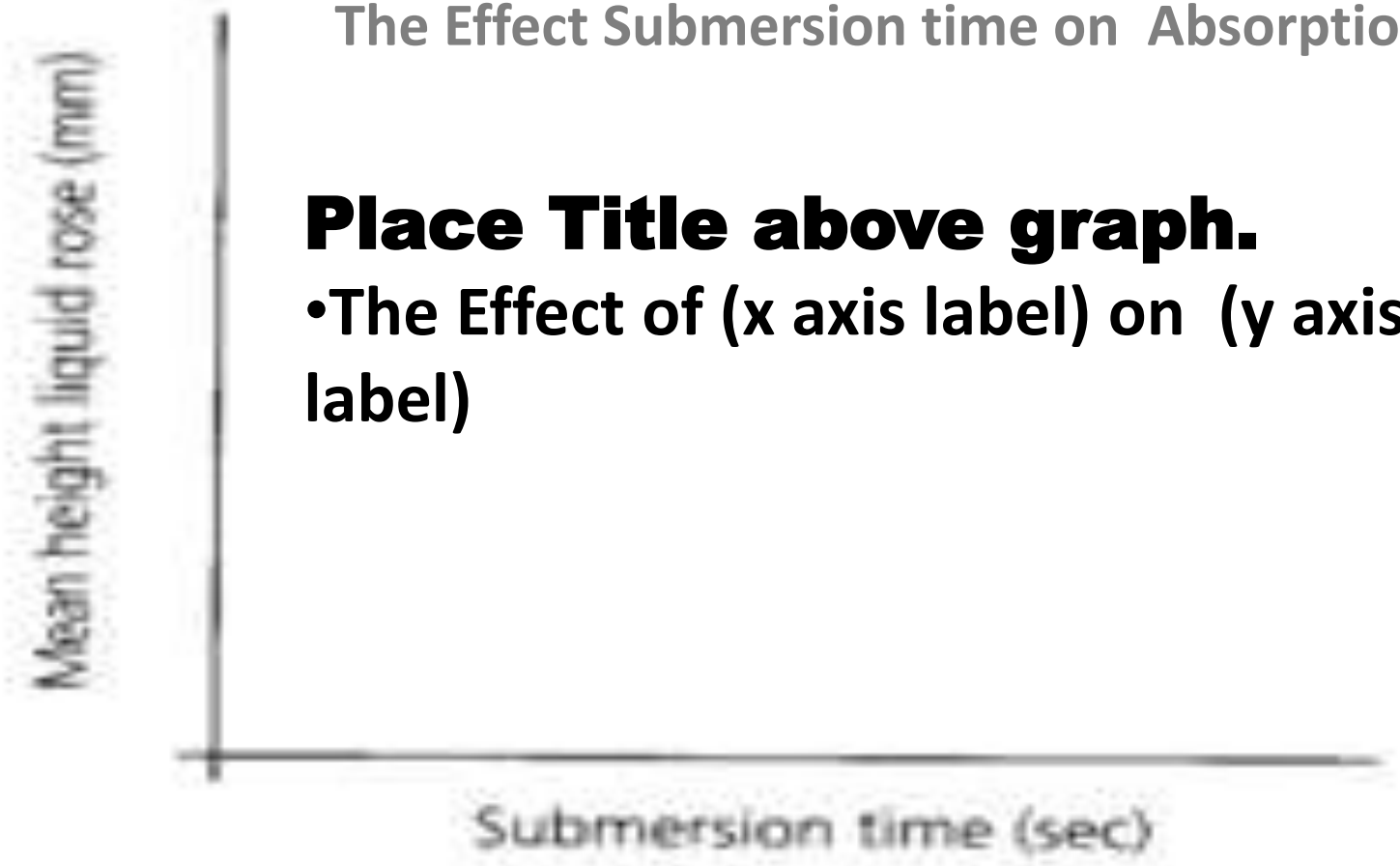
The DV, the distance the liquid rose (distance).

Experimental Data

x	**y**
Independent Variable Submersion time (sec.)	*Dependent Variable* Mean height liquid rose (mm)
10	11
15	14
20	14
25	15
30	16
35	17
40	19

Labels & Title

1. Draw and Label Axes



Place Title above graph.

- **The Effect of (x axis label) on (y axis label)**

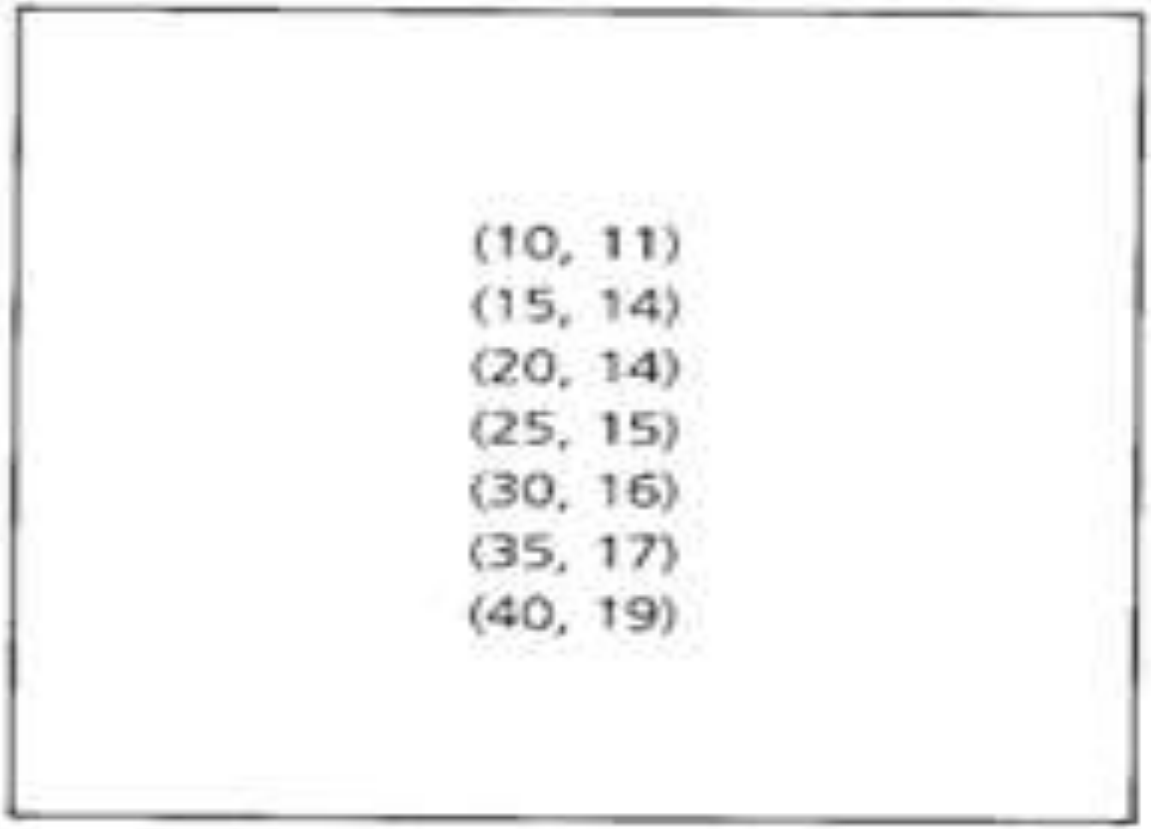
Graphing

- **X axis: independent variable.**

- **Y axis: dependent variable.**

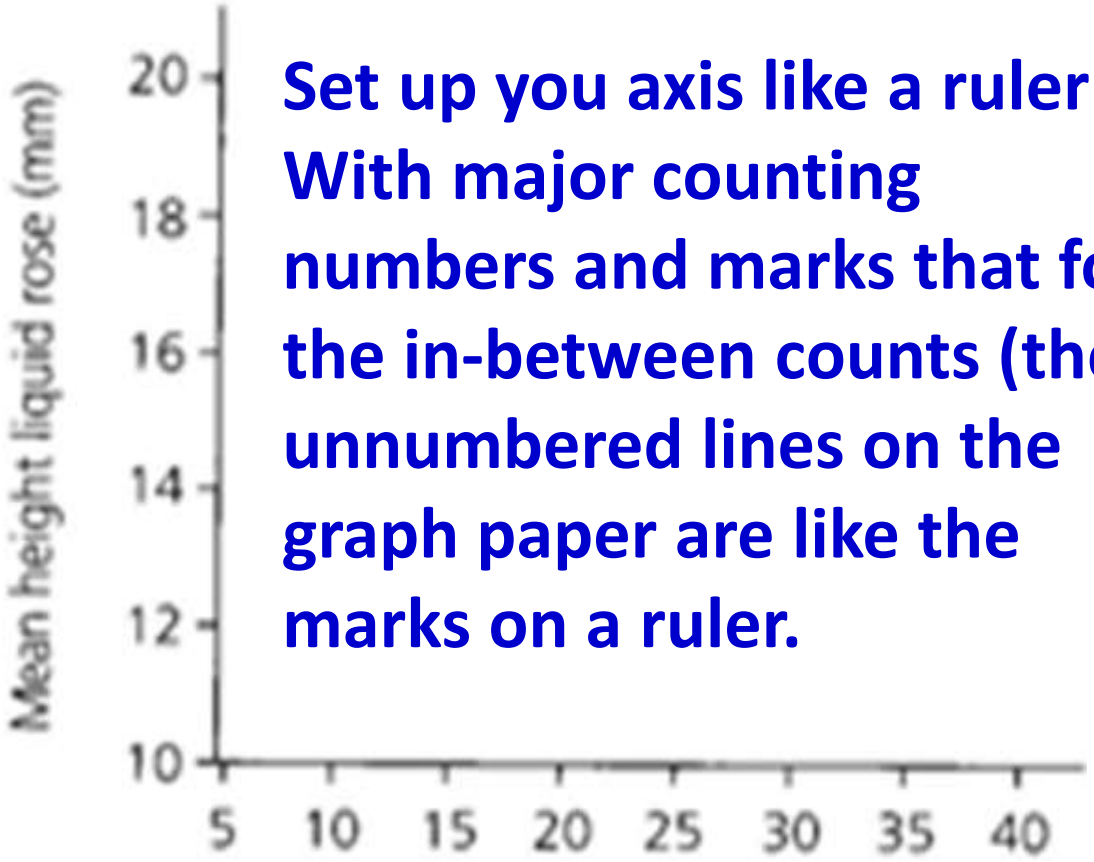
Data Pairs

2. Write Data Pairs



Determine Scale for Axis

3. Determine Scales for Axes

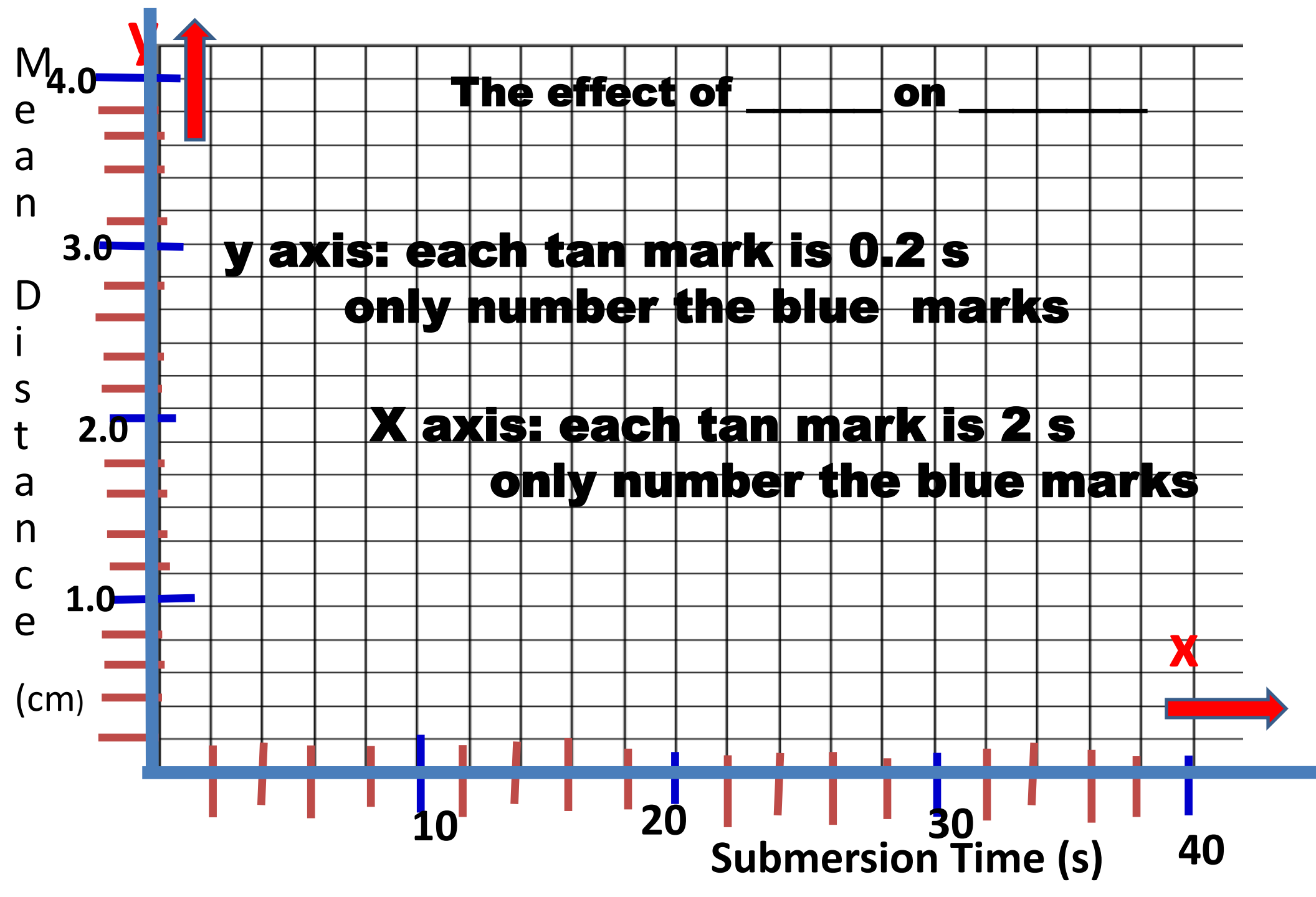


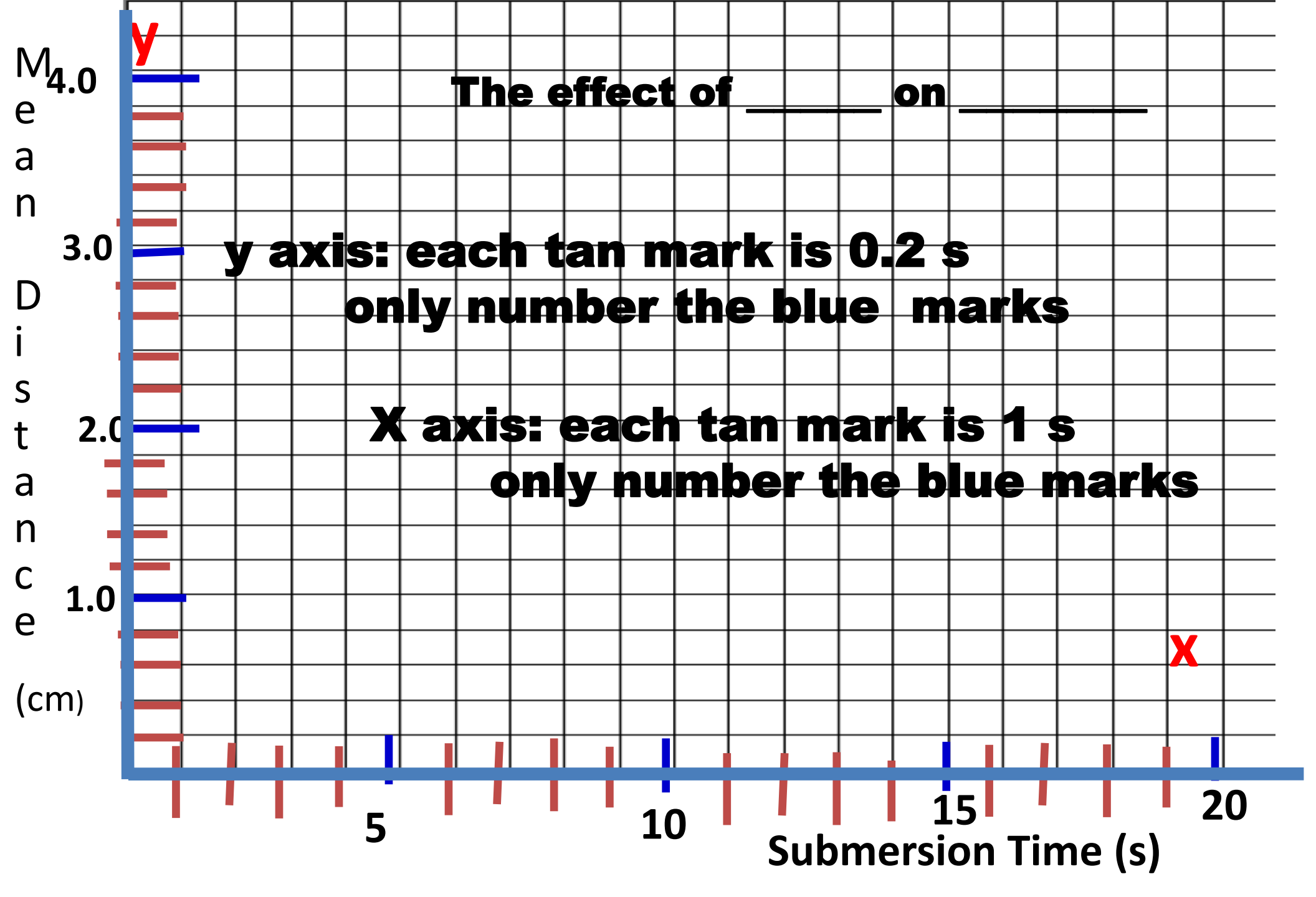
Set up you axis like a ruler: With major counting numbers and marks that for the in-between counts (the unnumbered lines on the graph paper are like the marks on a ruler.

Make your graphing area as large as possible.

Graphs do not have to start at zero.

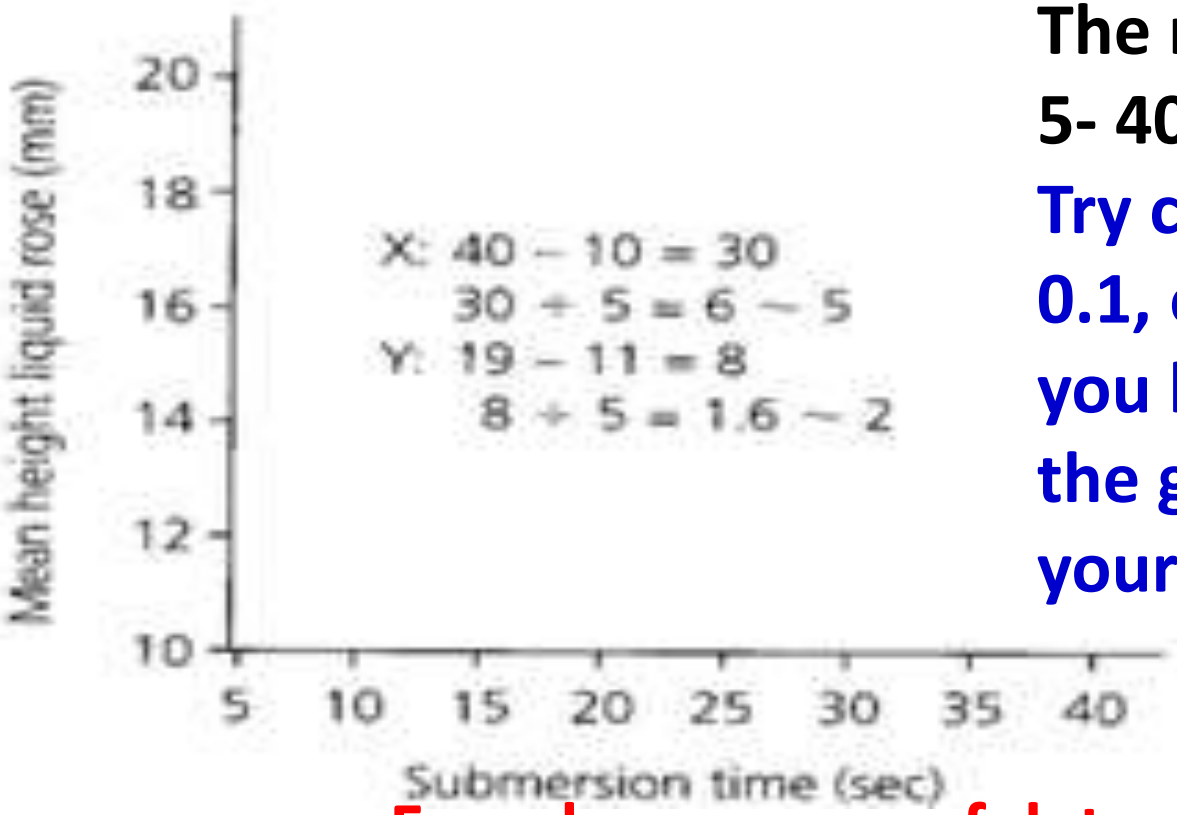
You must have even spacing on each axis.
The two axis can be different from each other.


Mean Distance (cm)
4.0
3.0
2.0
1.0
y
The effect of _____ on _____
y axis: each tan mark is 0.2 s
only number the blue marks
X axis: each tan mark is 2 s
only number the blue marks
X
10
20
30
40
Submersion Time (s)


y
Mean Distance (cm)
4.0
3.0
2.0
1.0
The effect of _____ on _____
y axis: each tan mark is 0.2 s
only number the blue marks
X axis: each tan mark is 1 s
only number the blue marks
X
5
10
15
20
Submersion Time (s)

Determine Scale for Axis

3. Determine Scales for Axes



The range of this graph: x = 5- 40, y = 10 - 20

Try counting each line by 0.1, or 0.2, or 0.5 and see if you have enough lines on the graph paper to cover your range.

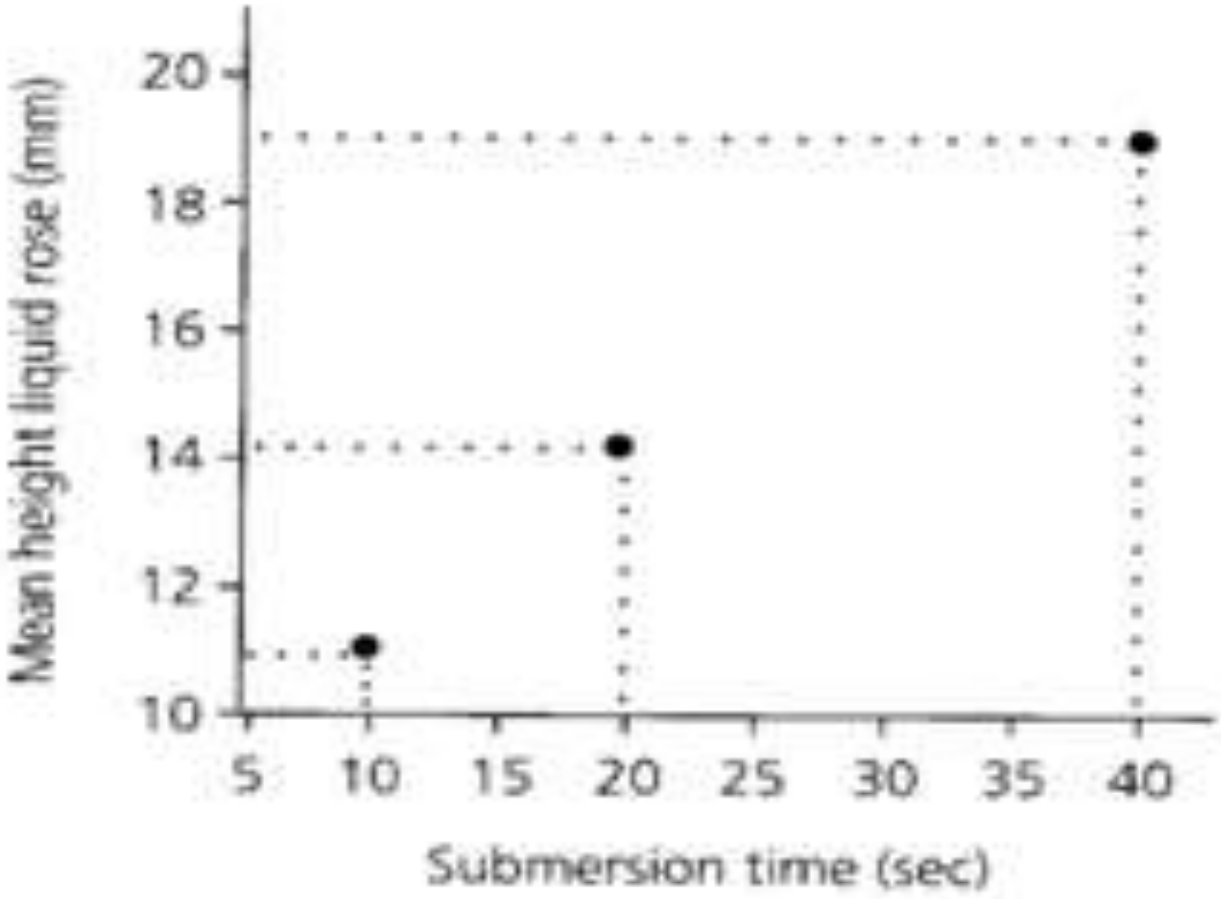
For a large range of data points:

Numbering for each axis:

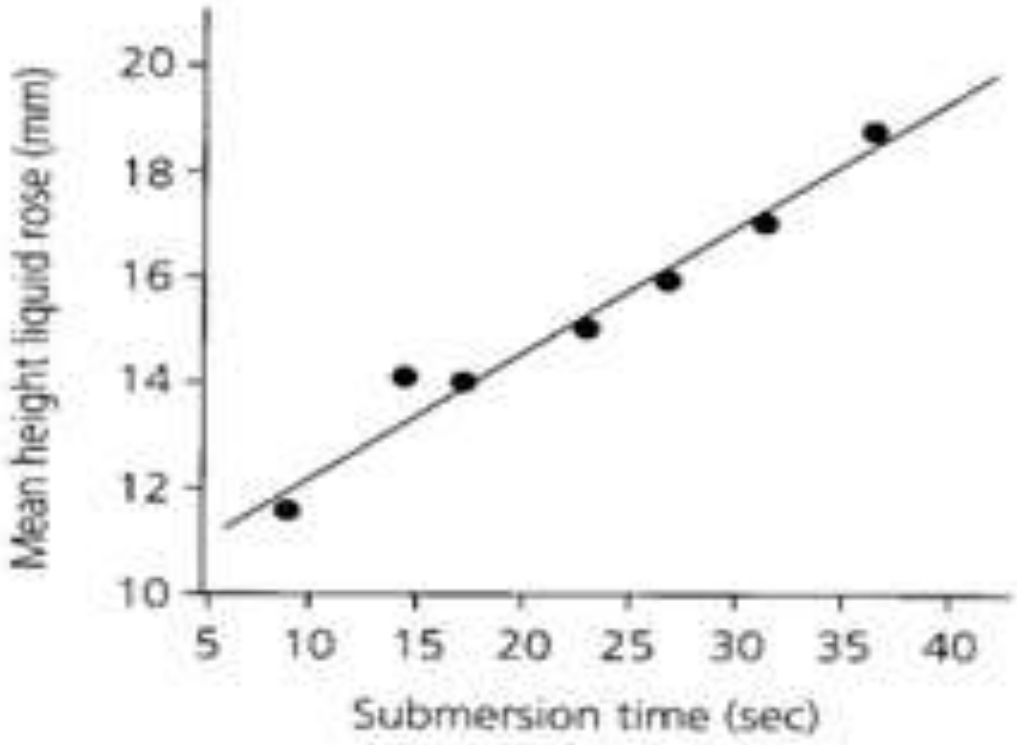
$$\frac{\text{maximum value} - \text{minimum value}}{5}$$

Then round off to a nearest common counting unit.

4. Plot Data Pairs



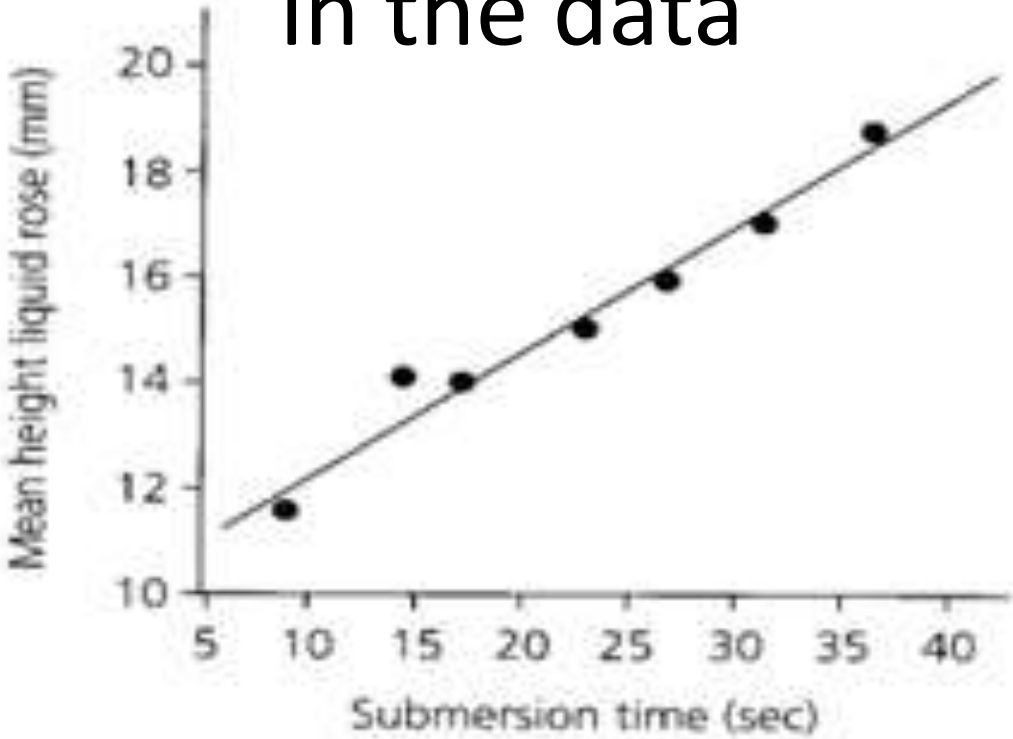
5. Summarize Trends



Draw "best fit" trend line

A linear trend line is a straight line that is drawn so it comes to as many points as possible. A trend line does not have to pass through the points.

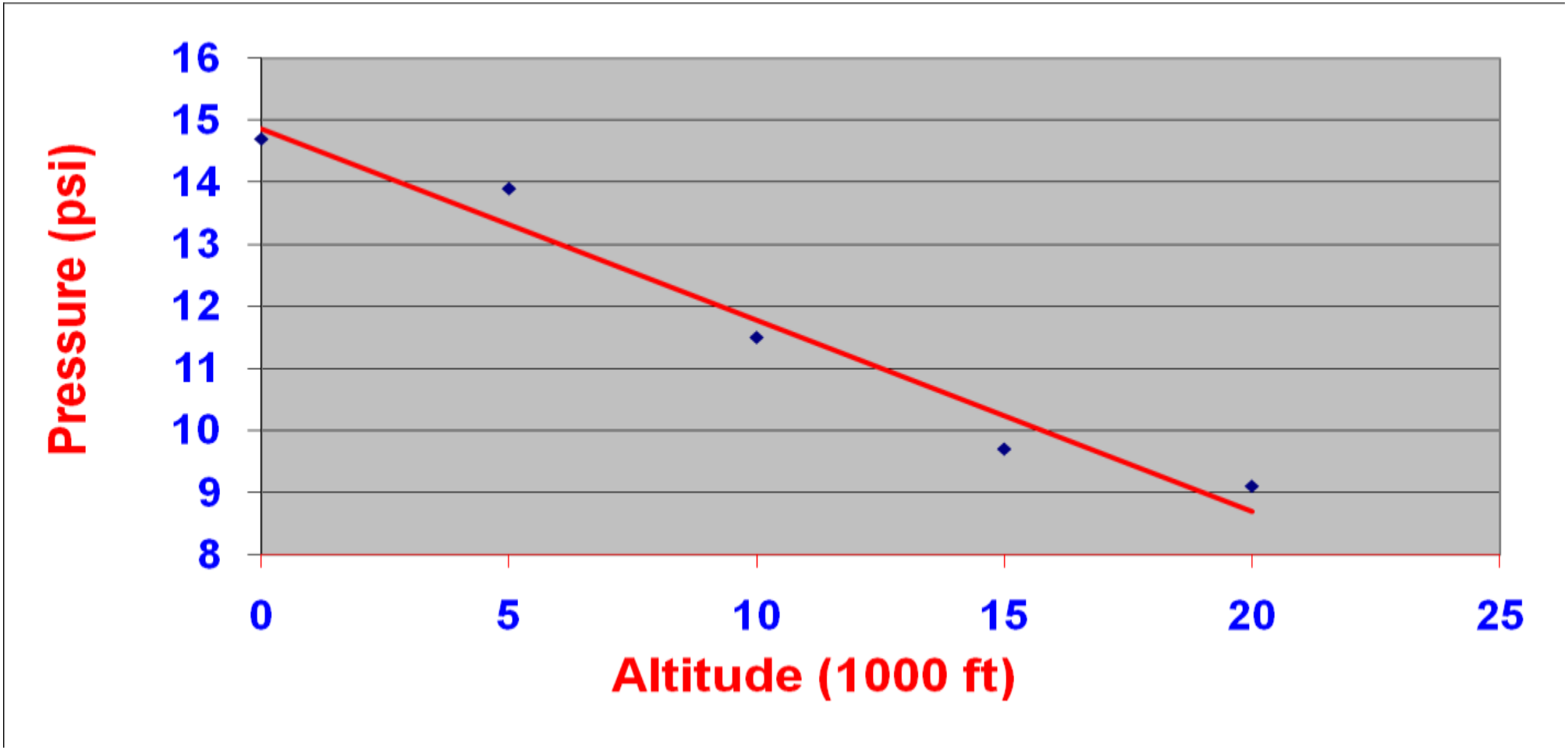
Graphs help reveal the trends or patterns in the data



Draw "best fit" trend line

As the length of time the paper towel was submerged increased, the height the liquid rose also increased.

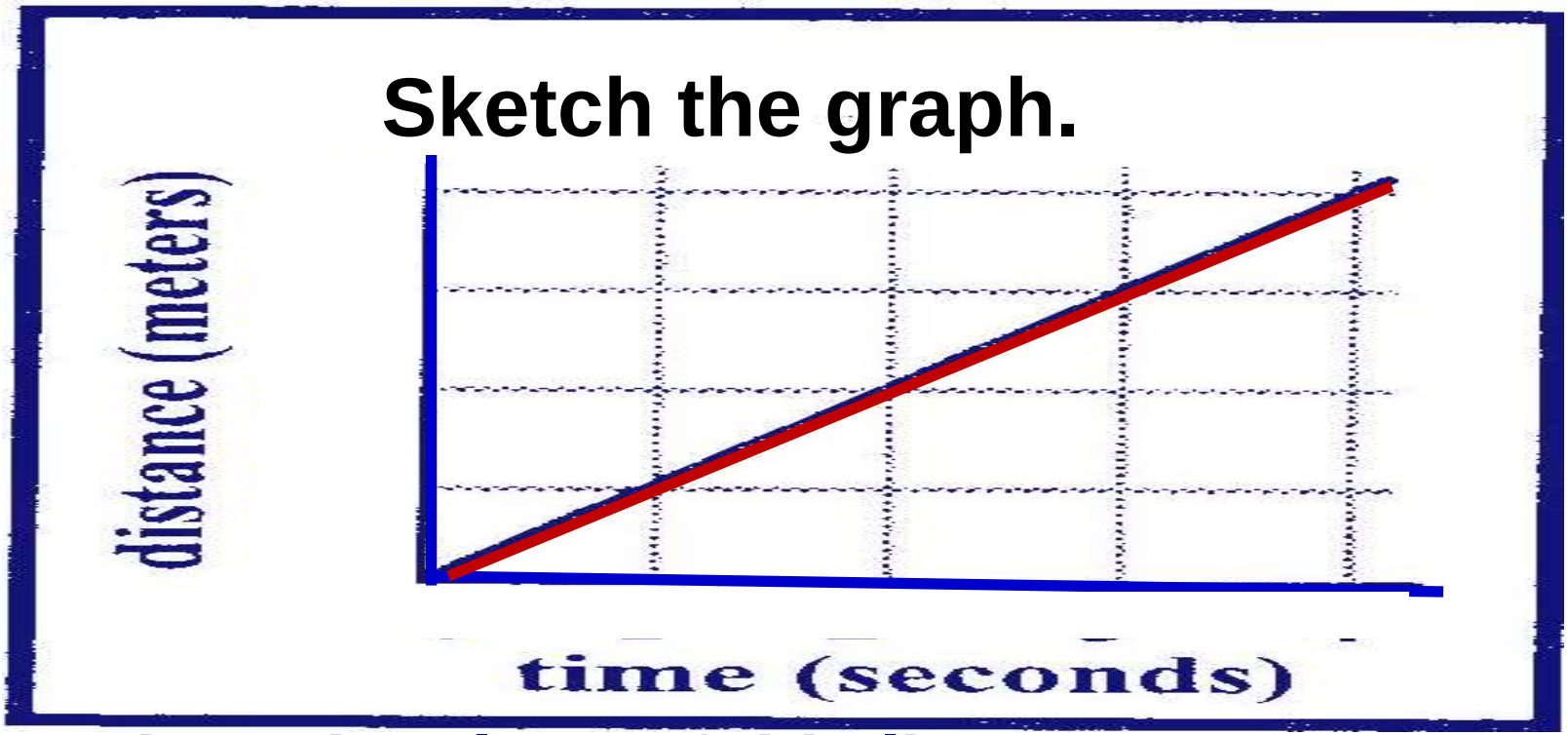
Trend line: A straight line that passes as close to as many points as possible.



Trend: As the altitude increased, the pressure decreased.

Slope

Sketch the graph.



1. What does the slope of this line represent? **speed**

$$slope = \frac{rise}{run} = \frac{y}{x} = \frac{\textbf{distance (d)}}{\textbf{time (t)}}$$

$$speed = \frac{\textbf{distance } (d)}{\textbf{time } (t)}$$