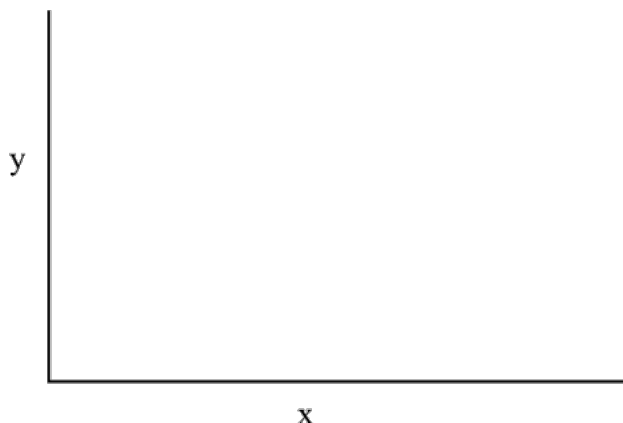


X. GRAPHING DATA:

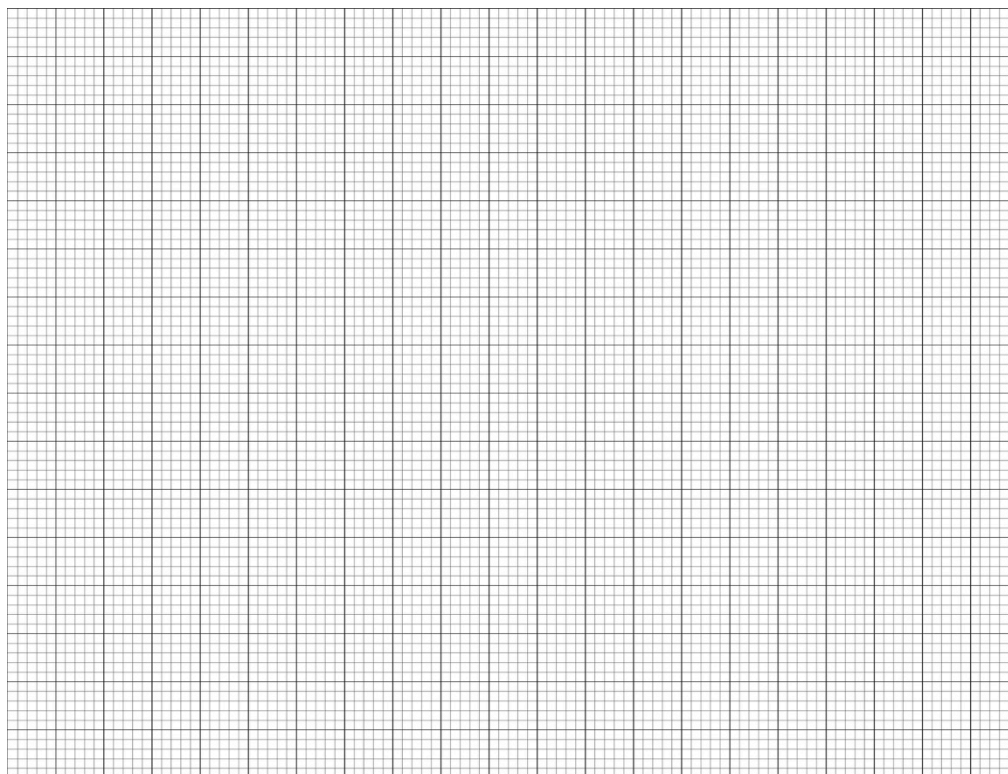
Follow along and complete these notes as you view video “#10: Making & Interpreting Graphs” at <https://edpuzzle.com>.

- Graphs visually represent how the \_\_\_\_\_ responds or changes as the \_\_\_\_\_ changes
  - We can see trends and relationships more easily
  - Independent variable: \_\_\_\_\_ (or with time, control spacing of variable)
    - Usually plotted on the \_\_\_\_\_ (horizontal axis)
  - Dependent variable: \_\_\_\_\_ to investigate its response to the independent variable
    - Usually plotted on the \_\_\_\_\_ (vertical axis)
  - We say we plot “\_\_\_\_\_” or “\_\_\_\_\_”
- Types of Plots I: Linear
  - In general, a line has form \_\_\_\_\_
    - Slope  $m$  can be positive or negative
  - If y-intercept,  $b = 0$ , plot is a \_\_\_\_\_ (directly proportional): \_\_\_\_\_
  - We draw “\_\_\_\_\_” line through data points (never connect-the-dots)
    - $m = \text{slope} =$
  - Units of slope can represent property or characteristic of data
    - e.g.
- Constructing Plots
  - Always plotted as “y vs. x” or “y as a function of x”
  - USE \_\_\_\_\_ (Use “scatter plot”)
    - Usually best to orient in “landscape” (wide) format
  - Take up \_\_\_\_\_
  - Find maximum value, and place as far along axis as possible, divisions in regular, round intervals
    - \_\_\_\_\_—linear relationship will be messed up
  - Label both axes with \_\_\_\_\_
  - All graphs have \_\_\_\_\_: “Density Plot of Unknown Metal”
  - If the plot is a “best fit line”, draw the line in which about half of the data points are above the line and about half are below
    - In Excel, add a Trendline, make it linear, and set the intercept = 0



- Using the volume and mass data at right, construct a plot of the mass vs. volume of the unknown metal, draw a best-fit straight line using (0,0), then use the slope to determine the density of the metal.

Unknown Metal Data	
Volume (mL)	Mass (g)
2.0	16.5
4.0	28.0
6.0	46.0
8.0	62.5
10.0	72.5



- To significant figures, slope = \_\_\_\_\_ . This is a unit of \_\_\_\_\_, so the \_\_\_\_\_ of the metal is 7.53 g/mL or 7.53 g/cm<sup>3</sup>.

- Types of Plots II: Inverse

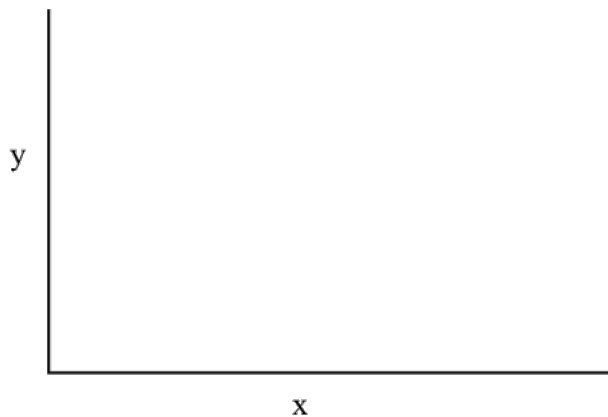
- As the value on one axis \_\_\_\_\_, the value on the other \_\_\_\_\_, or \_\_\_\_\_ (i.e. if one quantity doubles, the other is halved):

- \_\_\_\_\_
- We can rewrite this as  $xy = C$

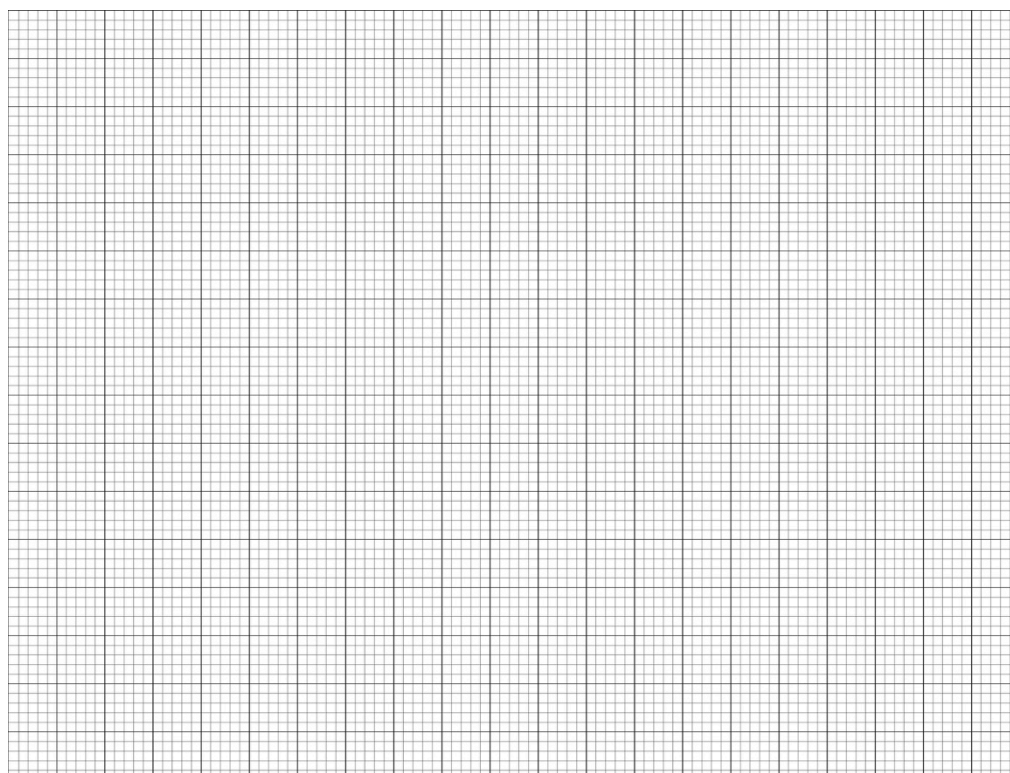
- data approaches axes but never quite reaches (asymptote).
- Draw “best fit” \_\_\_\_\_ through data points

- Can make linear by \_\_\_\_\_ ( \_\_\_\_\_ ) so \_\_\_\_\_, where C is the slope and the y-intercept is 0.

- According to Boyle’s Law, the volume of a gas decreases as the pressure increases:  $V \propto 1/P$  or  $PV = C$ . Plot the volume of gas in a piston (y-axis) vs. the pressure on the piston (x-axis), at right:



Piston Data	
Pressure (atm)	Volume (mL)
0.5	32.5
1.0	15.8
2.0	7.6
5.0	3.4
10.0	1.5



- To make the previous graph linear, calculate  $1/P$  (inverse pressure) for each point and plot Volume (y) vs. Inverse Pressure (x)

Piston Data		
Pressure (atm)	Volume (mL)	1/Pressure (1/atm)
0.5	32.5	
1.0	15.8	
2.0	7.6	
5.0	3.4	
10.0	1.5	

