Notes for Intro Notepacket

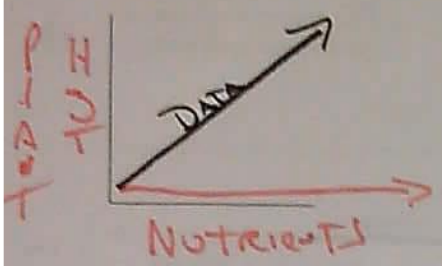
*The first variable written is the X

Fact(s) to memorize: 4 - 6

Graphical Relationships

A. Direct Relationship.

As one variable increases, the other Increases

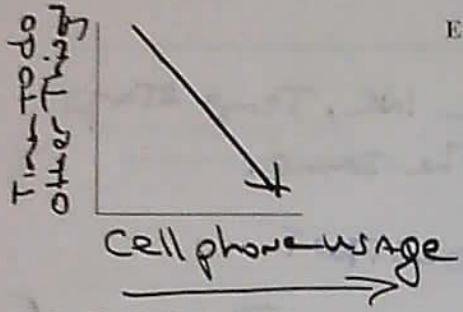


Examples:

The more NUTRIENTS added
The Taller the PLANTS will Grow

B. Inverse Relationship

As one variable increases, the other decreases

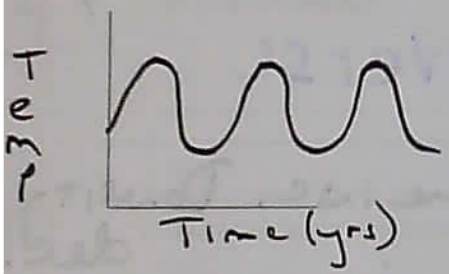


Examples:

Increase cell phone usage
Time to do other things decreases

C. Cyclic Relationship

As one variable increases, the other will INC & dec IN A predictable pattern



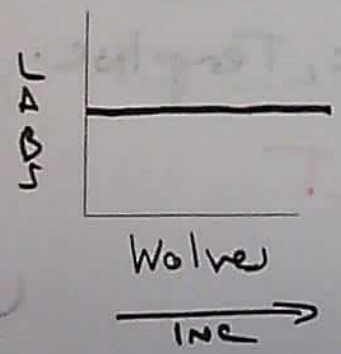
Examples: As the year INC. The Global Temp INC & dec.

*Events that are cyclic are also Predictable !

- COSTANT -

D. No relationship.

As one variable increases, the other Remain the same



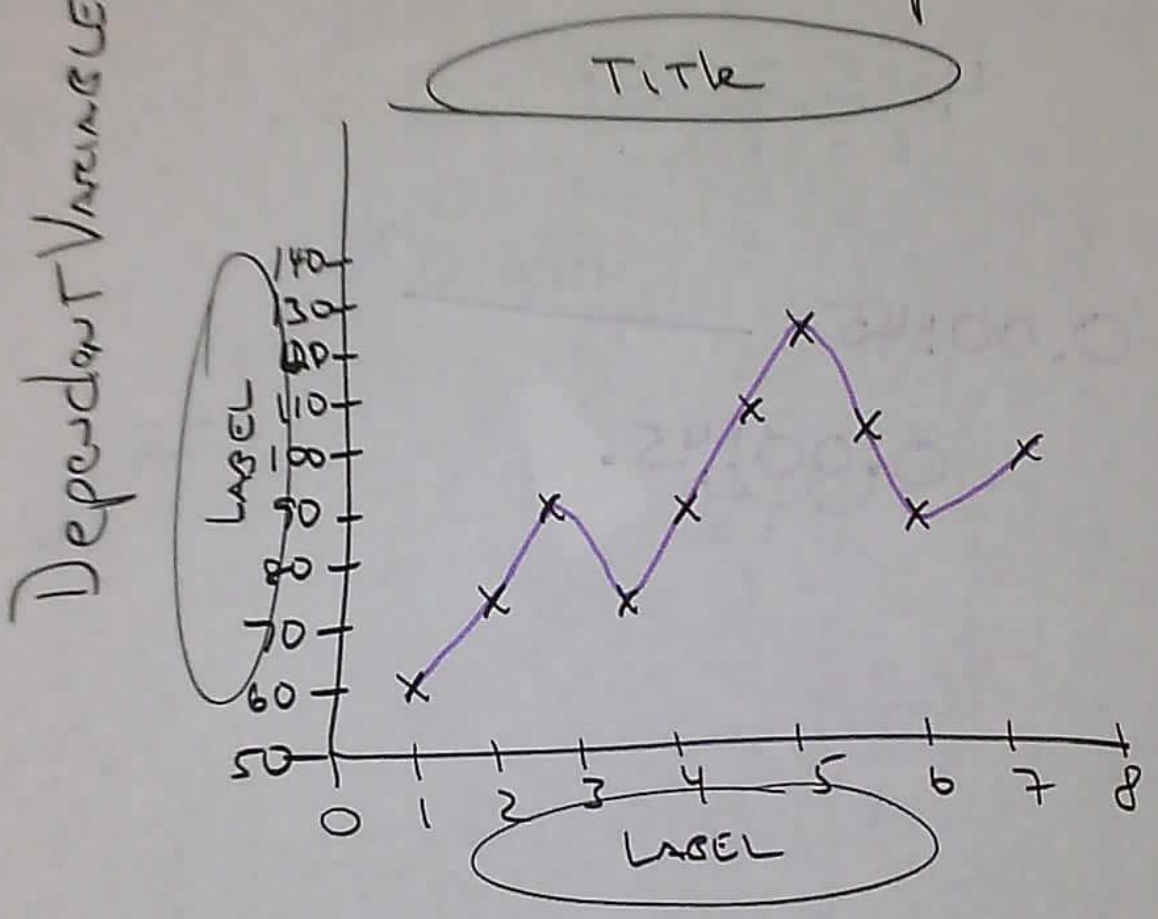
Examples:

As the number of wolves INCREASE
The number of LABS Remains the same

T A L E S

Title Axis Drawn Axis Labeled Even Spacing

How to Graph?



$445{,}000 = 4.45 \times 10^{5}$

$4.45000.$

5 4 3 2 1

$0.00145 = 1.45 \times 10^{-3}$

0.00145

1 2 3

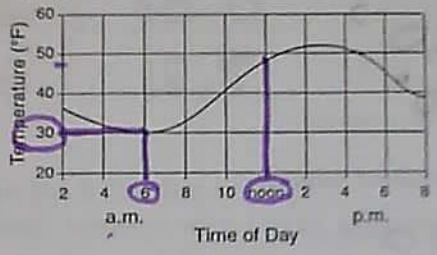
Rate of Change — change in value (variable) over time

Formula for Rate of Change — $ROC = \frac{\text{A in Value}}{\text{Time}}$

Graphs — visual rep. of data obtained in the experiment

1. The temperature of water in a container was 60°C. Ten minutes later, the water temperature was 35°C. What was the rate of cooling of the water?
   (1) 25 C°/min (2) 2.5 C°/min (3) 35 C°/min (4) 3.5 C°/min

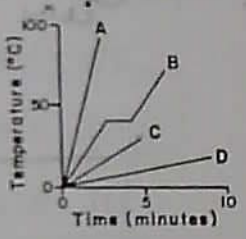
2. The graph below shows the temperature readings for a day in April.



The average rate of temperature change, in Fahrenheit degrees per hour, between 6 a.m. and noon was
(1) 6°/hr (3) 3°/hr
(2) 8°/hr (4) 18°/hr

18°C
18°C - 30°C
6hrs

Use the graph to the right to answer questions 3 and 4. The graph represents the relationships between temperature and time as heat is added at a constant rate to equal masses of four substances labeled A, B, C, and D.



3. The temperature of which substance increased the most rapidly? A

4. Which substance has a change that is not at a constant rate? B

5. Calculate the average daily rate of movement of the hurricane during the period from 3 p.m. August 24 to 3 p.m. August 28. The hurricane traveled 2,600 kilometers during this 4-day period.

$\frac{2,600}{4 \text{ Days}}$ 650 km/Day

Fact(s) to memorize: 7 & 8

Density of Matter

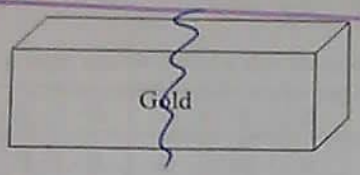
Density: Amount of mole. in a given space

Formula: $\text{Density} = \frac{\text{Mass}}{\text{Volume}}$

A. Density Proprieties:

- Heat & Pressure can change Density.
- ~~The same material will have the same Density~~ No matter the size.

Example:

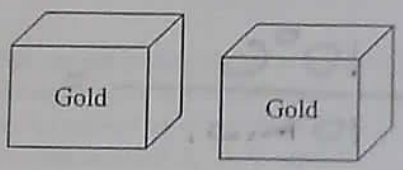


Mass = 162 g
Volume = 8.4 cm³

$\text{Density} = \frac{\text{mass}}{\text{volume}} = \frac{\text{g}}{\text{cm}^3}$

Density = 19.3 g/cm³

If you take that sample of gold and break it into two exact halves, the mass and volume is half of the original, but the density remains the same.



Mass = 81 g
Volume = 4.2 cm³

$\text{Density} = \frac{\text{mass}}{\text{volume}} = \frac{\text{g}}{\text{cm}^3}$

Density = 19.3 g/cm³

Practice questions:

1) If a wooden block were cut into eight identical pieces, the density of each piece compared to the density of the original block would be
(1) less (2) greater (3) the same

2) Under the same conditions of temperature and pressure, three different samples of the same uniform substance would have the same
(1) shape (2) density (3) mass (4) volume

Fact(s) to memorize: 8 - 16

B. Change in Density:

Two factors that do effect density are Heat and Pressure

1. Temperature As temperature increases, molecules begin to move a part (expand), which means the volume increases.

(a) Warm air Rises because it is Less dense.
An example would be a Hot Air balloon

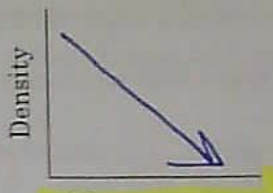
Less Dense Rise

More Dense Sinks

(b) State the relationship between temperature and density.

As Temp INC. Density decrease

(c) Draw the relationship between temperature and density in the graph below.



Phases of Matter:

(a) Most materials have their greatest density as a SOLID
The exception is water, because water expands when it freezes.

(b) Water is at its greatest density at a temperature of 4 °C
The density of water is 1 g/ml

(c) If an object floats on water, it is less dense than the water.
If an object sinks in water, it is more dense than the water.

2. Pressure: When pressure is added, it causes the material to become smaller (compress), volume decreases

(a) State the relationship between pressure and density.

As pressure INCREASE Density INCREASE

(b) Draw the relationship between pressure and density in the graph below.