Name _____   Teacher _____

Partner _____   Period _____

GRAPH   ANALYSIS   LAB   1

Introduction : Constructing and interpreting graphs are integral parts of any Earth Science course. This section presents a review of graphing with emphasis on the rate of change.

Objective : You will review graph construction and interpretation in this lab.

VOCABULARY :   Define the following terms prior starting this lab
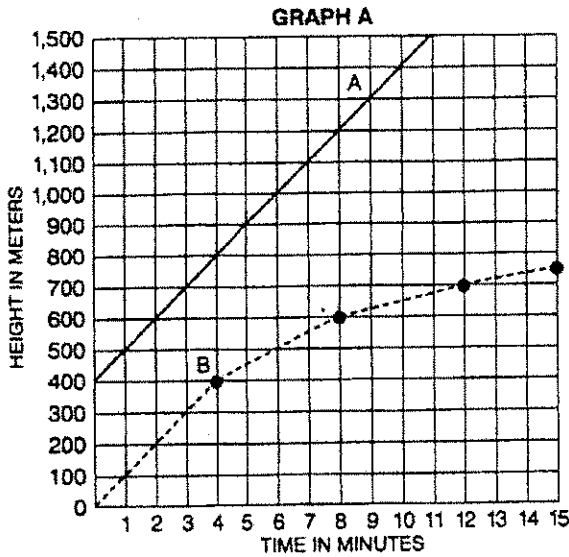
Rate of change :

Direct relationship :

Inverse (Indirect) relationship :

Dynamic Equilibrium :

PART A: Base your answers to the following questions on Graph A. It represents the flight of two weather balloons that were released from different locations.

GRAPH A

3. During the first four minutes (time 0 to time 4) how many meters did B rise?

_____

4. During the first four minutes, what was the rate of increase for the balloon represented by Line A?

_____

5. During the first four minutes, what was the rate of increase for the balloon represented by Line B?

_____

6. What was the rate of change along line A from time 4 minutes to time 8 minutes?

_____

7. What was the rate of change along line B from time 4 minutes to time 8 minutes?

_____

1. Was the altitude of the balloons increasing or decreasing as shown by lines A and B?

_____

8. Do lines A and B show a direct or an inverse relationship between altitude and time?

_____

2. During the first four minutes (time 0 to time 4) how many meters did A rise?

_____

PART B: A cup of hot water was left standing on a lab table. Temperature was measured and recorded at one-minute intervals. Plot the given data on Graph B. Be sure to completely label each axis. Answer the questions on the Report Sheet. Note: Time is in minutes and temperature is in degrees Celsius.

Time (min)	0	1	2	3	4	5	6	7	8
Temp °C	36.0	32.5	30.5	29.0	28.0	27.0	26.0	25.5	24.5

Time (min)	9	10	11	12	13	14	15
Temp °C	24.0	23.5	23.2	23.0	23.0	23.0	23.0

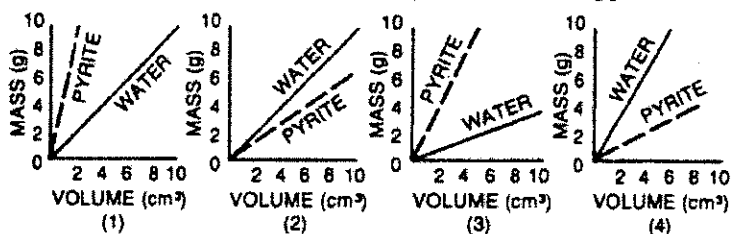### GRAPH B

TEMP. °C

TIME (MIN.)
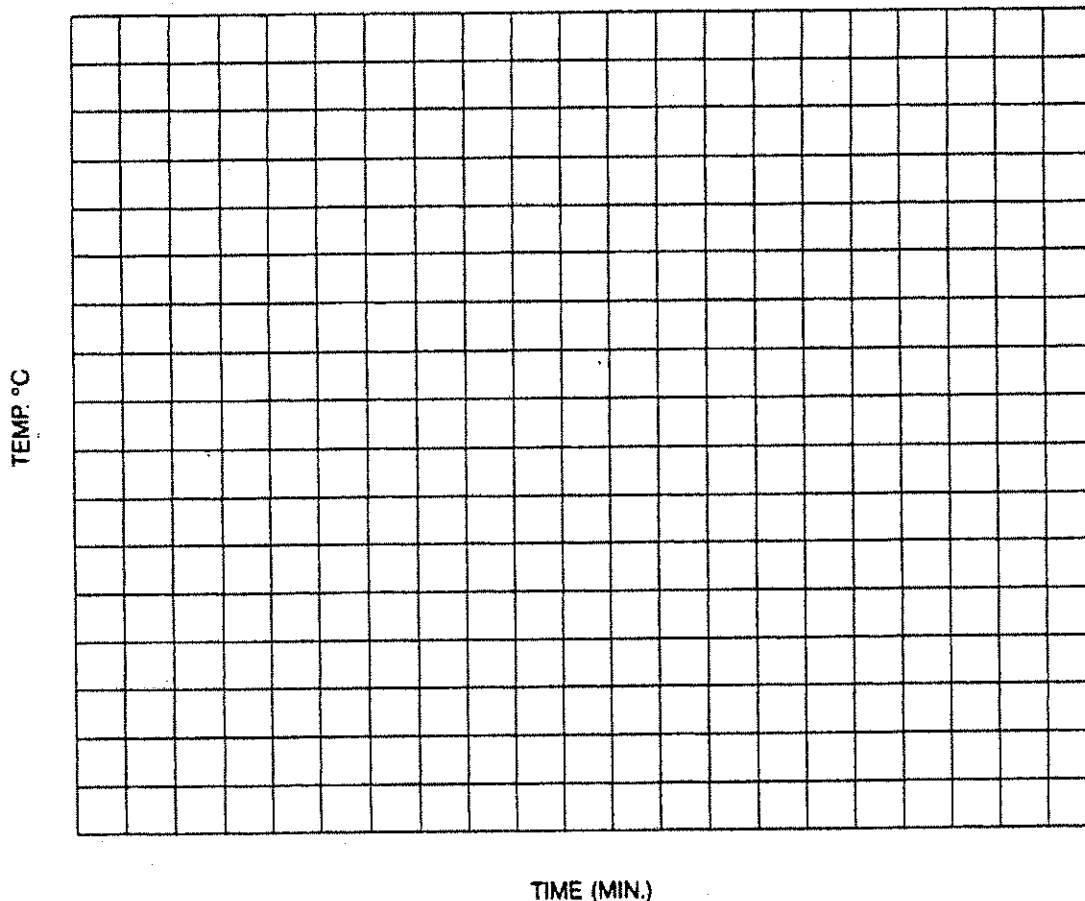
1. Did temperature increase or decrease with time?

2. Calculate the rate of temperature change from time 0 to time 4.

3. Calculate the rate of temperature change from time 4 to time 8.

4. Does the graph show a direct or inverse relationship?

5. Is temperature a dependent or independent variable?

PART C: Base your answers to the following questions on Graph C and your knowledge of density.
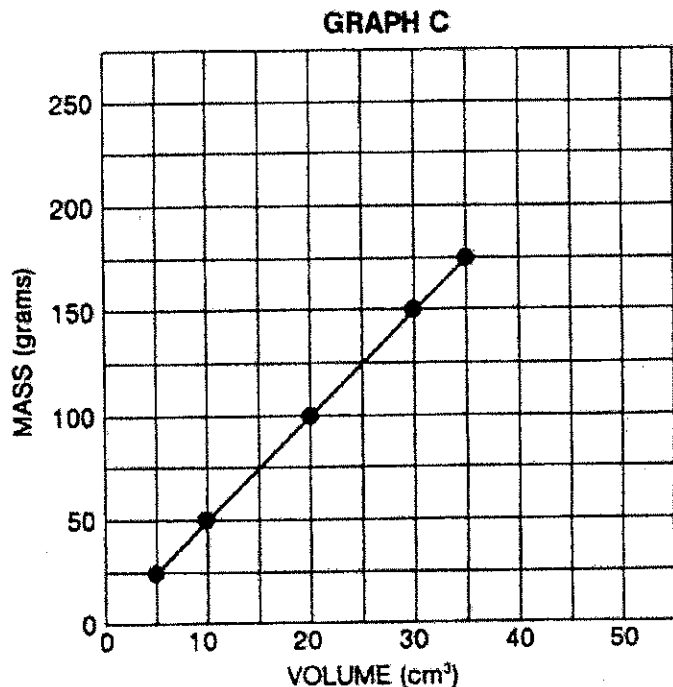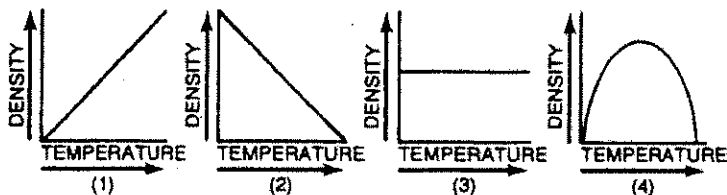
GRAPH C

The mass & volume for 5 samples of the mineral pyrite.

1. According to graph C, what is the density of pyrite? _____

2. If a sample of pyrite has a volume of 50 cm^3, what would be its mass? _____

3. The density of pyrite and the density of water (1.0 g/cm^3) were plotted on which diagram below best represents how the graph should appear? _____

4. A mineral expands (increasing its volume) when heated. Which graph best represents the relationship between change in density and change in temperature when that mineral is heated? _____

5. A student calculates the densities of five different pieces of aluminum, each having a different volume. Which graph best represents this relationship? _____
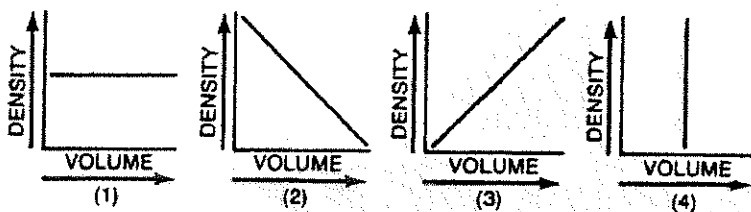
Discussion Questions:

1. In Part A, what happened to the rate of increase along line A from time 0 to time 8?

2. In Part A, what happened to the rate of increase along line B from time 0 to 8?

3. What general appearance does a graph line have if the dependent variable does not change with time?

Challenge questions:

1. Draw a graph showing an inverse relationship between two variables where the rate of change is increasing. Label each axis appropriately with "independent variable" and "dependent variable."

2. Draw a two-line graph in which line "A" shows a greater constant rate of change than line "B."

3. Explain why plotted data could never be depicted as a vertical line on a line graph.