

PROLOGUE

LAB P-3: GRAPH ANALYSIS

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:

rate of change:

direct relationship:

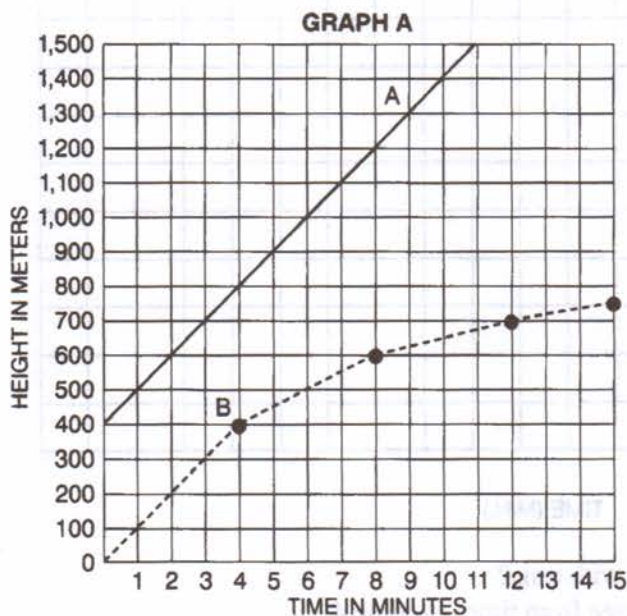
inverse relationship:

dynamic equilibrium:

PROCEDURE:

1. Answer the following questions and write your answers on the Report Sheet.
2. Be sure to label all answers whenever appropriate.

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. Answer the questions on the Report Sheet.



1. Was the altitude of the balloons increasing or decreasing as shown by lines A and B?
2. During the first four minutes (time 0 and time 4), how many meters did A rise?
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?
8. Do lines A and B show a direct or an inverse relationship between altitude and time?

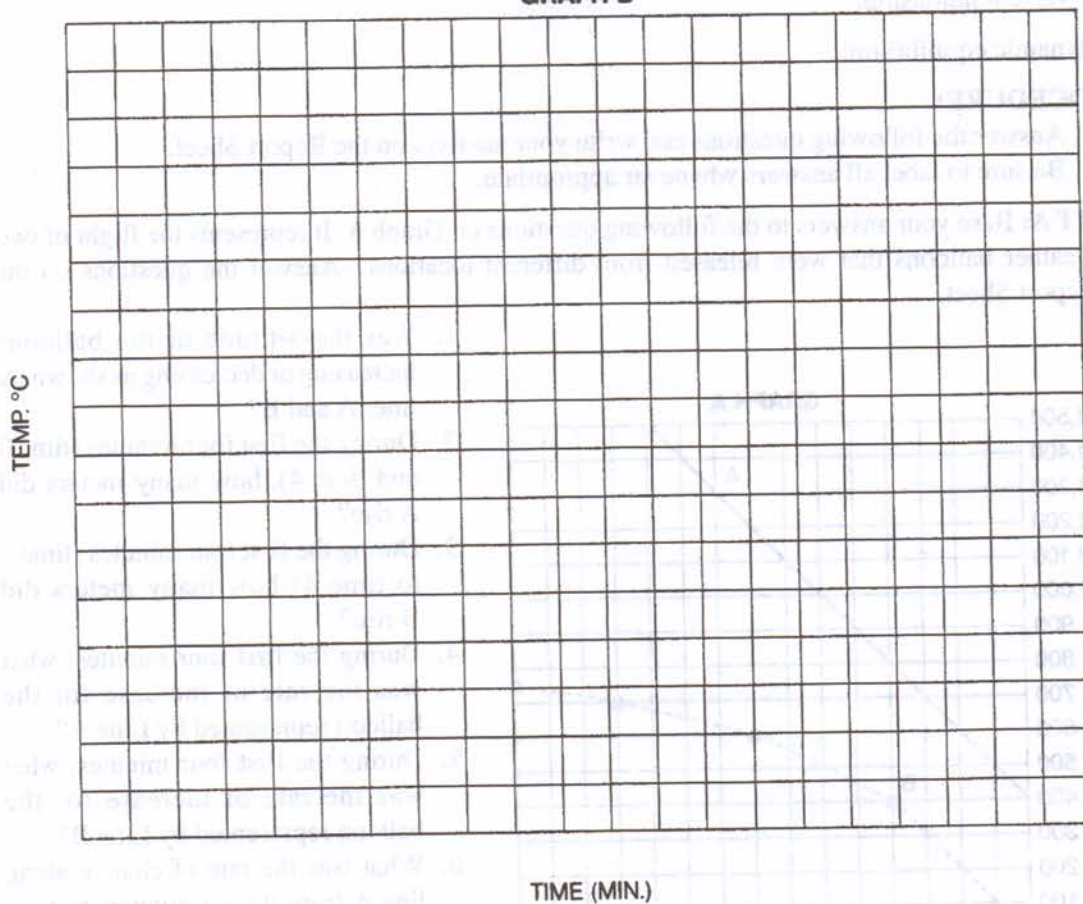
PART B: A cup of hot water was left standing on a lab table. Temperature was measured and recorded at one-minute intervals. Plot the given data on Graph B. Be sure to completely label each axis. Answer the questions on the Report Sheet.

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

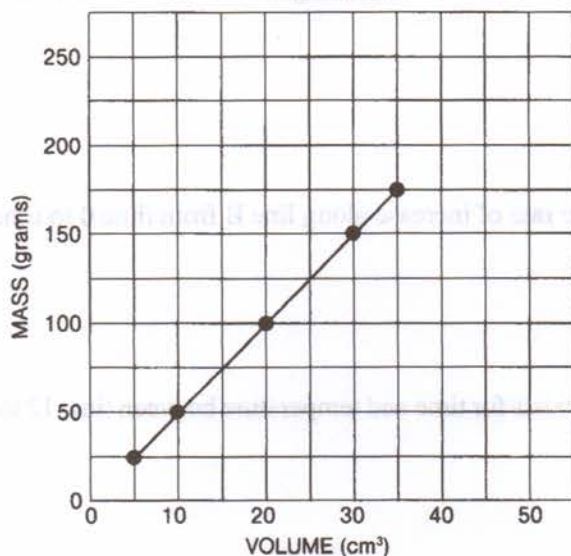
GRAPH B



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 this graph show a direct or inverse relationship?
5. Is time or temperature the independent variable?

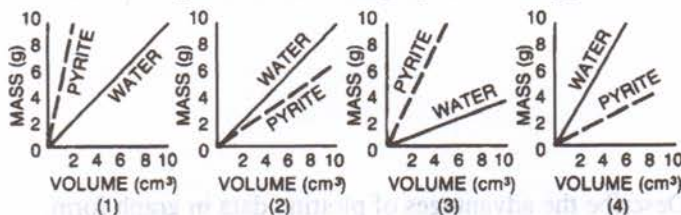
PART C: Base your answers to the following questions on Graph C and your knowledge of density. Place all answers in the spaces provided on the Report Sheet.

GRAPH C

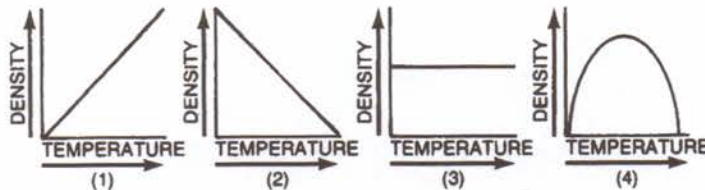


The mass & volume for 5 samples of the mineral pyrite.

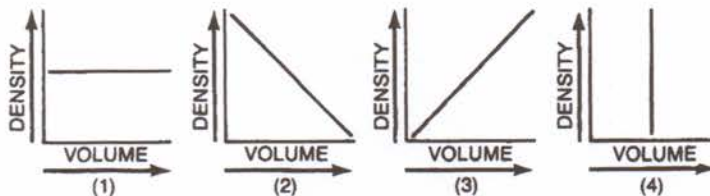
1. According to graph C, what is the density of pyrite?
2. If a sample of pyrite has a volume of 50 cm³, what would be its mass?
3. The density of pyrite and the density of water (1.0 g/cm³) were plotted on the same graph. Which diagram below best represents how the graph should appear?



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?

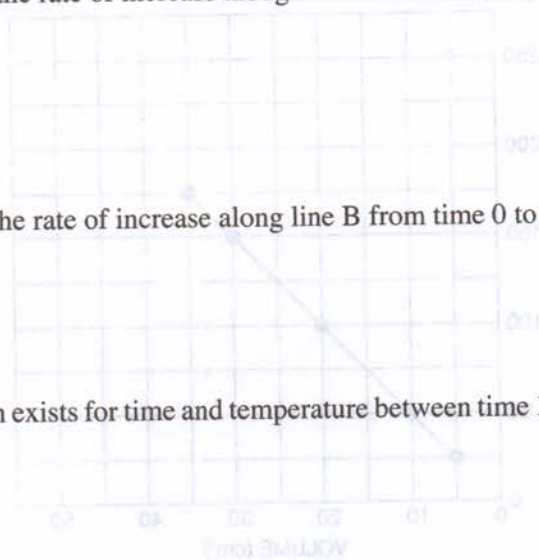


5. A student calculates the densities of five different pieces of aluminum, each having a different volume. Which graph best represents this relationship?



DISCUSSION QUESTIONS: (Answer in Complete Sentences)

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 time 8?

3. Describe the condition which exists for time and temperature between time 12 to 15 in Part B.

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



CONCLUSION: Describe the advantages of plotting data in graph form.



REPORT SHEET

PART A:

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

PART B:

1. _____

2. _____

3. _____

4. _____

5. _____

PART C:

1. _____

2. _____

3. _____

4. _____

5. _____