

NAME: \_\_\_\_\_ PERIOD: \_\_\_\_\_ DATE: \_\_\_\_\_

LAB PARTNERS: \_\_\_\_\_ LAB #2

## ANALYZING GRAPHS

### INTRODUCTION

Scientists study the ways in which different objects and phenomena in the universe are related to one another. They frequently plot graphs with the information they collect in order to understand it better. The characteristics of the graphs usually reveal much about the relationships. Graphs indicate whether the relationships are direct, inverse, constant, or cyclic.

**DIRECT:** As the measurements for one variable increase, so do the values for the other

**INVERSE:** As the measurement for one variable increase, those for the other decrease

**CONSTANT:** As the values for one variable change, those for the other stay the same

**CYCLIC:** A relationship which shows an orderly series of events that repeats at regular intervals

**DEPENDENT VARIABLE:** The data that you are measuring in your observations.

Usually placed on the vertical axis.

**INDEPENDENT VARIABLE:** The data that you know in advance such as the time.

Usually placed on the horizontal axis.

### **Standards:**

#### **HS. ESS2-2.**

Analyze geoscience data to make the claim that one change to Earth's surface can create feedbacks that cause changes to Earth's systems

### MATERIALS

Calculator

### PROCEDURE

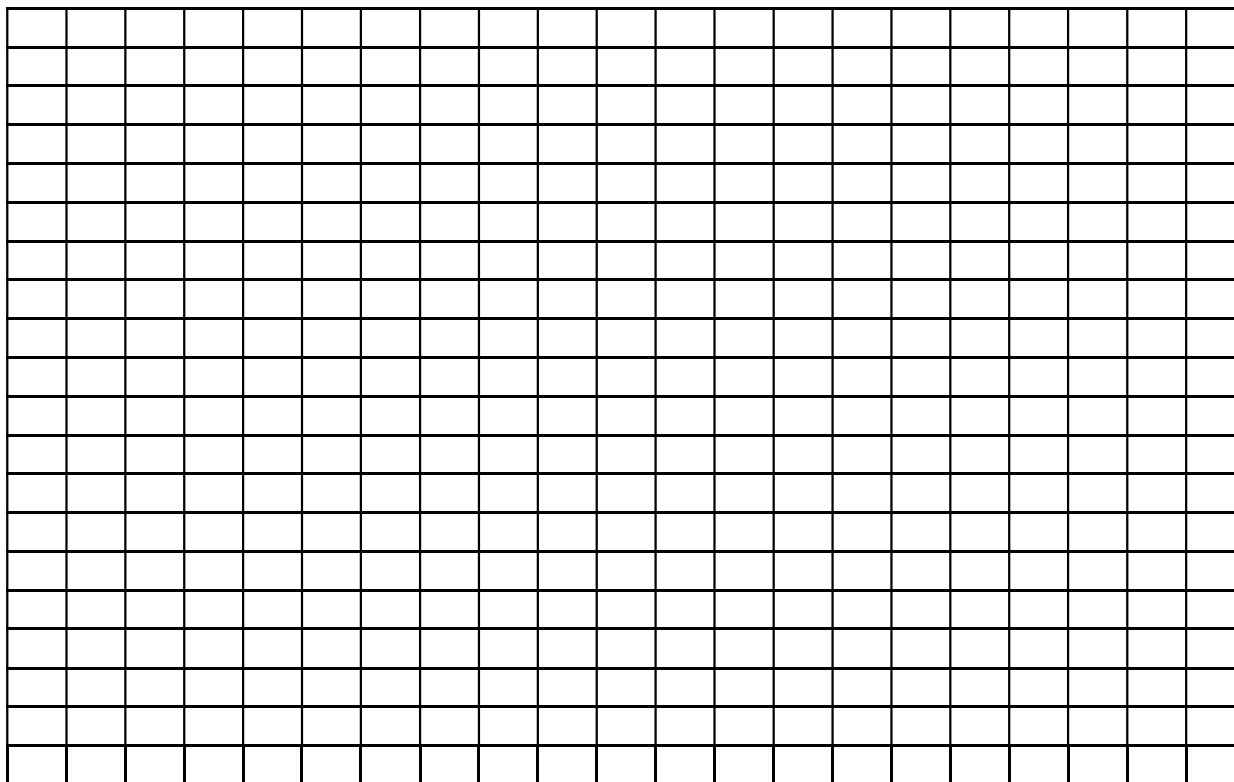
1. Graph the data listed for each of the six graphs on the following pages, after **correctly labeling (and/or numbering)** the X and Y axes.
2. Determine the type of relationship shown by each graph.
3. Complete pie graph 7 and 8
4. Refer to graph 9 and answer the corresponding questions.
5. Complete the lab summary questions.



While doing laboratory work on density, a group of students collected the following data on the mass and volume of various size samples of the mineral galena.

**MASS AND VOLUME OF GALENA SAMPLES**

MASS (grams)	5.0	9.2	14.8	18.3	23.6
VOLUME (mL)	25	46	74	91.5	118



Using a complete sentence **describe the relationship** between the mass and the volume of the galena samples.

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What **kind of relationship** is this and how does the graph show this relationship? \_\_\_\_\_

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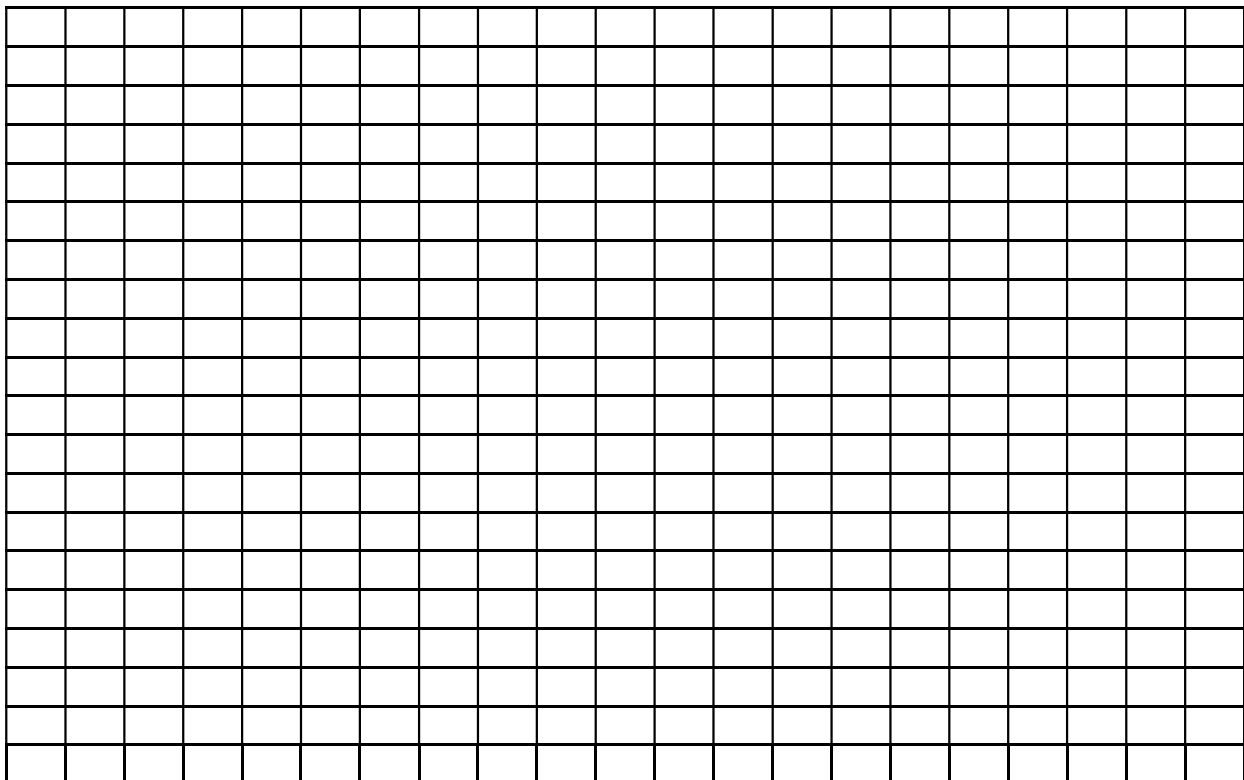
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## GRAPH 2

Samples of a rock material were placed in a container of water and shaken vigorously for 20 minutes. At 5-minute intervals, the contents of the container were strained through a sieve. The mass of the material remaining in the sieve was measured and recorded as shown in the data table below.

MASS OF MATERIAL REMAINING IN SIEVE

SHAKING TIME (min)	0	5	10	15	20
MASS REMAINING (grams)	25.0	17.5	12.5	7.5	5.0



Using a complete sentence **describe the relationship** between shaking time and the mass remaining for the rock material.

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What **kind of relationship** is this and how does the graph show this relationship? \_\_\_\_\_

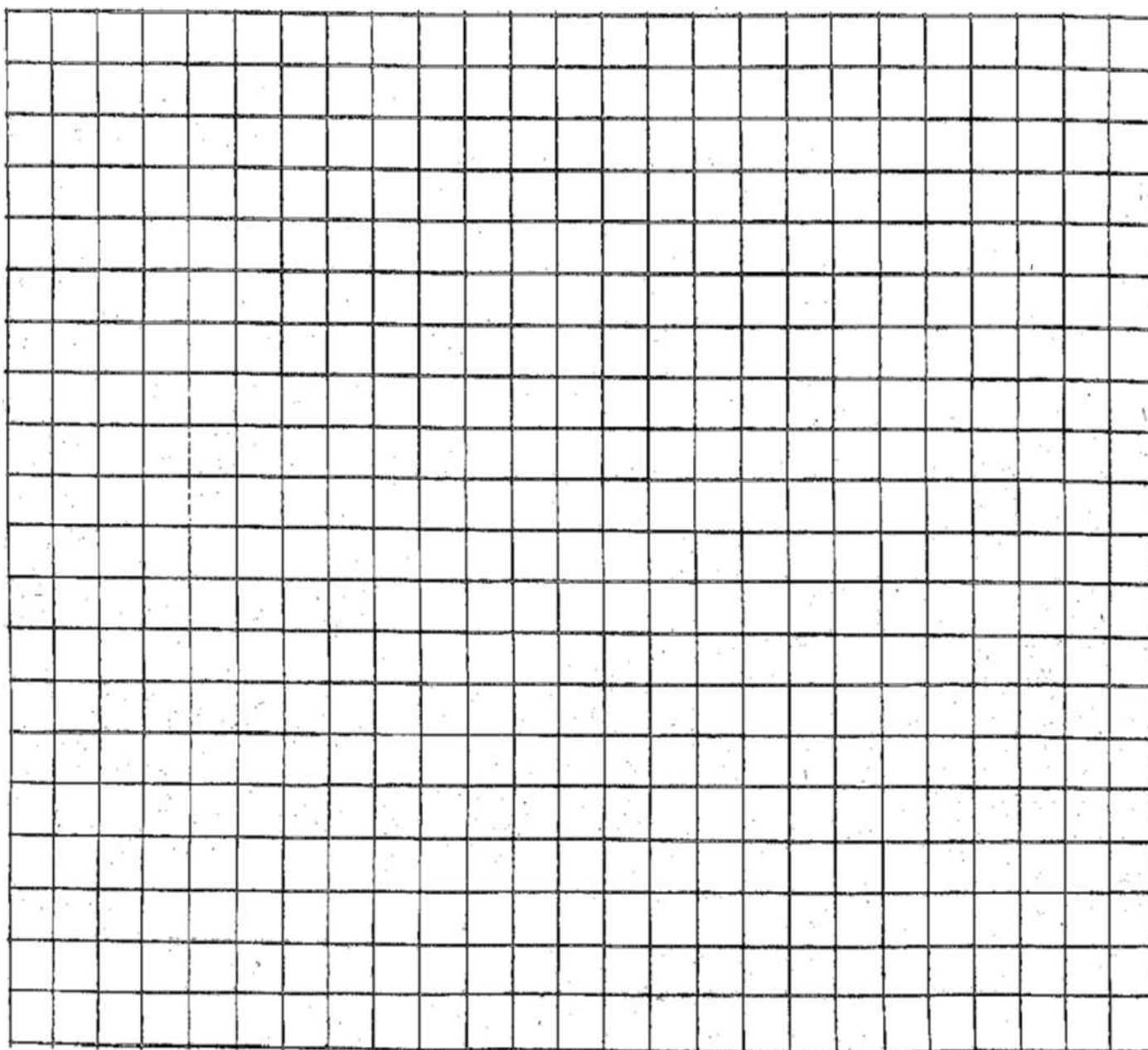
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### GRAPH 3

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.

Time (min)	0	1	2	3	4	5	6	7	8	9	10	11	12
Temp (°C)	55.0	51.5	48.2	44.1	41.5	39.6	37.0	35.0	33.1	30.8	28.5	26.9	25.7

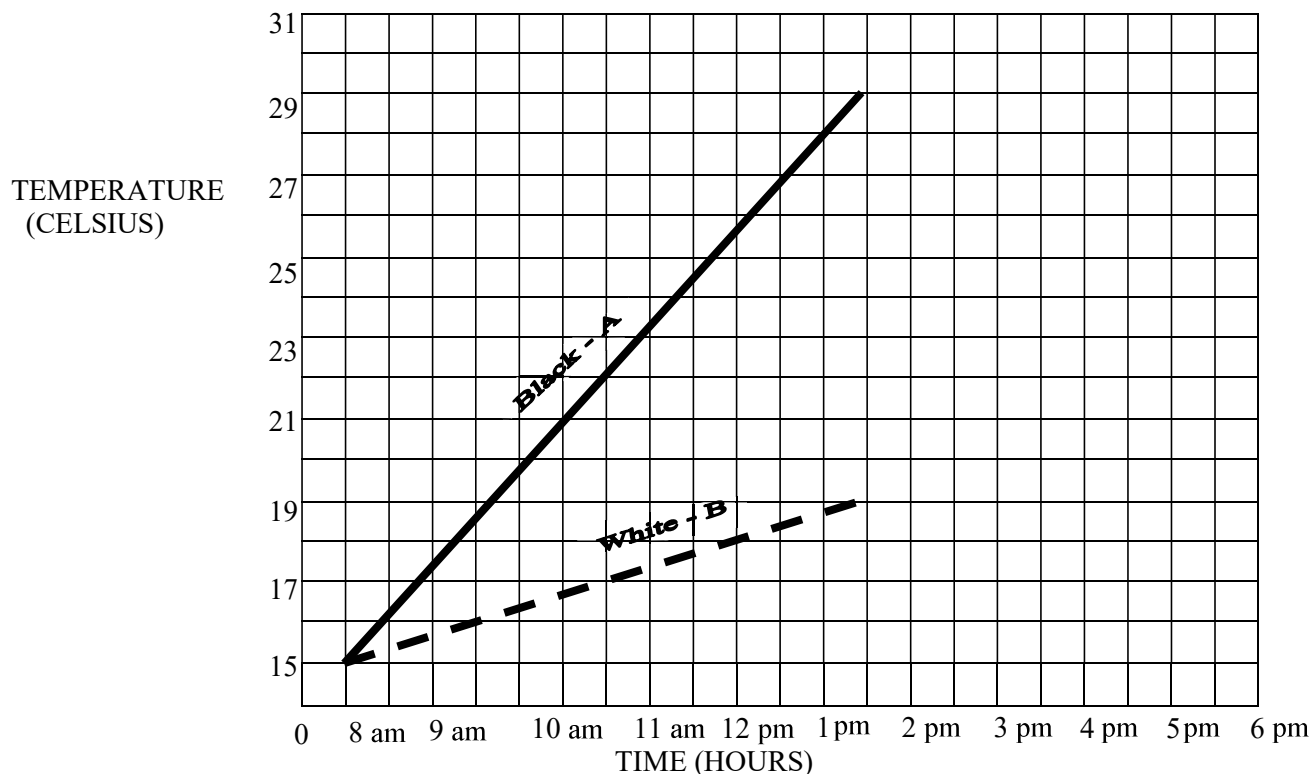
Time (min)	13	14	15	16	17	18	19	20	21	22	23	24	25
Temp (°C)	24.9	24.2	23.8	23.0	22.7	22.5	22.2	22.0	22.0	22.0	22.0	22.0	22.0



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 (indirect) relationship? \_\_\_\_\_

## GRAPH 4

THE FOLLOWING GRAPH SHOWS THE TEMPERATURE CHANGE INSIDE TWO PARKED CARS SITTING IN THE SUN. GRAPH A WAS FOR A CAR WITH A BLACK INTERIOR, AND GRAPH B FOR A CAR WITH A WHITE INTERIOR.



- 1) How many degrees did the temperature rise inside the car with the black interior? \_\_\_\_\_
- 2) How many degrees did the temperature rise inside the car with the white interior? \_\_\_\_\_
- 3) By looking at the graphs, which car showed the greatest RATE of temperature change? \_\_\_\_\_  
How did you tell? \_\_\_\_\_
- 4) For graph A, calculate the rate of change (in degrees per hour) in temperature from 11 am to 2 pm. (Show formula and work).
- 5) For graph B, calculate the rate of change (in degrees per hour) in temperature from 11 am to 2 pm. (Show formula and work).
- 6) Based on the graphs, predict (extrapolate) what the temperature would most likely be at:  
3 pm in the black car \_\_\_\_\_  
4 pm in the white car \_\_\_\_\_