NAME _____ *DATE* _____

INSTRUCTOR _____ *PERIOD* _____ *PARTNER* _____

UNIT 1: Earth's Dimensions

LAB 1-4: CONSTRUCTING A FIELD MAP

INTRODUCTION: A **field** is a region in which there is a definite physical property that can be measured at every point. There are many kinds of measurable field values that vary from place to place on or near Earth's surface. Among these measurable field values are atmospheric pressure, temperature and the elevation of Earth's surface with respect to sea level.

In Earth Science you will be concerned with many types of field maps. In this lab you will be introduced to these types of maps by using temperature data.

OBJECTIVE: You will measure and plot field values on a map. You will then learn to construct isolines and interpret the resulting field map.

VOCABULARY:

field:

isoline:

isotherm:

gradient:

PROCEDURE A:

For this procedure you will use the classroom map supplied by your instructor and the Report Sheet provided.

1. Calibrate your thermometer as instructed.
   *NOTE: Read all temperatures to the nearest $^1/_2$ degree.
2. FLOOR LEVEL READING: On signal, read the temperature of your station at floor level. Record this value in the appropriate location on your Report Sheet.
3. Repeat Procedure 2 measuring the temperature 1 meter above desk level at your station.
4. Obtain and record measurements for the other stations in the room as directed by your instructor.
5. For the level indicated by your instructor, plot the station temperatures on your room map.
6. Construct isotherms on your room map using 1 degree Celsius intervals.

PROCEDURE B:

For the following procedures use the room map with "Ideal" temperatures.

1. Construct isotherms using 1 degree Celsius intervals.
2. Locate and label an energy source and an energy sink.
   NOTE: An energy source is a region of high energy potential from which energy flows. An energy sink is a region of low energy potential towards which energy flows.
3. Draw an arrow which shows the direction energy flows between the source and the sink.
4. Calculate the temperature gradient between points A and B. Show all work and circle your answer. Be sure to label it properly.

5. Calculate the temperature gradient between points C and D. Show all work and circle your answer. Be sure to label it properly.

6. Answer the following questions placing your answers in the spaces provided.

   a) Is this a model of a static or dynamic field? _____

   b) Does this map represent two or three dimensions? _____

   c) What is the approximate temperature at point "X"? _____

   d) What is the name given to an isoline which connects points of equal temperature? _____

REPORT SHEET

Station Number	Floor Temp. (degrees C)	1 m Above Desk Temp. (degrees C)	Station Number	Floor Temp. (degrees C)	1 m Above Desk Temp. (degrees C)
1			16		
2			17		
3			18		
4			19		
5			20		
6			21		
7			22		
8			23		
9			24		
10			25		
11			26		
12			27		
13			28		
14			29		
15			30		

DISCUSSION QUESTIONS: *(Answer in Complete Sentences)*

1. Will the temperature field you measured and mapped have the same appearance tomorrow? EXPLAIN YOUR ANSWER.

2. Between which two letters on the "Ideal" map is the temperature change the greatest?

3. Between which two letters on the "Ideal" map is the temperature change the least?

4. As the temperature difference between two points increases, what happens to the spacing of the isotherms?

5. What factors may have caused the temperature variations in the classroom?

6. Other than the types of fields already mentioned in this lab, name at least two other scientific field quantities.

7. If a heat lamp were introduced into the room at Position B on the "Ideal" map, what changes would occur in the isotherm values?

CONCLUSION: Describe, step by step, how we can map the field of a variable quantity.