Name _____ Date_____

Activity: *Temperature Field Map*

Objective: The objective of this activity is to construct an isotherm map and use it to analyze temperature patterns in a room. You will learn to calculate gradient and construct a temperature profile.

Vocabulary:

Field
Isoline
Isotherm
Contour Interval
Gradient
Profile
Heat Source
Heat Sink

Materials: graph paper, centimeter ruler, pencil, and a red pen

Procedure:

The map shows temperatures (in degrees Celcius) that have been collected in a room. Connect all points of equal value. Use curved lines and make sure that they do not cross.

a) Identify the inferred position of the heat source by placing a red "X" on the map in the appropriate spot.

b) Analyze the map and identify the location of the steepest gradient. Draw a line connecting the highest isotherm to the lowest isotherm and measure it with the centimeter ruler. Use a conversion scale of 1 cm = 1 meter. Calculate the gradient. Show all work.

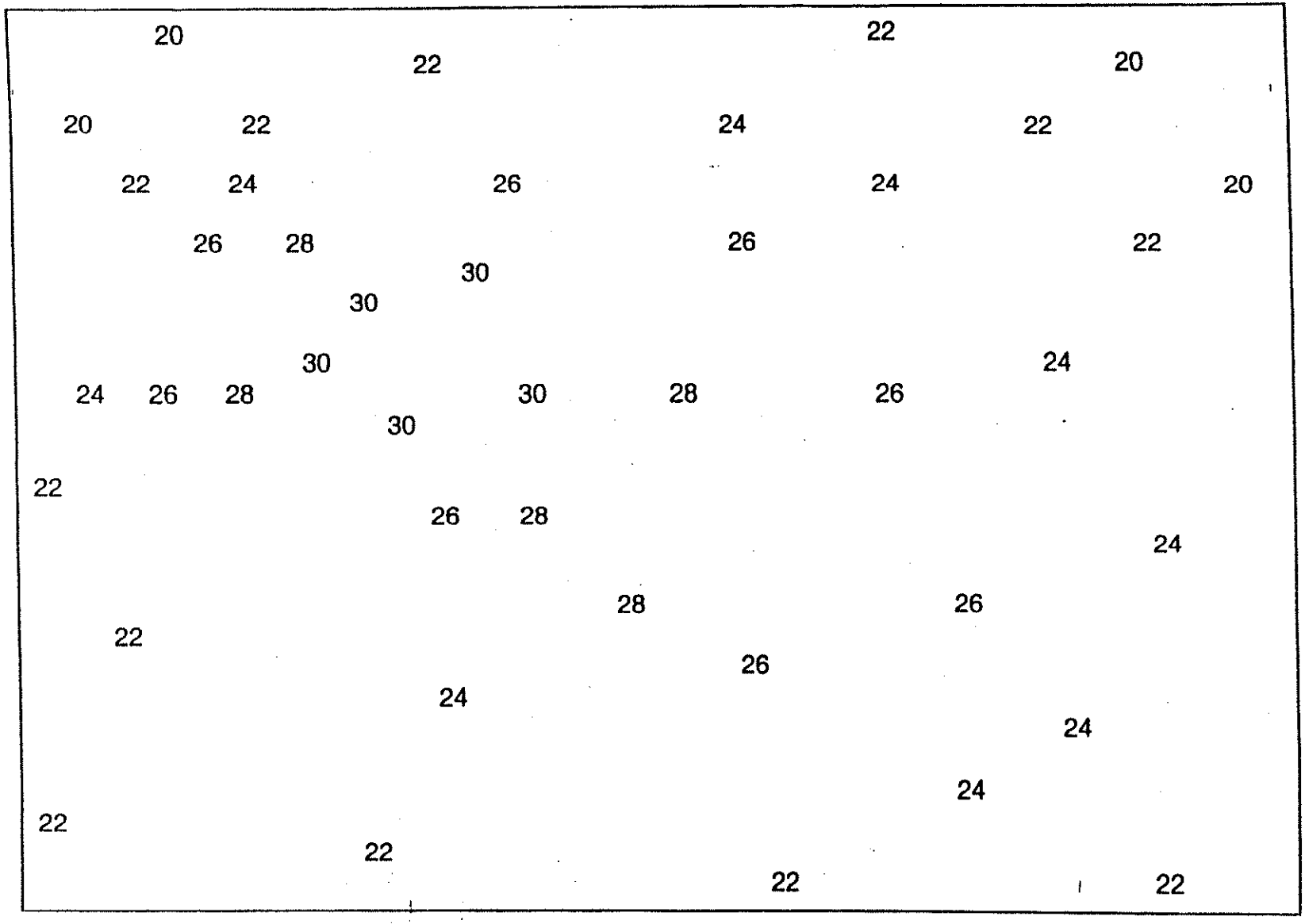
c) Analyze the map and identify the location of the lowest gradient. Draw a line connecting the highest isotherm to the lowest isotherm and measure this new distance with the centimeter ruler. Use the same conversion scale. Calculate the gradient. Show all work.

d) Draw a horizontal reference line from the left wall through the location of the inferred heat source all the way to the right wall. Using this line as a reference, construct a profile of this temperature field.

Contour Interval _____

Temperature Field Map

Scale: 1cm = 1meter



(3)

Gradient Calculations:

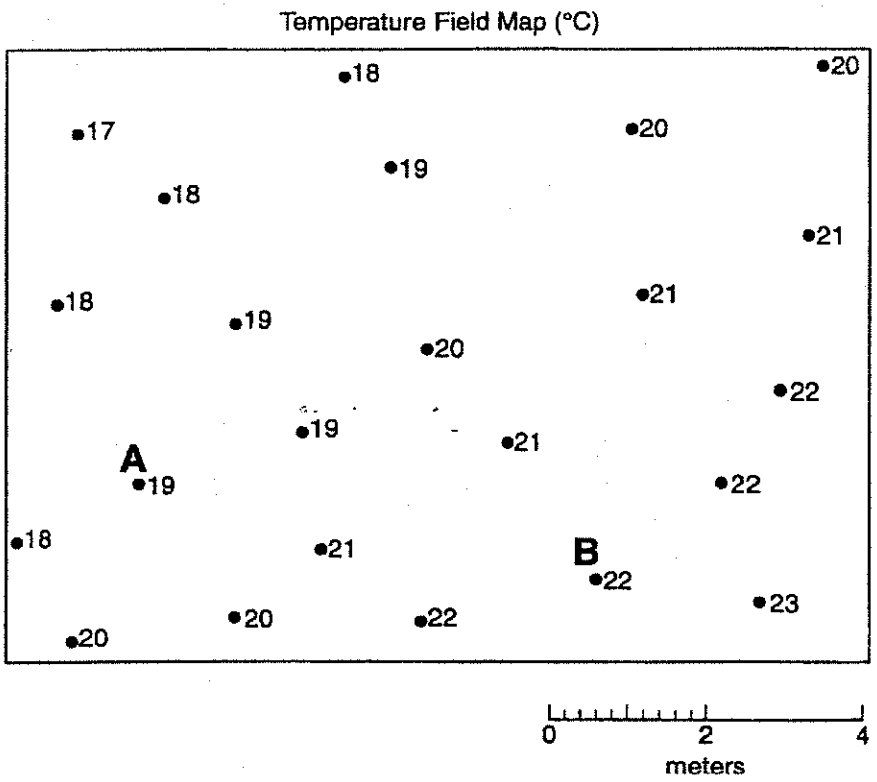
	Highest Gradient	**Lowest Gradient**
Difference in Temperature	_____	_____
Distance (in meters)	_____	_____

Gradient Formula: _____

Substitutions:

Calculated Gradient _____ _____
(include appropriate units)

Base your answers to questions 1 and 2 on the temperature field map below. The map shows temperature readings (°C) recorded by students in a science classroom. The readings were taken at the same time at floor level. Temperature readings for points *A* and *B* are labeled on the map.

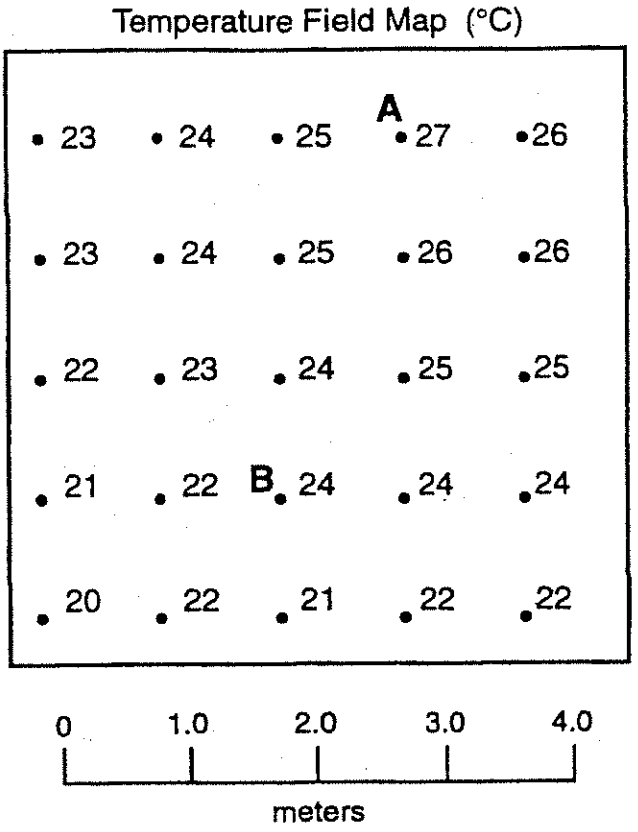


1 On the temperature field map, use solid lines to draw the 18°C, 20°C, and 22°C isotherms. Isotherms must extend to the boundary of the map. Label each isotherm to indicate its temperature.

2. Determine the temperature gradient from point *A* to point *B* by following the directions below.

a Write the equation used to determine the gradient.
b Substitute values from the field map into the equation.
c Solve the equation and label the answer with the proper units.

Base your answers to questions 3 and 4 on the temperature field map below. the map shows 25 measurements (in °C) that were made in a temperature field and recorded as shown. The dots represent the exact location of the measurements. *A* and *B* are locations within the field.



3. On the temperature field map above, draw threee isotherms: the 23 °C isotherm, the 24 °C isotherm, and the 25 °C isotherm.

4. Calculate the temperature gradient between locations A and B on the temperature field map, following the directions below.

a Write the equation for the gradient.
b Substitute data from the map into the equation.
c Calculate the gradient and label it with the

Discussion Questions:

1) Define Field – _____

_____

2) How is the heat source identified? _____

_____

3) What is the contour (isoline) interval for this map. How can you tell?

_____

_____

4) Are there temperature values between the lines (isotherms)? Explain.

_____

_____

5) Why can't isolines ever cross? _____

_____

6) How do isolines indicate differences in gradient? _____

_____

7) How is a profile constructed? Outline a procedure. _____

_____

_____

8) How does the profile help in interpreting field maps? _____

_____

Temperature Field Map lab—CHALLENGE QUESTIONS

The field map below shows temperature readings in Fahrenheit degrees for 41 cities. Draw isotherms at 5° intervals beginning with 25°. Be sure to label both ends of each isotherm. Then create a profile of the field from point A to B.