Name _____ **Earth Science**
Lab 7: Constructing a Field Map **Date _____**

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

Vocabulary:

Field

Scalar field

Vector field

Isoline

Isotherm

Gradient

Procedure A:

1. Construct isotherms on the "Ideal Temperature" map 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 toward which energy flows.)
3. Draw an arrow showing the direction energy flows between the source and the sink.
4. Calculate the temperature gradient between points A and B. Show all work and label your answer properly.

5. Calculate the temperature gradient between points C and D. Show all work and label your answer 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. Is temperature a scalar or vector quantity?

    c. Does this map represent two or three dimensions?

d. What is the approximate temperature at point "X"?

e. What is the name given to an isoline connecting points of equal temperature?

Procedure B:

1. Complete a temperature field map of the United States (attached).
2. Start with the 30 degree isotherm.
3. Use an interval of 10 degrees.

Discussion questions:

1. Will the temperature field map you created of the United States have the same appearance tomorrow? Explain.

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?

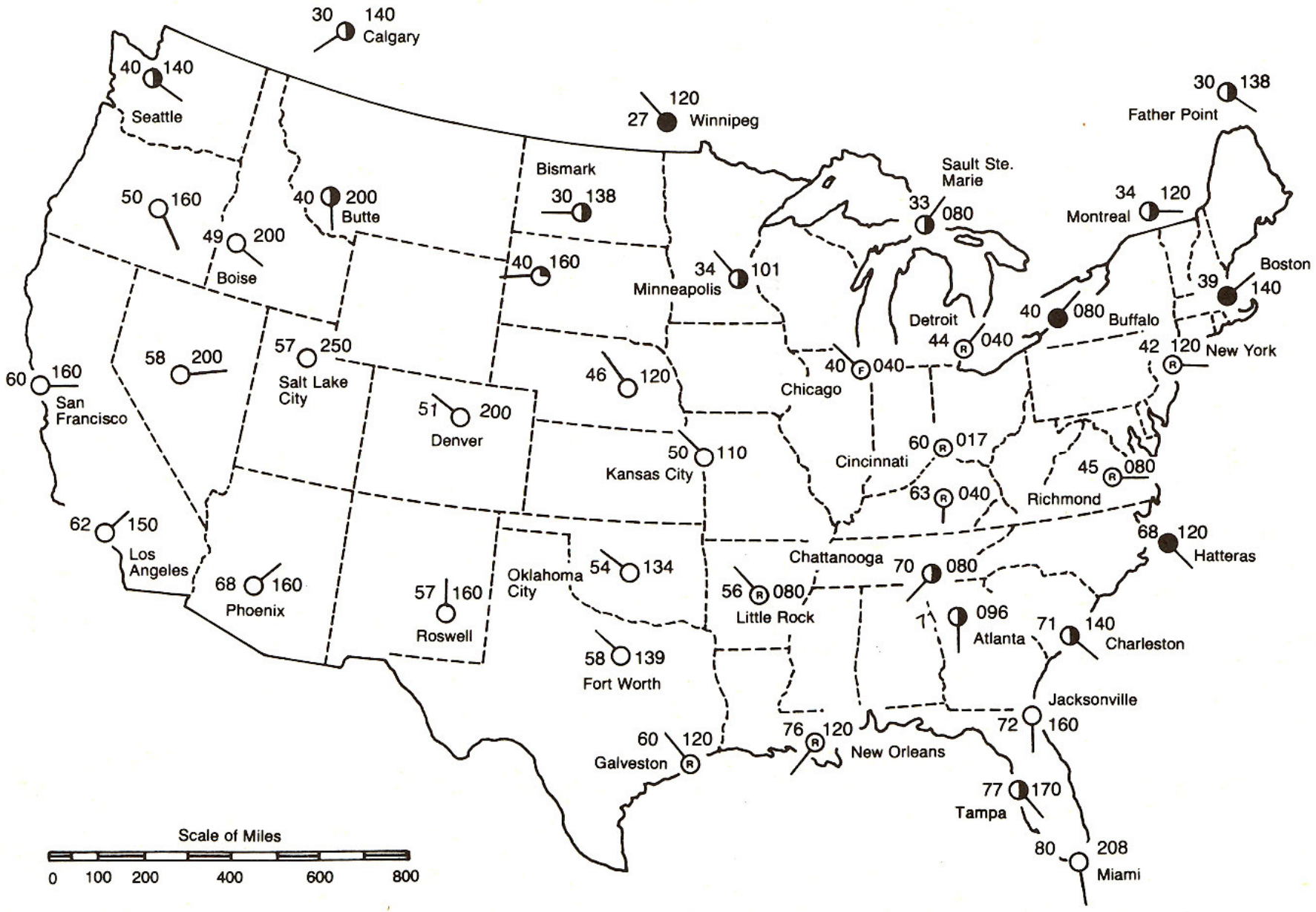
4. As the temperature difference between two points increases, what happens to the spacing of the isotherms?

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?

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