

Name \_\_\_\_\_ Period \_\_\_\_ Date \_\_\_\_\_ 02-14

## Basic Map Skills

### Objectives

In this exercise you will read a map to:

- Locate places in New York State and determine their coordinates and bedrock types
- Measure distances using a scale
- Analyze changes in latitude and longitude
- Infer the compass directions between two points
- Use directions and distances to locate specific sites

### Materials

Generalized Bedrock Geology of New York State (page 3 of E.S.R.T.)  
4"x6" card

### Background

Latitude – the number of degrees an observer is from the equator. *In the northern hemisphere, the altitude of Polaris is approximately equal to the local latitude.*

Degrees of latitude are a measurement of the angle of the observer's location to the equator. E.g., Manlius is at latitude 43°N. This means if one draws a straight line to the center of the earth from Manlius, and a straight line from the equator to the center of the earth, the angle the two lines form is 43 degrees. Since latitude lines form circles around the globe and never meet they are often referred to as *parallels*.

Longitude – The number of degrees an observer is east or west of the Prime Meridian. Meridian – an imaginary straight line that connects the north and south poles. Meridians are synonymous with longitude. When the Sun straddles the local meridian it is solar noon.

- Latitude is always written first, followed by longitude:  
43° N, 76° W
- Degrees of latitude or longitude are subdivided into minutes and seconds.  
One degree is equal to 60 minutes.  
One minute is equal to 60 seconds.

Thus, twenty three and one half degrees south of the equator is written as:  
23° 30'N.

### Test Yourself

Open an Earth Science Reference Table to page three. The map of *Generalized Bedrock Geology of New York State* plots the position of rock types, towns, lakes and large streams. Latitude and longitude are plotted along the margin of the map in 30 minute intervals (note the tick marks).

What is the age of the bedrock located at 43° N, 77° W? \_\_\_\_\_

Estimate the latitude and longitude of Slide Mountain \_\_\_\_\_

**Part II**

Each location below has two answer spaces. Estimate the latitude and longitude of each of these towns to the nearest minute using the *Generalized Bedrock Geology of New York State* map. Note this answer in the first space. In the second space note the type of rock (igneous, sedimentary or metamorphic) found at that locality.

e.g. **Niagara Falls**      43°05'N 79°00'W  
Sedimentary Rock

Buffalo \_\_\_\_\_

Massena \_\_\_\_\_

Syracuse \_\_\_\_\_

Binghamton \_\_\_\_\_

Jamestown \_\_\_\_\_

Plattsburgh \_\_\_\_\_

Oswego \_\_\_\_\_

Old Forge \_\_\_\_\_

**Part III Measuring Distances**

Measure distances using the bar scale located on the right side of the map. The top portion of the scale is in intervals of ten miles. The bottom portion of the bar scale is in intervals of ten kilometers.

Measure distances along a straight line in kilometers unless otherwise specified. A good method for doing this is to place a sheet of paper (or 4" x 6" card) on the map so that the edge of the paper makes a straight line between two desired points. Note on the straight edge tic marks for each location then compare this distance to the scale. *Always express answers in proper units.*

What is the distance in *kilometers* from Syracuse to:

Niagara Falls \_\_\_\_\_ Mt. Marcy \_\_\_\_\_

Slide Mt. \_\_\_\_\_ Albany \_\_\_\_\_

**Part IV – How to Measure Irregular Lines**

The Pennsylvania border begins at lake Erie (find it at approximately 42° 15'N, 79° 45'W). Measure the length of this border (in kilometers) from Lake Erie to where it meets the Delaware River east of Binghamton. Note the answer in the space provided:

\_\_\_\_\_

B) What is the length in kilometers of the Genesee River in NYS? \_\_\_\_\_

### Part V Changes in Longitudes

Longitude lines meet at the North Pole. As a consequence of this, longitude lines are not parallel to each other. To see this relationship use a straight edge and draw the meridians in for  $75^\circ$  and  $74^\circ$  W (from the Canadian border to New Jersey). Then answer the following questions.

A) Measure the distances between the following longitudes (in kilometer) found in Long Island (at  $40^\circ 30' N$ ):  
 $74^\circ W$  to  $73^\circ W$  \_\_\_\_\_

b) Measure the distances between the following longitudes (in kilometers) along the Canadian border (at  $45^\circ 00' N$ ):  
 $75^\circ W$  to  $74^\circ W$  \_\_\_\_\_

C) Using complete sentences, describe how the separation or distance between pairs of longitude changes as latitude increases?

D) What causes this change?

### Part VI Following Directions

The questions below ask you to determine the compass directions between cities. Here's an example:

*In what direction is Elmira from Jamestown?*

Answer: Elmira is east of

Jamestown.

All answers must be written in complete sentences using the eight basic compass directions (north, south, east, west, north east, southeast, southwest, northwest). The questions start out easy and become more involved!

1. In what direction is Oswego from Slide Mountain?
2. In what directions is Ithaca from Elmira?
3. In what direction is Rochester from Binghamton?
4. Imagine standing at the far eastern end of Long Island (Montauk). In which direction would you look to see the sun rise?
5. Start in Albany; go west to Syracuse; in which direction is Jamestown?
6. Start in Buffalo; travel 240 kilometers east; then go 45 miles south. Name the town and the river closest to this point.

