

NAME: _____ PERIOD: _____ DATE: _____

LAB PARTNERS: _____ LAB #5

LOCATING POSITIONS ON THE EARTH USING LATITUDE AND LONGITUDE

INTRODUCTION

To determine locations on the Earth's surface, you must have points of reference. A coordinate system, which is a system of imaginary lines, has been developed. The latitude-longitude coordinate system is the most commonly used system to locate places on the Earth's surface. Latitude is the angular distance north or south of the equator. Longitude is the angular distance east or west of the prime meridian. In this lab you will be using different views of the Earth's latitude-longitude system to locate and describe locations on Earth's surface.

MATERIALS

World map
Globe
Pencil with eraser

APPROXIMATE TIME 2 periods

OBJECTIVES

To determine positions on the earth using the coordinate system of latitude and longitude.

PROCEDURES:

1. Answer questions 1 and 2 in Part I.
2. Using the coordinates of latitude and longitude provided in Part II; plot these on the attached world map.
3. Find letters I-P on the world map and determine the latitude and longitude for each location.
4. In Part 4, find the cities listed and determine their latitude and longitude by using the world globe.
5. Answer lab questions in Parts 5, 6, and 7.

PART 1

1a. From what reference line on the earth is latitude measured? _____

1b. What is the latitude of this line? _____

2a. From what reference line on the earth is longitude measured? _____

2b. What is the longitude of this line? _____

2c. Through what city does this line pass? _____

PART 2

On the world map (page 36), place a letter at the following coordinates. Then use a highlighter or colored pencil to color over the letter.

A 10° N, 50° E

B 30° N, 10° E

C 40° S, 25° E

D 55° S, 100° E

E 60° N, 135° W

F 65° N, 120° W

G 70° S, 115° W

H 75° S, 75° W

PART 3

On the world map, find the following points and determine their latitude and longitude.

	LATITUDE	LONGITUDE
I		
J		
K		
L		
M		
N		
O		
P		

PART 4

Using a globe, determine the latitude and longitude of the following cities?

CITY	LATITUDE	LONGITUDE
San Francisco		
New York City		
Mexico City		
Paris		
Moscow		
Tokyo		
Sydney		
Cape Town		
Buenos Aires		
Baghdad		

PART 5

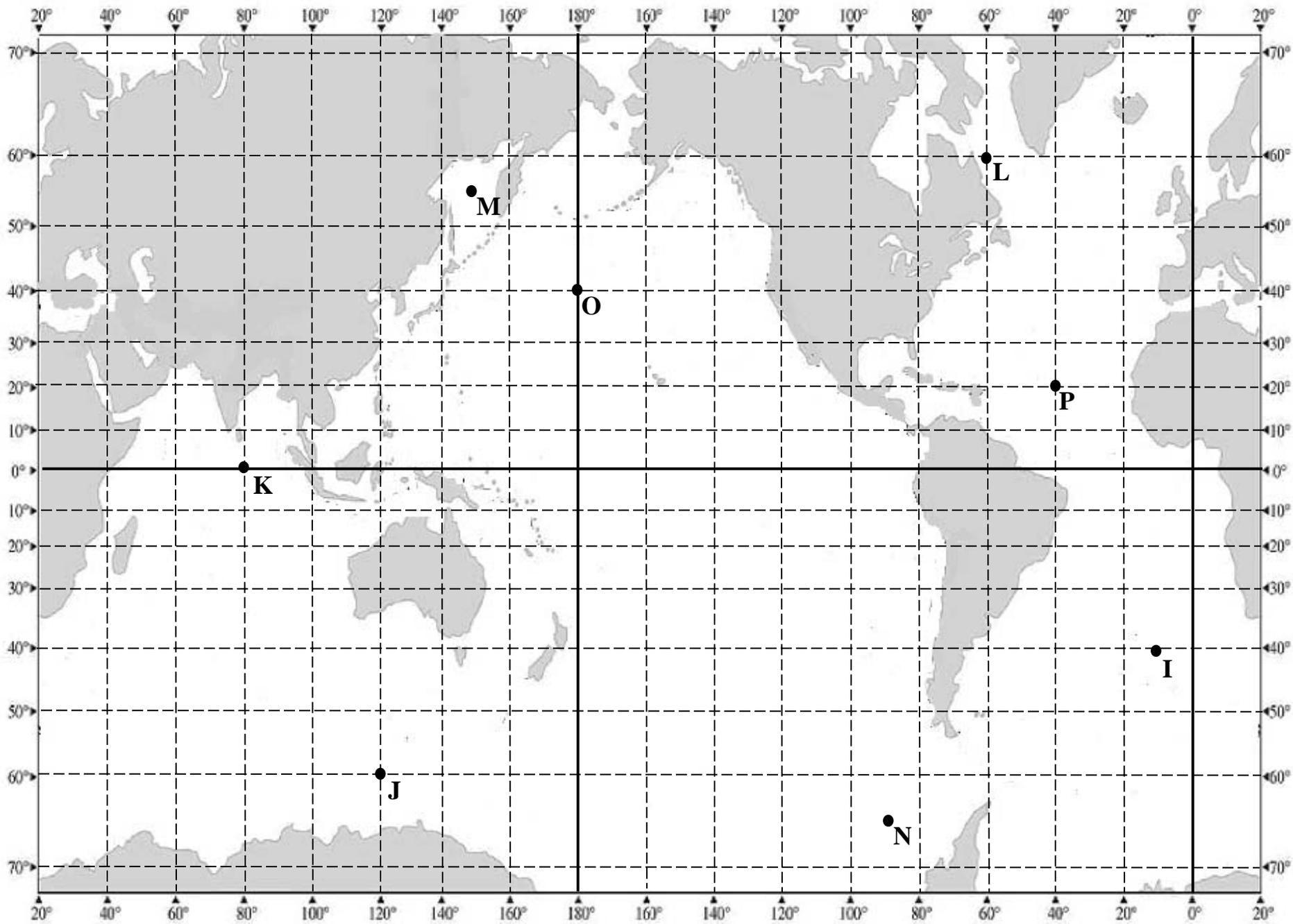
QUESTIONS

1. What is the latitude of the North Pole? _____
2. Explain why any two lines used to determine latitude never can touch each other.

3. You are on a boat which is crossing the Prime Meridian. The altitude of Polaris is 50° . Explain how you know the boat's location is 50° North latitude and 0° longitude.

4. Explain why the distance between two meridians at the North Pole is 0 miles.

5. What is the maximum number of degrees of longitude possible? _____



PART 6

PROBLEM SOLVING

(Answer these questions in complete sentences)

1. Is it possible for a city to be located at 115° S latitude and 25° W longitude? Explain.

2. What is located at the following coordinates?

40° South Latitude

80° East Longitude

3. What happens to the distance between longitude lines as one moves from the North Pole to the Equator? Explain.

4. Using your ESRT, what is the approximate latitude and longitude of your school?

5. There is an old phrase “Digging a hole through the Earth’s center would bring you out in China.” If you could drill a hole from Long Island straight through the Earth’s core, where would you in fact come out?

PART 7

LATITUDE/LONGITUDE IN NEW YORK STATE

Using the map on page 3 of your Earth Science Reference Tables entitled “Generalized Bedrock Geology of New York State,” answer the questions below.

1. What city is located at the following coordinates?

LATITUDE	LONGITUDE	LOCATION
40°45'N	74° W	
43°15'N	77°37'W	

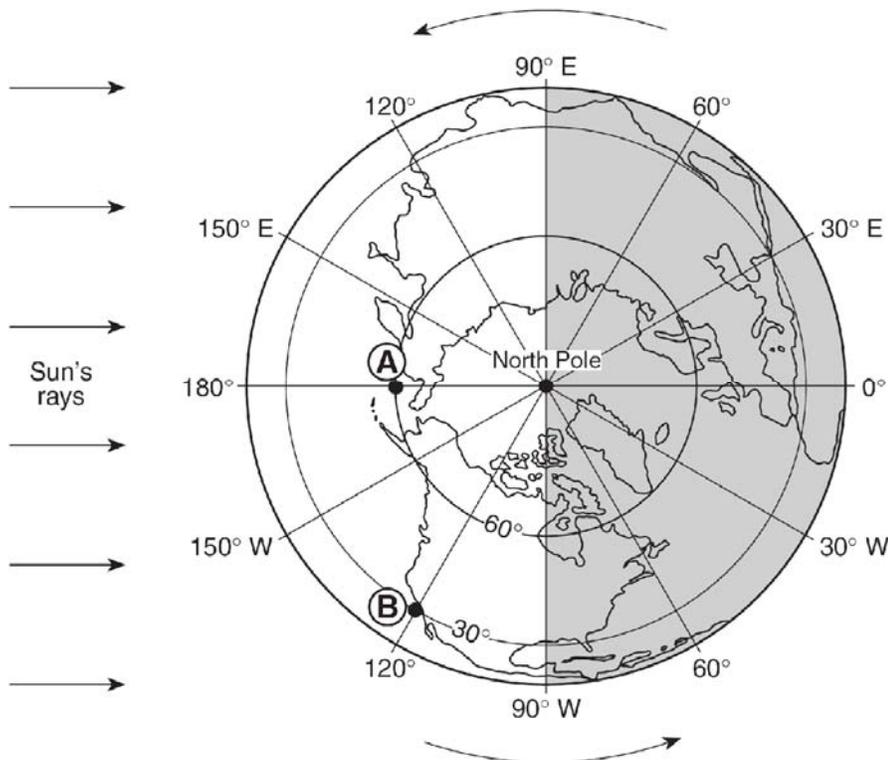
2. Give the latitude and longitude, to the nearest minute, of the following locations:

LOCATION	LATITUDE	LONGITUDE
ELMIRA		
MASSENA		

PART 8

Views of the Earth's northern or southern hemisphere can be represented by showing a polar view of the Earth's latitude and longitude system. In this type of map, for the northern hemisphere, the North Pole is in the center of the map representing a latitude of 90° N. The rest of the latitude lines are drawn as circles. Longitude lines are shown drawn from the pole to the outside of the map. Use the map on the next page to learn to interpret plotted points as well as plot points using a polar version of the latitude-longitude system.

LATITUDE/LONGITUDE POLAR VIEW



Using the map above, answer the questions below:

1. What is the latitude and longitude of point A?

2. What is the latitude and longitude of point B?

3. Plot point C using the following coordinates: 45° N 30° E

4. Plot point D using the following coordinates: 75° N 120° W

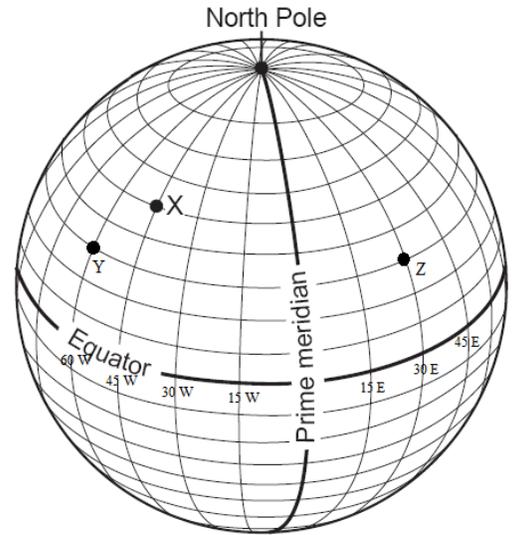
5. Which of the two lettered points have same solar time? Explain.

PART 9

TELLING TIME ON EARTH

Use the diagram to the right to answer questions 1 through 5.

1. What is the rate of the Earth's rotation? _____
2. For every 15° of longitude time changes by _____ hour(s).
3. In this diagram of the Earth longitude lines are _____ degrees apart.
4. If it is 3 PM at point X, what time is it at point Y? _____
Point Z? _____
5. If it is 4 AM at point Z what time is it at point X? _____



Use the diagram below to answer questions 6 through 9.

6. In this diagram of the Earth longitude lines are _____ degrees apart.
7. If it is 9 AM at Point D, what time is it at Point C? _____ Point E? _____
8. Which two lettered locations have the same time?

Explain:

9. Explain why the time zones are 15° of longitude apart.

