

Latitude and Longitude

AGE LEVEL

Grades 6-9

TIME ALLOWANCE

Approximately 2 hours 45 minutes

OBJECTIVES

1. Students learn how to find latitude and longitude on a map or atlas
2. Students work in groups to create maps with the cruise route. These maps will give students practice at plotting locations given latitude and longitude coordinates, and at the same time provide maps for the classroom to reference throughout the cruise.

MATERIALS

- Latitude / Longitude handout
- Poster board
- Markers
- Atlases or maps for reference

INSTRUCTION:

1. 45 minutes. Lecture. Draw on the board two globes- one showing latitude, one showing longitude. Discuss Time Zones, Hemispheres, Prime Meridian, Equator, Arctic Circle, Antarctic Circle, Tropic of Cancer, and Tropic of Capricorn. Students copy into notes.
2. 30 minutes. Game! Everyone gets an atlas. Divide the class into teams. Ask each team to find the latitude or longitude of a certain place, or provide them with coordinates and see who can find the city at that location first.
3. 45 minutes (or homework assignment). Each student complete the Latitude / Longitude worksheet (attached).
4. 45 minutes. Student groups (4 per group) use an atlas and poster board to draw a map of the world. They must plot each cruise waypoint referenced in the Cruise Plan (excerpt attached). Save these maps so that additional

Latitude and Longitude

information can be plotted on each one later on (temperatures, notes from teacher while at sea, surface currents, etc.)

EVALUATION / ASSESSMENT

Game! (see above)
Homework assignment (attached).
Cruise route maps

EXTRA CREDIT

What is the significance of 23.5 degrees latitude (north and south)?

NAME: _____

LATITUDE AND LONGITUDE

Using your atlas, find the latitude and longitude of each of the following cities.

CITY	COUNTRY/STATE	LONGITUDE	LATITUDE
New York	New York		
Philadelphia	Pennsylvania		
Chicago	Illinois		
San Francisco	California		
Boston	Massachusetts		
London	England		
Paris	France		
Berlin	Germany		
Rome	Italy		
Tokyo	Japan		
Rio de Janeiro	Brazil		
Anchorage	Alaska		
Bombay	India		
Perth	Australia		

QUESTIONS:

1. Which of the cities is farthest north?
2. Which of the cities is farthest south?
3. Which of the cities is farthest east?
4. Which of the cities is farthest west?
5. How many miles are there in each degree of latitude?
6. What distance is represented by one minute of latitude (60 minutes for each degree)?
5. What distance is represented by one second of latitude (60 seconds for each minute)?
6. By using your answer to question 5, determine the circumference of the earth.

Give the name of the largest city in the vicinity of the following latitudes and longitudes. Also give the name of the country in which each of the cities are located.

LATITUDE. & LONGITUDE.	CITY	COUNTRY
50N 123W		
34N 118W		
26N 80W		
19N 96 W		
1S 48W		
26 S 58W		
37S 175E		
38N 128E		
17N 3W		
30N 32E		
40N 33W		
51N 4E		

Find the missing component of information.

Place	Latitude	Longitude
Vancouver, Canada		
	40N	75W
	52N	0
Rome, Italy		
Bombay, India		
Cape Town, South Africa		
	38N	151E
	62N	150W
Moscow, Russia		

(excerpt from the EPIC 2001 Operation Plan, dated 7/15/01)

2.3 Cruise Way Points:

LEG 1

<u>Way Point</u>	<u>Lat.</u>	<u>Long.</u>	<u>Naut. Miles</u>	<u>Ave. Sp</u>	<u>Hrs</u>	<u>ArrDep</u>		<u>Comments</u>
						<u>Date</u>	<u>Date</u>	
1	32.7 N	117.2 W	-	0.0	-	9/3	9/6	San Diego
2	20.0 N	110.0 W	862	13.0	66.0	9/8/8		
3	12.0 N	95.0 W	1005	13.0	77.0	9/11	-	
4	12.0 N	95.0 W	--	0.0	7.0	-	9/11	Repair buoy
5	10.0 N	95.0 W	120	13.0	9.0	9/12	9/12	
6	8.0 N	95.0 W	120	13.0	9.0	9/12	-	
7	8.0 N	95.0 W	--	0.0	7.0	-	9/13	Repair Buoy
8	10.0 N	95.0 W	120	13.0	9.0	9/13	-	Repair Buoy
9	10.0 N	95.0 W	--	0.0	480.0	-	10/3	ITCZ ops
10	0.0 N	95.0 W	600	9.8	61.0	10/5	10/5	CTD section
11	0.5 S	91.5 W	212	13.0	16.0	10/6	10/9	Galapagos Is.

LEG 2

<u>Way Point</u>	<u>Lat.</u>	<u>Long.</u>	<u>Naut. Miles</u>	<u>Ave. Sp</u>	<u>Hrs</u>	<u>ArrDep</u>		<u>Comments</u>
						<u>Date</u>	<u>Date</u>	
1	0.5 S	91.5 W	-	--	70.0	10/6	10/9	Galapagos Is.
2	2.0 S	95.0 W	228	13.0	18.0	10/10	10/10	
3	8.0 S	95.0 W	360	9.8	37.0	10/11	10/11	CTD section
4	20.0 S	85.0 W	932	9.8	95.0	10/15	--	CTD section
5	20.0 S	85.0 W	-	0.0	144.0	--	10/21	IMET
							mooring	
6	20.0 S	72.0 W	756	9.8	77.0	10/24	10/24	CTD section
7	20.5 S	70.3 W	102	13.0	8.0	10/25	-	Arica, Chile