"Where's the Math?" at the Earth and Moon Viewer website
Learner Activity Page

Note: It is helpful to understand the 24 hour clock (also known as military time) in order to complete these activities. There is an excellent explanation of the 24 hour clock at this great website, Time Flies: http://www.planemath.com/activities/timeflies/time1.html

A. Using latitude and longitude to view your city on the Earth and Moon Viewer:

You will need to know the latitude and longitude coordinates for the city nearest you. If you don't know these coordinates, use this form from the U.S. Census Bureau Tiger Gazetteer: http://www.census.gov/cgi-bin/gazetteer . The information will appear under "location". For example,

Corvallis, OR (city)
Population (1990): 44757
Location: 44.57100 N (Latitude; round to 44.6N)
123.27603 W (Longitude; round to 123.3W)

Your city/state:_____

Latitude (round_to the nearest tenth)_____

Longitude: (round to the nearest tenth)_____

1) Plot the approximate coordinates of your city on a map of the world. You may be able to find a map at the CIA World Factbook website
http://www.odci.gov/cia/publications/factbook/docs/ref.html
or at the Xerox PARC Map Viewer: http://mapweb.parc.xerox.com/map

2) Go to the Earth and Moon Viewer: http://www.fourmilab.ch/earthview
Scroll down to the bottom of the screen, and you will see a form for entering your city's latitude and longitude coordinates. After you enter these coordinates, you go to a view of your area as it appears from space. Zoom in and out to see the view from various altitudes. Write a paragraph about what you see—did anything surprise you? Was it daytime/nighttime when you looked at this area?

B. Using the Earth and Moon Viewer for an exploration of time and time zones:

1) Print the U.S. Naval Observatory World Time Zone Map:
http://aa.usno.navy.mil/AA/faq/docs/world_tzones.html

Find your time zone as indicated on the map. What letter is your time zone?_____

Calculate the difference between your local time (also called "civil time") and Universal Time Coordinated (UTC-formerly known as Greenwich Mean Time) found in zone Z on the world map.

_____

How many hours must you add to or subtract from UTC in order to get your local time?

_____

Write a mathematical expression to explain this procedure._____

_____

2) Go back to the Universal Time displayed at the Earth and Moon Viewer. Compare the UTC (Universal Time Coordinated) to your clock time.

Local time at your location:_____

UTC on the Earth and Moon Viewer_____

What is the difference in hours between these two times?_____

Is your mathematical expression a correct one for finding this difference? Modify your expression if you need to do so._____

_____

3) Go to the U.S. Naval Observatory website, Complete Sun and Moon Data for One Day
http://aa.usno.navy.mil/AA/data/docs/RS_OneDay.html

Type the name of the closest city to you in order to get the data on sunrise and sunset for one day.

Date:_____

Location:_____

Season:_____

Sunrise:_____

Sunset:_____

Amount of time between sunrise and sunset (hours and minutes)_____

Given the 24-hour day, what percentage of this date's 24 hours is in daylight (the time between sunrise and sunset):

Keep track of the hours/minutes of sunlight for a week or a month (the longer the better). What is happening to the percentage of daylight in your area? Graph this information in an interesting way. What do these data tell you about the relationship between the length of daylight times and the seasons of the year?

4)Choose a city from the list provided at the Earth and Moon Viewer:
http://www.fourmilab.ch/earthview/cities.html

Locate that city on a map or globe.

City:_____

Latitude:_____

Longitude:_____

Find its time zone from the Time Zone Map:_____

Calculate its local time, based on the UTC you find at the Earth and Moon Viewer._____

Then, view the city from space via the Earth and Moon Viewer. Do you expect it to be daytime or nighttime? What date will it be? _____

C. How Far Is It?--Calculate distance given two coordinates:
Bali/Indonesia How Far Is It—the Distance Calculator: http://www.indo.com/distance/

Using the form on this website, find the distance between your home city and the city you chose in #4 (above):

Name of your city_____Name of second city_____

Distance: in miles_____kilometers_____nautical miles_____

Write a short paragraph to answer one of these questions:
What is your opinion of the Earth and Moon Viewer website and the other websites you visited? What did you learn from this activity? What surprised you? What suggestions do you have for additional activities?? Send these comments to Susan Cowles at <skcowles@home.com>

Note: If you want to see a real-time photo of your city, you might find it on the World Map of Live Web Cams at http://dove.mtx.net.au/~punky/World.html