GEOS 53 Geologic Evolution of the Earth   Laboratory Exercise # 1   Name:
Purpose: An introduction to location on planet earth: Longitude and Latitude

Description of longitude and latitude and other information which may be useful is available on the class wed page under Lab Exercise #1.

I. How far am I from my hometown? (If your hometown is Stockton, pick your favorite city in the US other than Stockton.)

1. My hometown (or selected city) is: _________________________________

2. Visit the web site http://www.indo.com/distance. [Links are available on the class web page under Lab Exercise # 1] Type in Stockton, CA and your home town. Record the following information:

Distance from Stockton to your hometown (or selected city):

Miles ____________________   Kilometers: __________________

Direction from Stockton to your hometown (or selected city) ___________________________

Driving Distance from Stockton to your hometown (or selected city): _______________________

(If you can’t drive to your hometown leave this blank – for example Hilo, Hawaii)

For your hometown (or selected city) record the following:

Elevation: ____________________   Population: ________________________

Longitude ____________________   Latitude: __________________________

(Remember all longitudes in the western hemisphere are WEST and all latitudes in the northern hemisphere are NORTH)

For Stockton record the following:

Elevation: _______15 feet________   Population: ___210,943 (1990)____

Longitude: _121deg18min24sec WEST___   Latitude: 37deg58min11sec _ NORTH____

II. Sun time determination.


What is the distance between these two cities?

Miles_5329______________   Kilometers:__8577___

What is the longitude?   00:00:00E   and Latitude   51:28:00N   of Greenwich, England
Is Stockton North or South of Greenwich? ________ SOUTH ________

Explain the basis of your answer.

Greenwich has a larger LATITUDE number meaning it is further north of the Equator

What is the difference in longitude (degrees) between Stockton, California and Greenwich, England?

Longitude Stockton, CA (degrees only)           __121__

Longitude Greenwich, England (degrees only) __0__

Difference               __121__

Calculate the “sun time” difference between Greenwich and Stockton. Show your calculations even if you use a calculator. (Remember the earth rotates at a rate of one degree of longitude each four minutes of time.)

121x4= 484 minutes  
484 minutes = 8 hours and 4 minutes

III. Earth/Sun Relationships

Scroll down to “DATES” and select “EARTH’S SEASONS”
Scroll down to the Year 2002.

On what date this year is/was the earth closest to the sun (Perihelion)? _Jan 4, 18hr UT_

On what date this year is/was the earth be farthest from the sun (Aphelion)? _Jul 5, 11hr UT_

On what date and time does Spring begin this year (March equinox)?

Universal time: _Mar 20_ 6:49am  
Stockton time: _Mar 19_ 10:49pm or 22:49

On what date and time does Summer begin this year (Summer solstice)?

Universal time: _June 21_ 00:57  
Stockton time: _June 20_ 4:57 pm or 16:57

Follow the link to “Table of Sunrise/Sunset, Moonrise/Moonset etc.”
Scroll to “Cities in the US” Enter California as the “State or Territory” and Stockton for the “Place Name”. Then Click on “Compute Table”.

Record the time for Sunrise and Sunset for the following days in 2002:

TODAY  Sunrise:  ___7:21PST___  Sunset:  ___17:06PST___
Date: _January 12, 2004_
Record the time for Sunrise and Sunset for the following days in 2004:

Today’s Date: January 12  Sunrise: 7:21 PST  Sunset: 17:06 PST

Enter Sunrise-Sunset times for Stockton on June 20, September 22 and December 21 in the chart for question # 3.


Follow the link to “Table of Sunrise/Sunset, Moonrise/Moonset etc.”
Scroll to FORM B “Locations Worldwide” Enter west Longitude 121 degrees 0 minutes; south Latitude 38 degrees 0 minutes; time zone 8 hours west of Greenwich. Then Click on “Compute Table”. Repeat for west longitude 121 degrees 0 minutes and north Latitude 0 degrees 0 minutes

<table>
<thead>
<tr>
<th>Location</th>
<th>June 20 Sunrise</th>
<th>June 20 Sunset</th>
<th>September 22 Sunrise</th>
<th>September 22 Sunset</th>
<th>December 21 Sunrise</th>
<th>December 21 Sunset</th>
</tr>
</thead>
<tbody>
<tr>
<td>121W 38S</td>
<td>7:20</td>
<td>16:51</td>
<td>5:52</td>
<td>18:01</td>
<td>4:38</td>
<td>19:27</td>
</tr>
<tr>
<td>121W 0S</td>
<td>6:02</td>
<td>18:09</td>
<td>5:53</td>
<td>18:00</td>
<td>5:59</td>
<td>18:06</td>
</tr>
<tr>
<td>Stockton</td>
<td>4:43</td>
<td>19:31</td>
<td>5:53</td>
<td>18:01</td>
<td>7:18</td>
<td>16:50</td>
</tr>
</tbody>
</table>

On which day/days is/are sunrise and sunset most similar in all three locations? Sep 22

On which day/days is/are sunrise and sunset most different in all three locations? June 20 & Dec 21

Scroll down to “Positions of the Sun and Moon” and follow the link to “Altitude and Azimuth of the Sun and Moon during one day”

Use Form A to determine the altitude of the sun at 12:00 for Stockton CA for the following days this year (use 10 minute Tabular Interval):

Use Form B to determine the altitude of the sun for west Longitude 121 degrees 0 minutes, north Latitude 0 degrees 0 minutes, time zone 8 hours west AND west longitude 121 degrees 0 minutes and south Latitude 38 degrees 0 minutes, time zone 8 hours west.

<table>
<thead>
<tr>
<th>Location</th>
<th>June 20</th>
<th>September 22</th>
<th>December 21</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stockton</td>
<td>75.4</td>
<td>52.0</td>
<td>28.6</td>
</tr>
<tr>
<td>121W 0N</td>
<td>66.5</td>
<td>89.1</td>
<td>66.6</td>
</tr>
<tr>
<td>121W 38S</td>
<td>28.6</td>
<td>52.1</td>
<td>75.4</td>
</tr>
</tbody>
</table>

Is the sun’s noon angle greater in Stockton’s summer or winter months? SUMMER

5. Explore the Naval Observatory website and list the date of the next solar eclipse.

April 19, 2004 [a partial eclipse]