Name _____ Period ____

Investigation: How does sea surface temperature (SST) along the California coast change during El Niño ?

INTRODUCTION:
The following tables show the SST anomaly values in degrees Celsius from 124.9^O West to 117.9^O West longitude and 41.9^O North to 32.3^O North latitude in September 1996 and September 1997.   Sea surface temperature "anomaly" just means the amount sea surface temperature differs from what it usually is for a particular time of year. In this investigation we will consider the data and draw conclusions about El Niño years and non-El Niño years in California.

MATERIALS:
        data tables for 1996
        data tables for 1997
        colored pencils or pens

PROCEDURES:
Color the boxes in each data table containing the anomaly values according to this color key:

SST Anomaly:	Color Code:
less than -1.0°C	Purple
-1.0°C - 0.0°C	Dark Blue
0.0°C - 1.0°	Light Blue
1.0°C - 2.0°C	Green
2.0°C - 3.0°C	Yellow
3.0°C - 4.0°C	Orange
greater than 4.0°C	Red
=100	Black - special value for land

ANALYSIS:
1- Describe the overall SST pattern for southern California in 1996.
2- Describe the overall SST pattern for southern California in 1997.
3- Write a few sentences comparing 1996 and 1997 SST's.
4- From your knowledge of El Niño, which year best fits the description?
5- If the normal SST for Los Angeles in the month of September is 19°C, what was the temperature during El Niño?
6- How do SST's along the California coast change during an El Niño?
7- From your knowledge of the seasonal SST changes along California, propose a hypothesis explaining why satelllite oceanographers use SST *anomaly* data, rather than real SST data.

CREDITS:
Adapted from "Physical Oceanography from Space," JPL-PODAAC, http://podaac-www.jpl.nasa.gov/kids/ index.html

Sea Surface Temperature Anomaly, °Celsius
September 1996

Latitude °North	Longitude °West								
	124.9	124.0	123.1	122.3	121.4	120.5	119.6	118.7	117.9
41.9	0.7	100	100	100	100	100	100	100	100
41.0	0.7	100	100	100	100	100	100	100	100
40.1	-0.7	100	100	100	100	100	100	100	100
39.3	0.2	0.1	100	100	100	100	100	100	100
38.4	-1.6	-0.8	100	100	100	100	100	100	100
37.5	-0.6	-2.2	-1.8*	100	100	100	100	100	100
36.7	-0.3	0.2	-1.9	-2.3	100	100	100	100	100
35.8	0.7	-0.4	-0.2	-0.6	-2.2	100	100	100	100
34.9	0.3	-0.1	-0.6	-0.2	-1.9	100	100	100	100
34.0	0.0	-0.4	0.2	0.5	-0.5	0.1	0.0**	100	100
33.1	0.6	0.5	0.5	-0.1	0.0	0.2	1.1	0.7	2.0
32.3	0.4	-0.3	-0.7	-0.1	0.4	0.2	0.4	0.3	1.5***

* denotes coastal waters of San Francisco
** denotes coastal waters of Los Angeles
*** denotes coastal waters of San Diego

Sea Surface Temperature Anomaly, °Celsius
September 1997

Latitude °North	Longitude °West								
	124.9	124.0	123.1	122.3	121.4	120.5	119.6	118.7	117.9
41.9	6.4	100	100	100	100	100	100	100	100
41.0	4.3	100	100	100	100	100	100	100	100
40.1	3.3	100	100	100	100	100	100	100	100
39.3	4.3	3.6	100	100	100	100	100	100	100
38.4	3.5	3.1	100	100	100	100	100	100	100
37.5	2.9	3.5	3.6*	100	100	100	100	100	100
36.7	3.3	3.0	3.2	2.4	100	100	100	100	100
35.8	2.5	2.6	2.2	2.2	1.8	100	100	100	100
34.9	2.8	2.4	2.3	2.2	1.7	100	100	100	100
34.0	2.4	2.9	2.0	1.8	1.6	1.7	2.3**	100	100
33.1	2.4	2.5	1.7	1.4	0.9	1.4	1.3	2.2	3.2
32.3	2.0	1.9	1.4	1.5	1.3	1.3	1.5	2.2	2.1***

* denotes coastal waters of San Francisco
** denotes coastal waters of Los Angeles
*** denotes coastal waters of San Diego

September 1996

Latitude °North	Longitude °West								
	124.9	124.0	123.1	122.3	121.4	120.5	119.6	118.7	117.9
41.9	0.7								
41.0	0.7								
40.1	-0.7								
39.3	0.2	0.1							
38.4	-1.6	-0.8							
37.5	-0.6	-2.2	-1.8*						
36.7	-0.3	0.2	-1.9	-2.3					
35.8	0.7	-0.4	-0.2	-0.6	-2.2				
34.9	0.3	-0.1	-0.6	-0.2	-1.9				
34.0	0.0	-0.4	0.2	0.5	-0.5	0.1	0.0**		
33.1	0.6	0.5	0.5	-0.1	0.0	0.2	1.1	0.7	2.0
32.3	0.4	-0.3	-0.7	-0.1	0.4	0.2	0.4	0.3	1.5***

September 1997

Latitude °North	Longitude °West								
	124.9	124.0	123.1	122.3	121.4	120.5	119.6	118.7	117.9
41.9	6.4								
41.0	4.3								
40.1	3.3								
39.3	4.3	3.6							
38.4	3.5	3.1							
37.5	2.9	3.5	3.6*						
36.7	3.3	3.0	3.2	2.4					
35.8	2.5	2.6	2.2	2.2	1.8				
34.9	2.8	2.4	2.3	2.2	1.7				
34.0	2.4	2.9	2.0	1.8	1.6	1.7	2.3**		
33.1	2.4	2.5	1.7	1.4	0.9	1.4	1.3	2.2	3.2
32.3	2.0	1.9	1.4	1.5	1.3	1.3	1.5	2.2	2.1***