

## Where do the critters live?

### Objective

Participants will determine where marine organisms might be found near southern California based on current ocean temperatures.

### Correlations

National Science Education Standards

Grades 5-8: A, C

Grades 9-12: A, C

California State Science Education Standards

Grade 6: 5b, e, 6b

Grade 7: 2a, d, e, 7b

Grades 9-12: Life Sciences 6a-g, 7d

Ocean Literacy Principles and Fundamental Concepts: 1 & 5

---

### Introduction

Any aspect of the physical environment that affects living organisms is called a “physical factor”. Aquatic organisms are greatly affected by various physical factors such as temperature, salinity, dissolved oxygen, depth, and several others. In the open coastal ocean, temperature can be a strong determinate of animal distribution. This is a web-based activity that uses ocean temperatures to understand where various ocean organisms could be found. Students are asked to answer a series of questions about the potential location of organisms. They will use links that provide water monitoring data for various locations. The real-time data will then be compared to the optimal temperature of each organism. From this comparison, students can determine the potential location of each organism.

**Note:** The data reported from the buoys are surface temperatures, and some of these species are found in midwater or near the bottom, so this exercise is only a general guide. However, students should find significant differences in the surface temperatures at different locations.

### Materials

- Computer
- Internet access

### Procedure

1. Study the table below containing the optimal water temperature ranges for these ocean organisms.

<b>Critter name</b>	<b>Critter optimal water temperature (°C)</b>	<b>Predicted location in CA</b>
---------------------	---	---------------------------------

---

Kelp Bass	16-20	_____
California Halibut	10-25	_____
California Sheephead	10-26	_____
CA Spiny Lobster	8-14	_____
White Seabass	16-20	_____
Yellowtail	20-30	_____
Eelgrass	0-25	_____
Giant Kelp	15-20	_____

2. Go to the NOAA National Buoy Data Center website:  
<http://www.ndbc.noaa.gov/maps/Southwest.shtml>

3. Retrieve water temperatures at several offshore sites from Diablo Canyon, CA to La Jolla, CA and record below. Use the station ID codes to locate the buoys. Look at the water temperature data for each buoy and record a maximum and minimum for the past 5 days from the given data. Remember:  $(^{\circ}\text{F} - 32) \times 5/9 = ^{\circ}\text{C}$

4. Match each organism in the table above with the locations listed below where they could be found living. Write the name of the corresponding location(s) next to each organism's name.

**Location (Station ID code)                      Water Temperature Range ( $^{\circ}\text{F}$  and  $^{\circ}\text{C}$ )**

Diablo Canyon (46215)	_____
Goleta Point (46216)	_____
Los Angeles (OHBC1)	_____
Oceanside Offshore (46224)	_____
La Jolla (LJAC1)	_____

**Suggested questions**

1. Which organisms would you expect to find off the coast of Los Angeles at this time?
  
2. Which organisms would you expect to find close to Diablo Canyon at this time?

3. Which organisms would you expect to find near La Jolla at this time?
4. Are there any organisms that might live through the whole range that you just investigated?

Think about and discuss:

Animals are sometimes found outside of their optimal/normal temperature ranges. Why do you think this occurs? Do you think they can survive there for long?

Alternative suggestion:

You can have your students figure out what buoys are in your area (or an area chosen by students) rather than giving them a list of buoys. Make sure they include buoy names and buoy numbers and you can ask them to also provide the latitude and longitude of the buoys.

### References

Temperature ranges for fish

<http://www.saltwatersportsman.com/article.jsp?ID=21011164>

Temperature for California Spiny Lobster

<http://www.ingentaconnect.com/content/els/01657836/2003/00000065/00000001/art00239>

Temperature range for Giant Kelp

<http://sanctuaries.noaa.gov/about/ecosystems/kelpdesc.html>

Temperature range and more information on eelgrass

<http://www.coastkeeper.org/eelgrass-in-newport-bay/>

Converting °F to °C and back

<http://www.manuelsweb.com/temp.htm>

$$(^{\circ}\text{F} - 32) \times 5/9 = ^{\circ}\text{C}$$

$$^{\circ}\text{C} \times 9/5 + 32 = ^{\circ}\text{F}$$

### Resource

California's Living Marine Resources

Free to download from California Department of Fish and Game

<http://www.dfg.ca.gov/marine/status/>

contains life history information and fishery status of many California fish and invertebrates