

## INVESTIGATING ISOTHERMS: GEOGRAPHIC DISTRIBUTION OF SEA SURFACE TEMPERATURES

### INTRODUCTION

Which regions of the sea are warmest? Which have the coldest temperatures? The sea surface temperature (SST) is determined by three factors: i. The amount of heat input in the form of sunlight, ii. The movement of surface currents, and iii. Upwelling. The attached map shows the general temperature boundary lines or contour lines, known as isotherms.

### MATERIALS:

SST maps provided by instructor  
colored pencils or pens  
world atlas reference (optional)

### PROCEDURES

- 1- Begin by writing the name of as many countries and continents as you can discover on your map.
- 2- Using a set of colored pencils, pens or water colors, create a “key” or a legend by choosing a different color for each temperature range shown on your map of the isotherms. [Suggestion: use warm tones or colors such as red and orange for high temperatures and cool tones or colors such as blue and purple for low temperatures].
- 3- Finally, using your color key, fill-in the regions of the ocean that correspond to the different surface water temperature values.

### ANALYSIS OF DATA

- A. List a few places you would visit, according to your map, if you wanted to go surfing in the warmest ocean water in the world.
- B. List at least 5 places you would visit if you wanted to touch the coldest ocean water.
- C. Describe the distribution of SST patterns as a function of latitude.
- D. After studying a map showing the prevailing ocean surface currents, describe the distribution of SST patterns as a function of surface currents.
- E. Here in southern California we are located approximately  $34^{\circ}$  North of the equator. On your map showing north America, draw a horizontal line across the map at  $34^{\circ}$ N latitude. Follow this line and fill-in the following information: (i.) The water temperature on the west coast of the USA at  $34^{\circ}$ N. (ii.) The water temperature on the east coast of the USA at  $34^{\circ}$ N.
- F. (i.) How much difference is there between the east coast and the west coast at the same latitude,  $34^{\circ}$ N? (ii.) Explain what forces or processes account for this temperature differential between our east coast and our west coast.
- G. Discuss the patterns and relationships you observe when comparing a map of SST and another map of surface water salinity.
- H. Using outside resources, find a map of the world showing regions of strong upwelling. Are these regions visible on your SST map? What happens to SST in regions of strong upwelling?

## TEACHER 'S GUIDE :

Depending upon your target audience, time and your curriculum plans, several options are included here:

If you want to use a single page, whole world map:  
a simple map with 5°C contours, and a more complex map with 1°C contours.

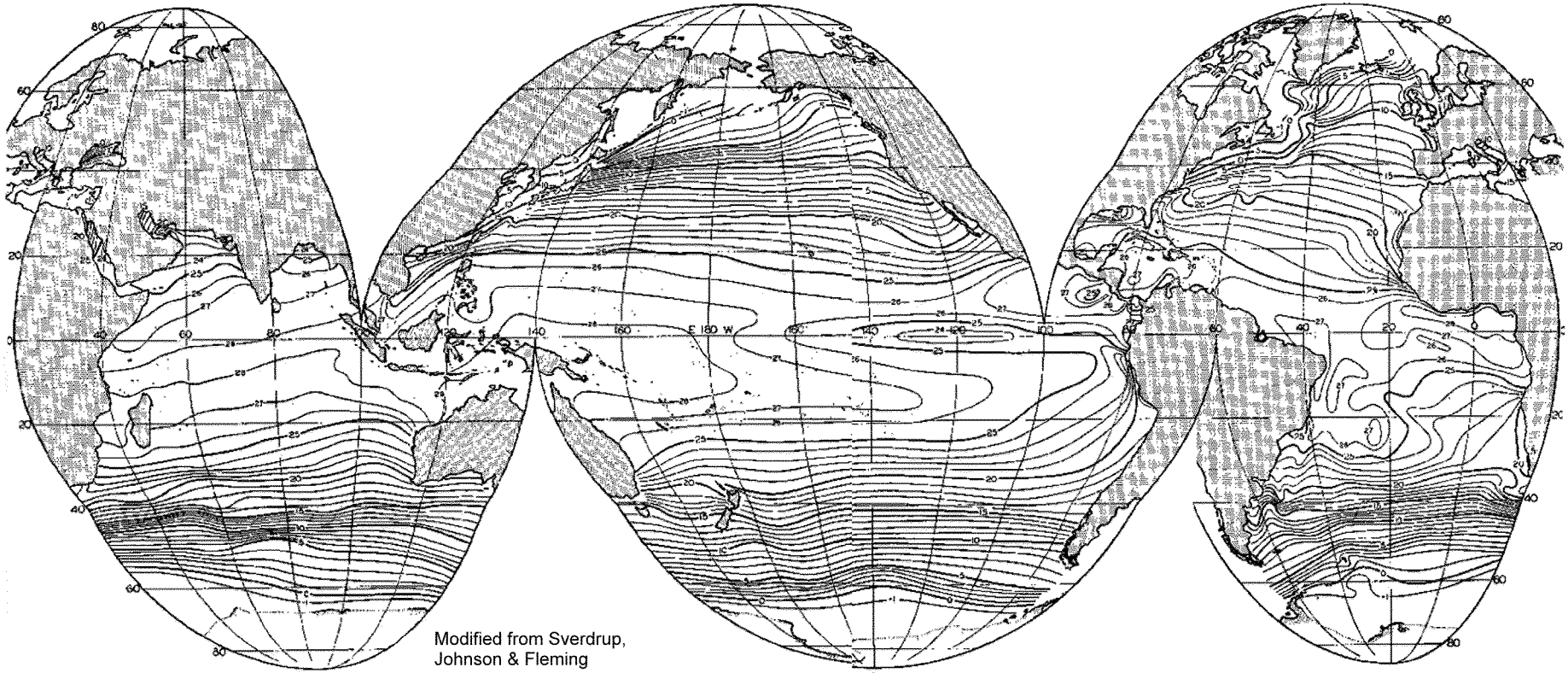
If you want to use a two page map, one page for Pacific and one page for Atlantic:

a simple map with 5°C contours, and a more complex map with 1°C contours.

In all, there are six pages which follow.

Name \_\_\_\_\_ Period \_\_\_\_\_

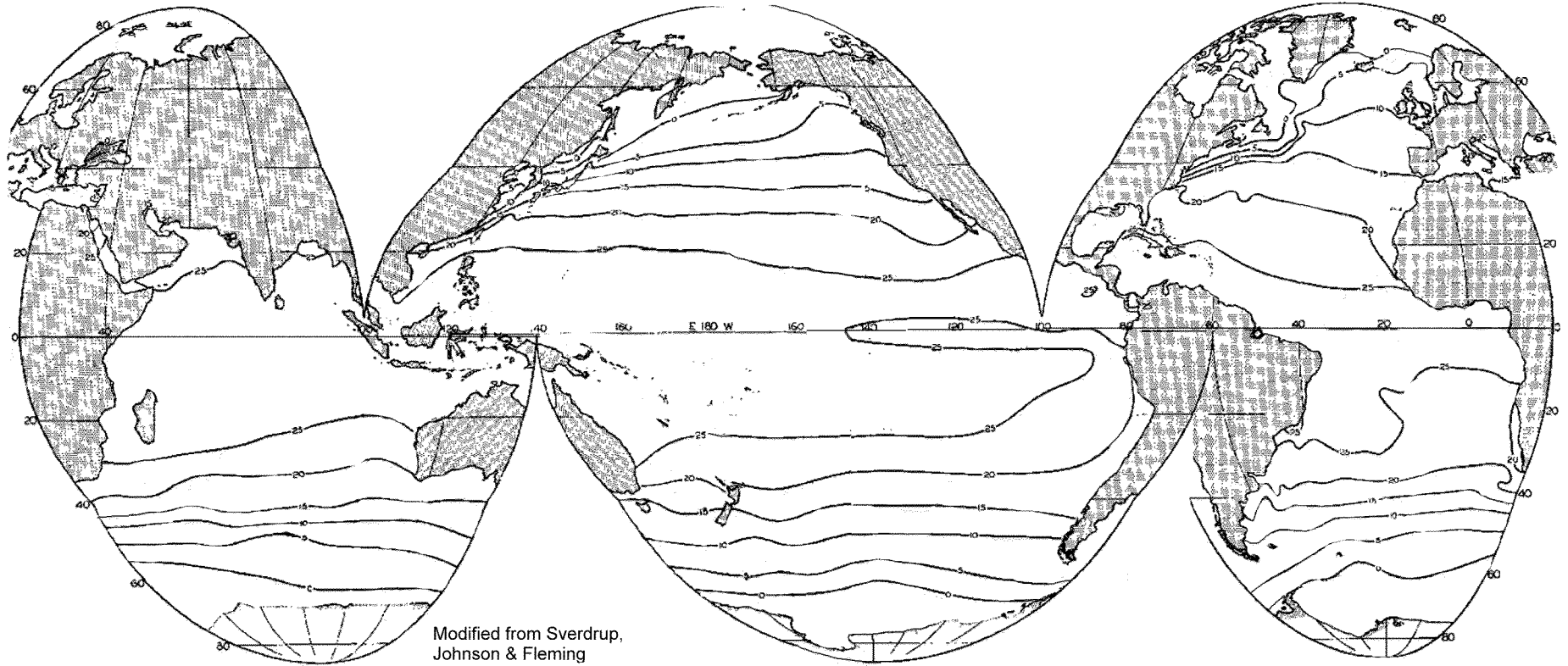
### WORLD SST (1°C CONTOURS)



Use the space below for your temperature color key:

Name \_\_\_\_\_ Period \_\_\_\_\_

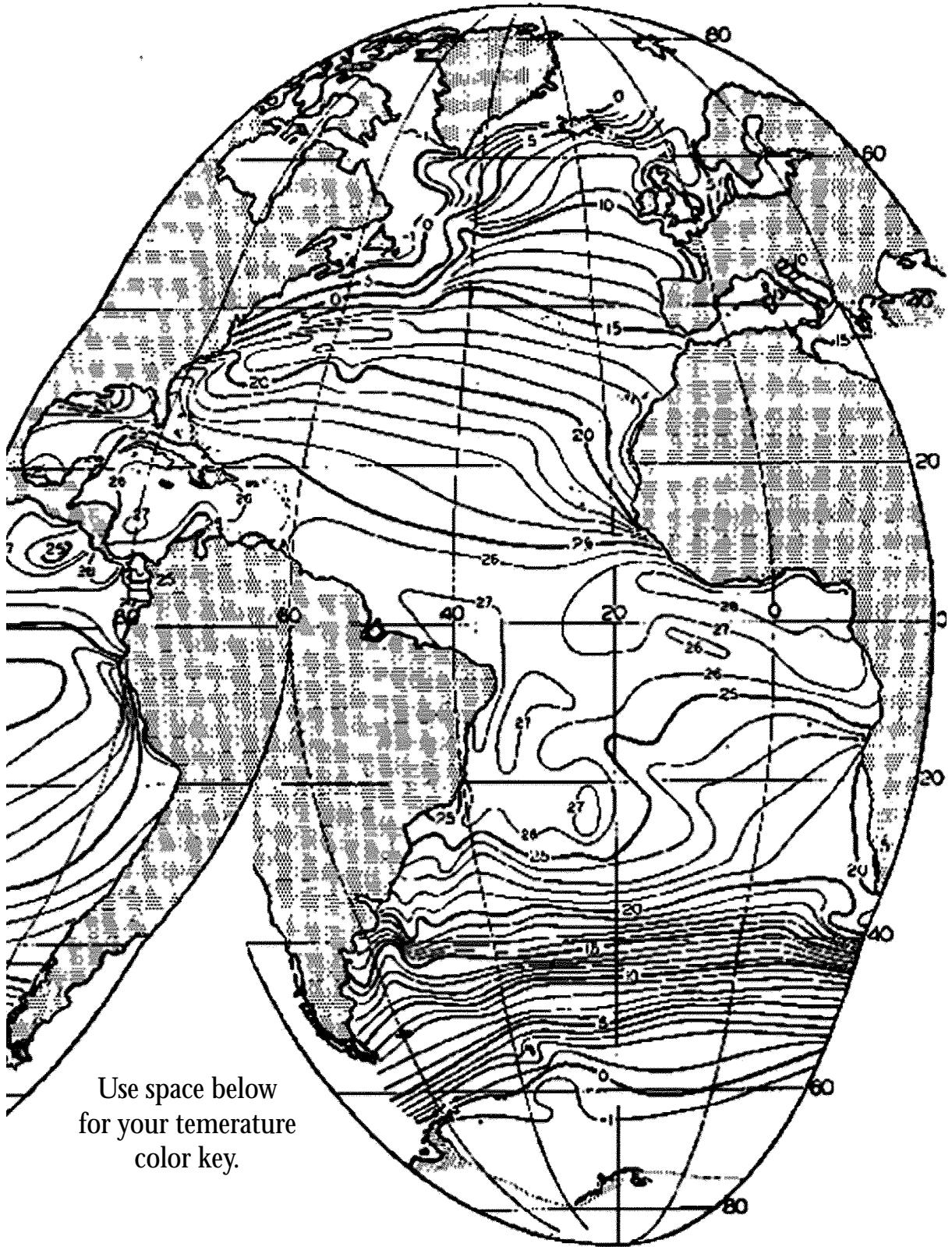
WORLD SST (5°C CONTOURS)



Use the space below for your temperature color key:

Name \_\_\_\_\_ Period \_\_\_\_\_

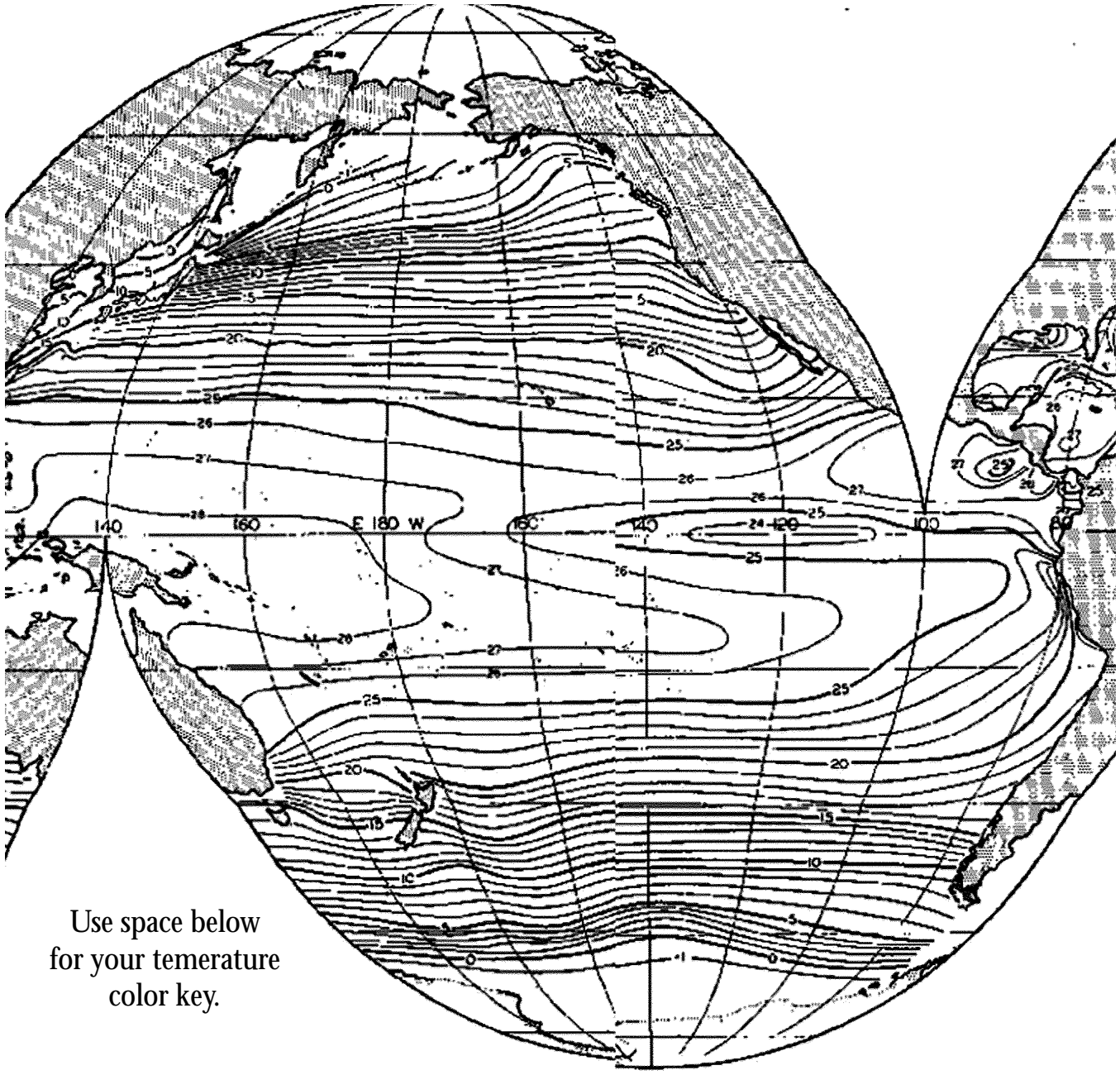
ATLANTIC OCEAN SST 1°C CONTOURS)



Use space below  
for your temperature  
color key.

Name \_\_\_\_\_ Period \_\_\_\_\_

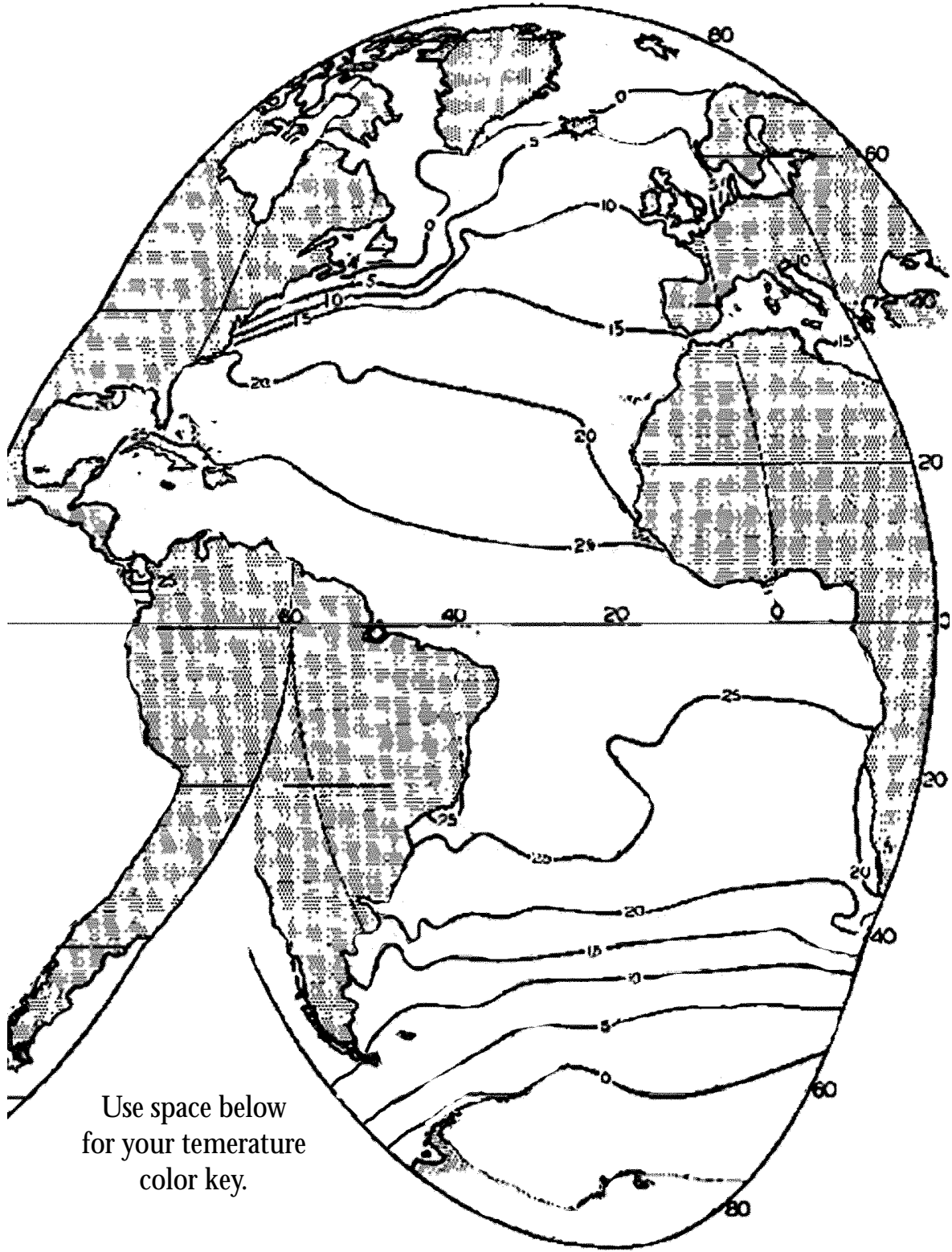
PACIFIC OCEAN SST (1°C CONTOURS)



Use space below  
for your temperature  
color key.

Name \_\_\_\_\_ Period \_\_\_\_\_

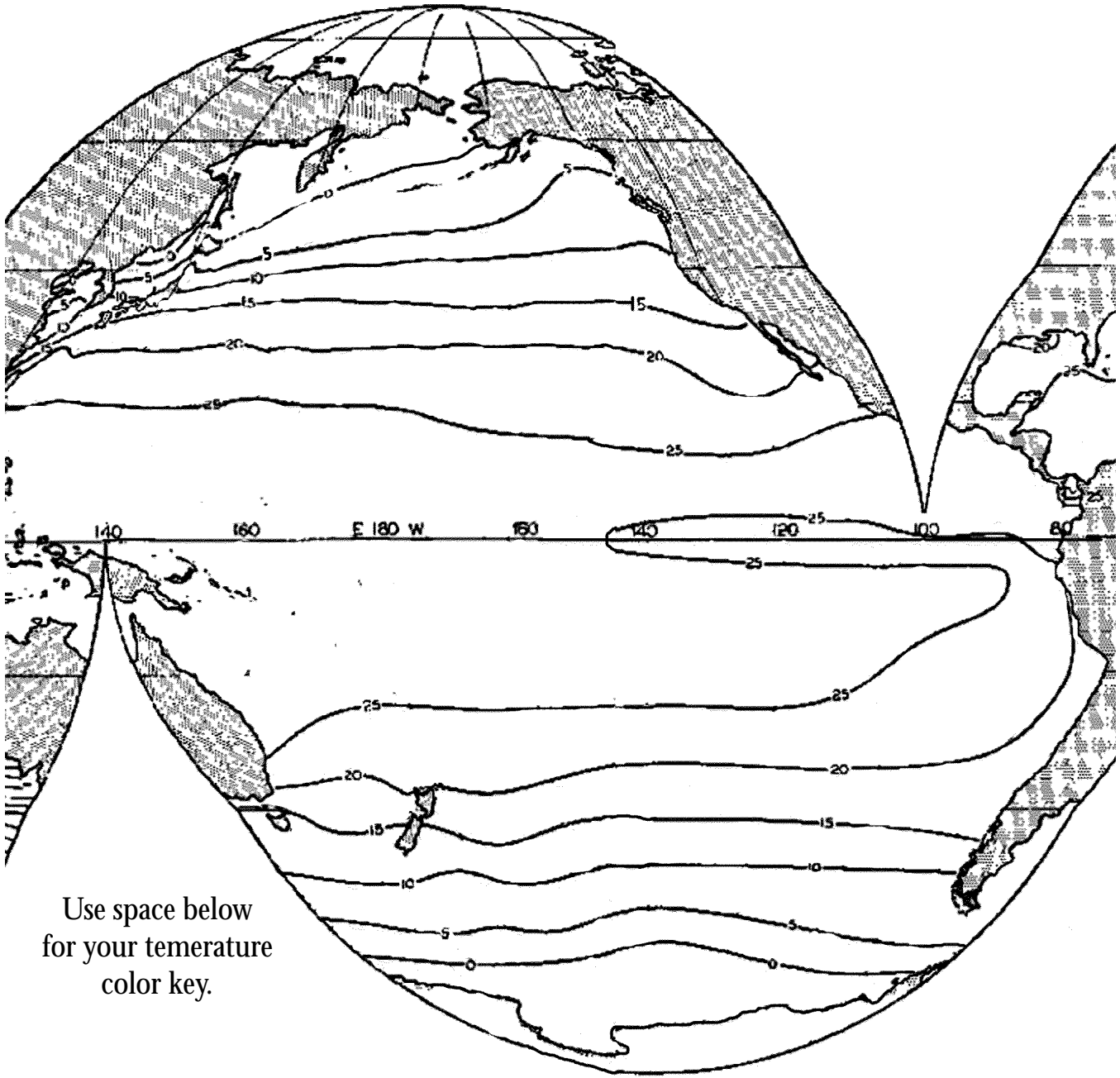
ATLANTIC OCEAN SST (5°C CONTOURS)



Use space below  
for your temperature  
color key.

Name \_\_\_\_\_ Period \_\_\_\_\_

PACIFIC OCEAN SST (5°C CONTOURS)



Use space below  
for your temperature  
color key.