

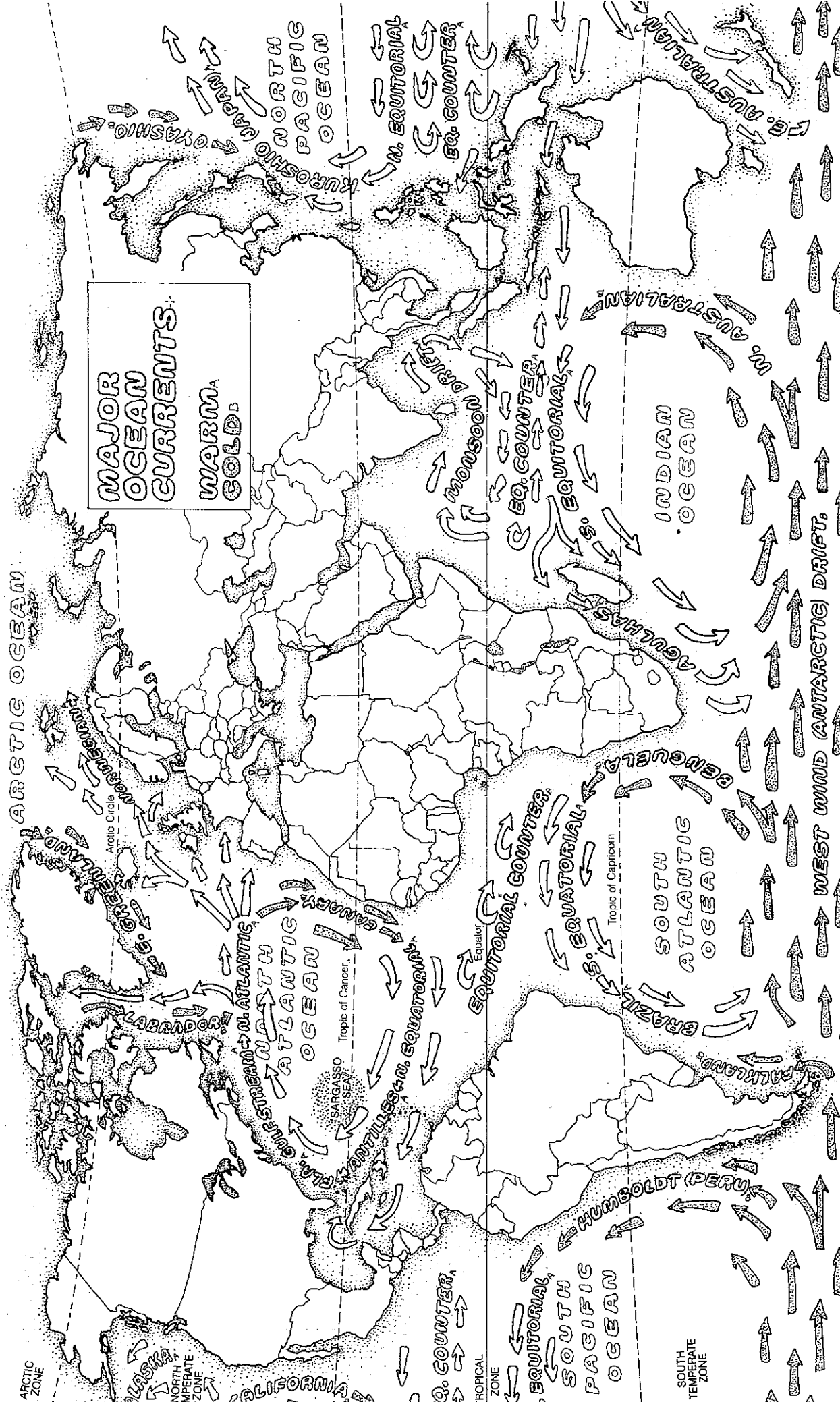
NAME: _____

Major Ocean Currents

- 1) What "propels" most surface ocean currents? _____
- 2) What range of depth do ocean currents have? _____
- 3) What is the range of speed that ocean currents have? _____
- 4) What creates the "Coriolis force?" _____
- 5) What effect does the Coriolis force have on ocean currents? _____

- 6) What is a "gyres?" _____
- 7) What is the "Monsoonal Drift"? _____
- 8) What is the speed of the deep ocean currents? _____
- 9) What direction do the deep ocean currents move? _____
- 10) What is Upwelling? _____
- 11) Where does upwelling occur? _____
- 12) What role do ocean currents have on climates? _____
- 13) How does the Gulf Stream impact the climate of Europe _____

- 14) What current cools the Southern Hemisphere? _____



Use a warm light color for the names of all the warm currents and their directional arrows (A), and a cool light color for the cold currents and their directional arrows (B). Because this world view shows only the edges of the Pacific Ocean, the important North Pacific Current—which is an extension of the warm Kuroshio (Japan) current—is not shown.

Across the oceans stream broad "rivers" of warm and cool water. These "surface currents" are propelled mostly by prevailing winds. These winds create a general movement of water westward near the Equator and eastward in the higher latitudes (note the similarity to wind patterns shown on the upper map). Surface currents range in depth to 2,500 ft. (760m) and in speed from 0.5 to 5 mph (0.8 to 9 kph), depending upon the strength and duration of the wind. The

"Coriolis force," created by the rotation of the Earth, exerts an influence on surface currents, causing them to veer toward the right (clockwise) from the wind's direction in the Northern Hemisphere and toward the left (counter-clockwise) in the Southern Hemisphere. This force produces five major "gyres" (circular patterns)—two in the northern oceans and three in the southern. The seasonal changes in wind directions similarly affect surface currents. The Monsoon Drift, shown below the Indian subcontinent, alternates in direction as winds blow from land in the winter and bring rain from the sea in the summer.

Beneath the surface currents and moving at a much slower pace (about 1 mile per day), the cold, dense "deep currents" (not shown) move from the polar regions toward the warm and less dense waters of the Equator. Water

from deep currents often rises along the coasts of continents to replace warm surface currents that have been driven away from shore by the Coriolis force. These "upwellings" bring valuable nutrients to the surface waters and attract and support large fish populations.

Surface currents play an important role in moderating coastal climates by moving vast quantities of warm or cold water. The Gulf Stream, which is actually a system of different currents (North Equatorial, Antilles, Florida, Gulf Stream, and North Atlantic Drift), raises the average winter temperature of the British Isles and the west coast of Europe by 20° F (11° C). The southwestern coasts of continents in the Southern Hemisphere are cooled by currents spawned by the West Wind Drift, which encircles Antarctica.

**Interpreting The Map
Major Ocean Currents**

1. Looking at the map what circular pattern do most currents in the southern hemisphere have? _____
2. Looking at the map what type of current (warm/cold) can one expect to find on the eastern coast of a continent? _____
3. What type of current is the Humboldt Current? _____
4. What currents form the clockwise pattern of currents in the North Atlantic?

5. What current dominates the East Coast of the U. S.? _____
6. What type of current is the Monsoonal Drift? _____
7. What current dominates the California coastal areas? _____
8. Looking at the map what type of current (warm/cold) can one expect to find on the western coast of a continent? _____
9. What current does the Gulf Stream merge with? _____
10. Looking at the map what circular pattern do most currents in the northern hemisphere have? _____