

NAME: \_\_\_\_\_

### Prevailing Winds Map

- 1) What are the properties of an air mass that impact weather?
  - a. \_\_\_\_\_
  - b. \_\_\_\_\_
- 2) How do High and Low Pressure interact? \_\_\_\_\_
- 3) What is a pressure gradient? \_\_\_\_\_
- 4) How are pressure gradients established? \_\_\_\_\_
- 5) At what latitude would you find the doldrums? \_\_\_\_\_
- 6) At what latitude would you find the horse latitudes? \_\_\_\_\_
- 7) What direction do the westerlies move toward? \_\_\_\_\_
- 8) What direction do the easterlies move toward? \_\_\_\_\_
- 9) What causes the winds to move in a diagonal direction? \_\_\_\_\_
- 10) What are the two prevailing winds?
  - a. \_\_\_\_\_
  - b. \_\_\_\_\_
- 11) Describe the "roaring forties." \_\_\_\_\_
- 12) What winds are the least predictable? \_\_\_\_\_
- 13) What area of the world has the fiercest winds? \_\_\_\_\_
- 14) What are the areas called that are at times void of air movement?
  - a. \_\_\_\_\_
  - b. \_\_\_\_\_
- 15) How did the Horse Latitudes get its name? \_\_\_\_\_  
\_\_\_\_\_

**16) What are violent wind storms called that originate in the tropics?**

**a. In the Caribbean** \_\_\_\_\_

**b. In the Southwest Pacific** \_\_\_\_\_

**c. In the Indian Ocean** \_\_\_\_\_

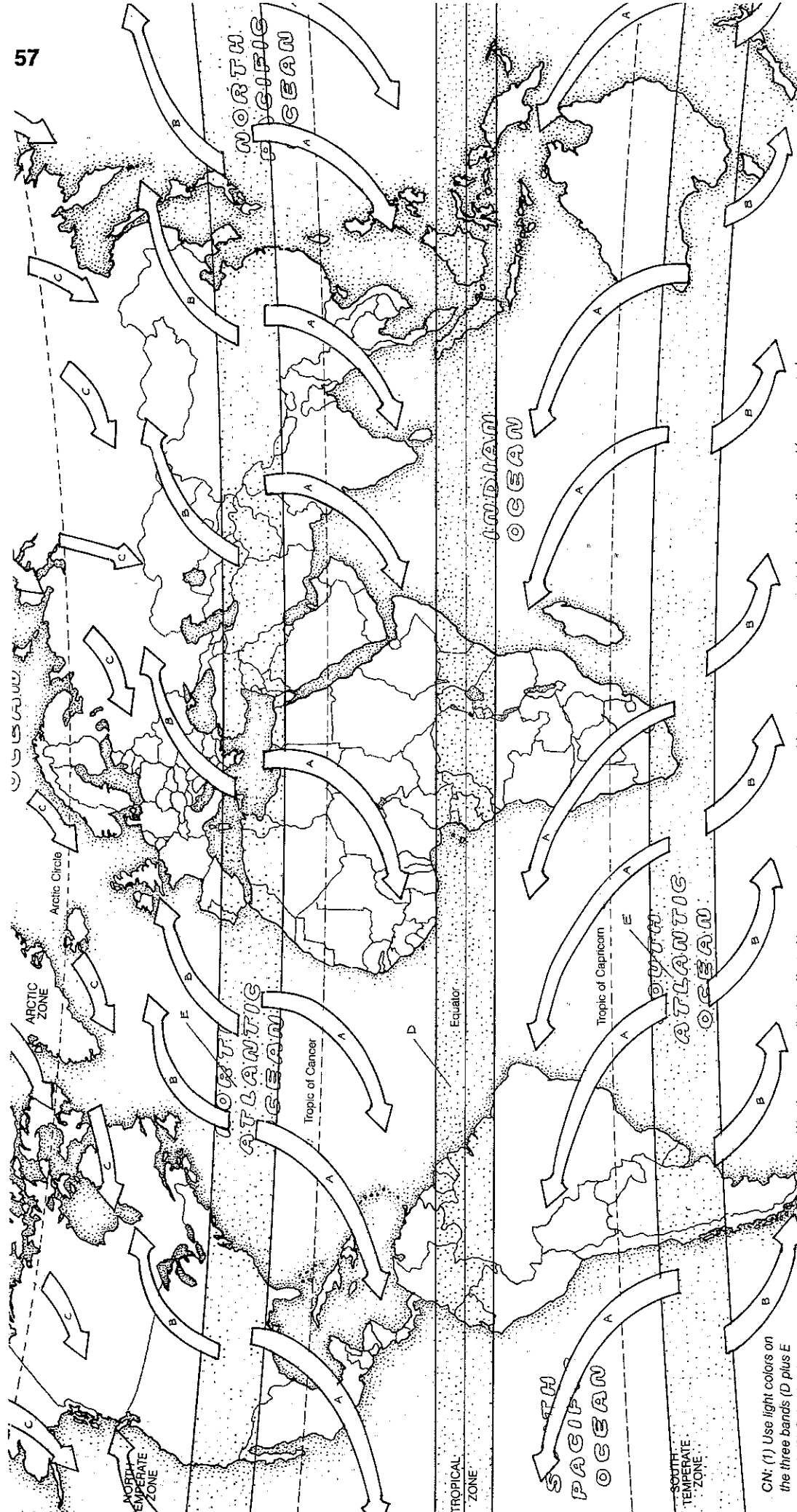
**17) What are the two names given for seasonal winds?**

**a. In Southeast Asia** \_\_\_\_\_

**b. In North Africa** \_\_\_\_\_

**18) What winds are responsible for the Jet Stream?** \_\_\_\_\_

**19) What speeds can the Jet Stream move at ?** \_\_\_\_\_



CN: (1) Use light colors on the three bands (D plus E twice). (2) Color the three types of winds (A-C). The Polar Easterlies in the Southern Hemisphere are not shown.

**PREVAILING WINDS<sup>A</sup>**  
**TRADE WINDS<sup>A</sup>**  
**WESTERLIES<sup>B</sup>**  
**POLAR EASTERLIES<sup>C</sup>**  
**DOLDRUMS<sup>D</sup>**  
**HORSE LATITUDES<sup>E</sup>**

Weather is generally the effect of large masses of air—warm or cold, wet or dry—moving around the planet. These masses originate in "source regions" where relatively stagnant air assumes a uniformity of moisture and temperature before beginning to spread its influence over great distances as a weather front. Winds are created when air moves from high-pressure areas toward low-pressure areas. Pressure gradients are caused by the uneven heating of the Earth's atmosphere. Warm air around the Equator rises from a low-pressure trough called the *Doldrums* (which spans the Equator between 5° N and 5° S latitude), and then flows north or south. When this air reaches a subtropical belt of high pressure in the Horse Latitudes, between 30° and 40° (N and S), it descends and becomes the *Trade Winds*, which blow toward the Equator, and the *Westerlies*, which blow toward the polar regions. Because of the rotation of the Earth, these winds do not blow directly north or south, but instead blow diagonally. Of the two "prevailing winds" (winds that blow most frequently in a particular region), the *Trades* are the steadiest in force and direction. But the *Westerlies* are generally stronger, especially in a 10° band of latitude just below the south Horse Latitudes. Here, without any continental obstructions, winds can build up great force—both the winds and the latitudes are called the "Roaring Forties." The least predictable prevailing winds are the *Polar Easterlies*, which arise in subpolar regions (outside of the polar circles). Antarctica

(not shown) has the most ferocious winds.

The upward movement of warm air in the Doldrums and the downward movement of cool air in the Horse Latitudes discourage any major horizontal movements, and some of the time these regions are without any winds. The Horse Latitudes were supposedly so named because horses on sailing ships had to be killed when water ran short during periods of tropical stagnation. The name "Doldrums" is self-evident. Tropical oceans spawn great windstorms that go by different names according to the part of the world in which they occur: "hurricanes" in the Caribbean, "typhoons" in the southwest Pacific, and "cyclones" in the Indian Ocean.

Regional winds (often seasonal) can bring excessive moisture (the monsoons of Southeast Asia), searing heat (the sirocco from northern Africa to southern Europe), or unseasonable cold (from northern to southern Europe). Local winds occur mostly in coastal areas. During the afternoon, cool ocean air rushes in to replace the heated air rising above the warm landscape. At night, the situation is reversed, but winds heading toward the ocean are not as strong as the ocean breezes. In the interiors, winds are likely to ascend hillsides during the day and descend at night.

At much higher altitudes (5-12 mi., 8-20 km), the winds are dominated by Westerlies; within them flow the jet streams at speeds up to 250 mph (400 kph).

**Interpreting the Map  
Prevailing Winds**

- 1) **What circulation pattern do the Westerlies have in the northern hemisphere?**  
\_\_\_\_\_
- 2) **What wind pattern dominates the mid latitudes in North America? \_\_\_\_\_**  
\_\_\_\_\_
- 3) **What circulation pattern do the Trade Winds have in the Northern hemisphere? \_\_\_\_\_**
- 4) **What winds do you think early explorers used to get to North America?**  
\_\_\_\_\_
- 5) **What circulation pattern do the Westerlies have in the southern hemisphere?**  
\_\_\_\_\_
- 6) **What circulation pattern do the Trade Winds have in the southern hemisphere? \_\_\_\_\_**
- 7) **What wind pattern dominates the high latitudes in North America? \_\_\_\_\_**  
\_\_\_\_\_
- 8) **What winds do you think early explorers used to return to Europe from North America? \_\_\_\_\_**