

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

### Regional Temperature Map

1) What usually determines the regional temperature of any given location?

\_\_\_\_\_

2) Why are the Polar Regions cooler than the tropics? \_\_\_\_\_

\_\_\_\_\_

3) What zone of latitude experiences seasonal changes? \_\_\_\_\_

4) What are the three factors that influence temperature

a) \_\_\_\_\_

b) \_\_\_\_\_

c) \_\_\_\_\_

7) What is the difference between land and water retaining heat? \_\_\_\_\_

\_\_\_\_\_

8) How does water temperature effect ocean air? \_\_\_\_\_

9) What makes Norway warmer than other areas of similar latitude? \_\_\_\_\_

\_\_\_\_\_

10) As air rises what heat retaining properties does it lose?

d) \_\_\_\_\_

e) \_\_\_\_\_

12) How much can air drop in temperature every 1,000 feet? \_\_\_\_\_

13) What two factors transfer much of the heat from the tropics?

f) \_\_\_\_\_

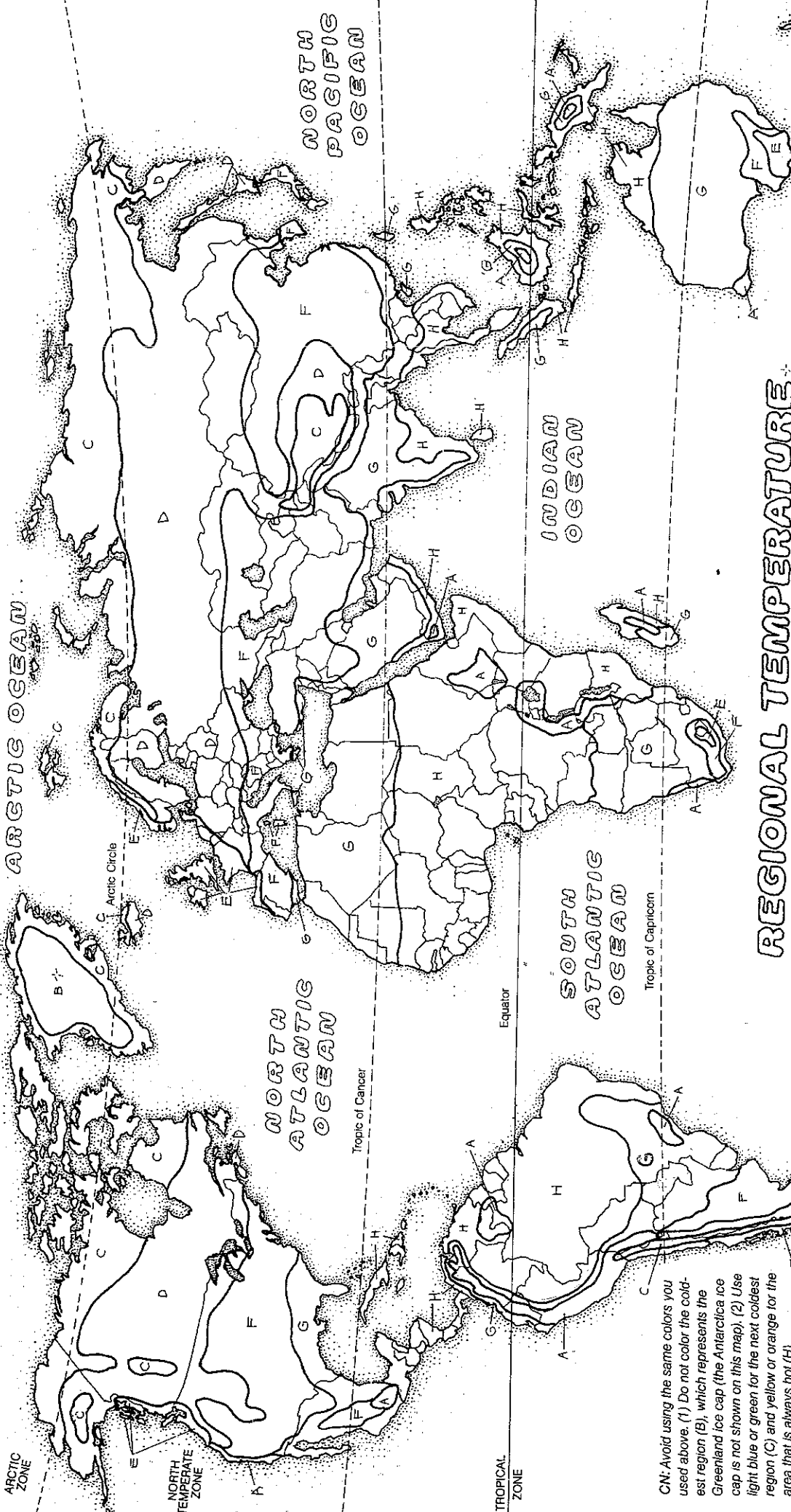
g) \_\_\_\_\_

15) What and where was the highest recorded temperature?

\_\_\_\_\_ at \_\_\_\_\_

17) What and where was the coldest recorded temperature?

\_\_\_\_\_ at, \_\_\_\_\_



The Sun is the source of the Earth's heat; the temperature of any particular region is largely determined by the amount of radiation it receives from the Sun. The tropical region is consistently the hottest because it receives the most radiation from the Sun, which is directly overhead most of the year. It follows that the polar regions are the coldest because there the Sun's rays are the most indirect; even in summer the polar Sun stays close to the horizon. The Temperate Zones, in which the angle of the sun changes throughout the year (Figs. 1, 44, 55), are the only regions to experience seasonal changes in temperature.

Other factors that influence temperature are proximity to large bodies of water, altitude, and prevailing wind conditions. Because water is much slower to heat up or cool down than land is, the summer ocean still has some winter coolness and the winter ocean has not lost all of its summer warmth. The water temperature affects the ocean air, which exerts a moderating influence on the air above the coastal lands. Bodies of water are also heated or cooled by the flow of ocean currents. The coast of Norway is much warmer than regions at comparable latitudes in Canada or Asia, due to the presence of the North Atlantic Drift (Gulf Stream).

Altitude also influences temperature. As air rises, it becomes thinner and loses its chief heat-retaining constituents: water vapor and carbon dioxide. Temperatures can

drop as much as 4° F (2.2° C) for every rise of 1,000 ft. (305 m) of altitude. This "lapse rate" explains both the presence of snow on Equatorial peaks and the mild temperatures experienced by some tropical areas.

Wind patterns and ocean currents around the globe do a great deal to transfer heat from the tropics. Without this air and ocean activity (created by temperature differences), the tropics would be much hotter and the rest of the globe much colder. As it is, temperature differences still can be immense: the highest temperature ever recorded was 136° F (58° C) in summer shade at Al Aziziyah, Libya, and the coldest was -120° F (-89° C) during winter in Antarctica.

For millions of years, the Earth's overall temperature has remained relatively constant because of the "heat balance" between the amount of solar radiation absorbed by the Earth and the radiation sent back to space. But carbon dioxide is building up in the Earth's atmosphere because of the burning of fossil fuels, and a "greenhouse effect" is being created as radiation is being retained by the Earth. Most scientists believe that a global warming trend has begun, but some insist that the Earth is due for another Ice Age in which a temperature drop of only a few degrees will bring back the glaciers over much of the Northern Hemisphere. Ice Ages have coincided with periodic variations in the Earth's orbit around the Sun.

## REGIONAL TEMPERATURE

CN: Avoid using the same colors you used above. (1) Do not color the coldest region (B), which represents the Greenland ice cap (the Antarctica ice cap is not shown on this map). (2) Use light blue or green for the next coldest region (C) and yellow or orange for the area that is always hot (H).

- ALWAYS MILD**<sup>A</sup>
- ALWAYS GOLD**<sup>B, C</sup>
- SUMMER:**
- COOL**<sup>C</sup>
- MILD**<sup>D</sup>
- MILD**<sup>E</sup>
- HOT**<sup>F</sup>
- VERY HOT**<sup>G</sup>
- ALWAYS MILD**<sup>G</sup>
- ALWAYS HOT**<sup>H</sup>

- WINTER:**
- VERY GOLD**<sup>C</sup>
- GOLD**<sup>D</sup>
- COOL**<sup>E</sup>
- GOLD**<sup>F</sup>
- MILD**<sup>G</sup>

**Interpenetrating The Map**  
**Regional Temperatures**

- 1) What latitude zones record the highest temperatures? \_\_\_\_\_
- 2) What temperatures are common at the mid latitudes in Europe and Western Asia? \_\_\_\_\_
- 3) Which continent has the most variations of temperature? \_\_\_\_\_
- 4) What latitude zones record the lowest temperatures? \_\_\_\_\_
- 5) What is the regional temperature where we live? \_\_\_\_\_
- 6) What regional temperature dominates the African continent? \_\_\_\_\_
- 7) Of all the continents, which has the fewest variations of temperature? \_\_\_\_\_  
\_\_\_\_\_