Climate Variables

CLASS NOTES

1. Latitude and Temperature
   - Temperature is affected by _____________________, the angle of insolation, intensity, and _____________________

2. Planetary Winds
   - Prevailing Winds - _____________________

   - Prevailing Winds are caused by ________________ differences and redistribute heat
3. Latitude and Moisture

- Moisture content varies with latitude because of the planetary winds
  - Low pressure causes air to _______________________, _______________________, _______________________, and _______________________, to form clouds and rain
  - High pressure causes air to ________________________ and form arid regions

4. Large Bodies of Water

- Oceans, seas, lakes, and bays modify climate regions where land masses close to a body of water will be regulated by the ____________ rate of heating and cooling of water

5. Ocean Currents

- Coastal climates are modified by ocean currents
  - Warm waters flow away from the ____________
  - Cold waters flow away from the ____________
6. Mountains and Elevation
   - Higher elevations are cooler due to temperatures decreasing
     - Mountains intersect planetary winds causing the air rise, expand, cool, and condense creating a cooler and more moist region on the windward side

7. Cloud Cover
   - During the day clouds ________________ sunlight from warming Earth’s surface and at night ________________ heat in the atmosphere

8. No Cloud Cover
   - During the day sunlight reaches the earth and heat energy ________________ the surface and at night ________________ back into space
PART I QUESTIONS: MULTIPLE CHOICE

1. Which current is a warm ocean current that flows completely around Earth?
   a. North Equatorial Current
   b. California Current
   c. West Wind Drift
   d. Gulf Stream

2. What is the best explanation for ice caps existing at the Earth’s poles and some mountains located near the Earth’s Equator have snow-covered peaks?
   a. Both mountain and polar regions have arid climates.
   b. An increase in snowfall and an increase in temperature have a similar effect on climate.
   c. Mountain and polar regions receive more energy from the Sun than other regions do.
   d. High elevation and high latitude have a similar effect on climate.

3. Which one of the following statements best explains why climates at continental shorelines generally have a smaller yearly temperature range than inland climates at the same latitude?
   a. Land changes temperature rapidly, due to the high specific heat and lack of transparency.
   b. Ocean water changes temperature slowly, due to the high specific heat and transparency.
   c. Ocean water is a good absorber and a good conductor of heat energy.
   d. Land is a poor absorber and a poor conductor of heat energy.

4. Compared to an inland location of the same elevation and latitude, a coastal location is likely to have
   a. warmer summers and cooler winters
   b. cooler summers and warmer winters
   c. warmer summers and warmer winters
   d. cooler summers and cooler winters

5. According to the Earth Science Reference Tables, the climate of which location in New York State is influenced least by large bodies of water?
   a. Buffalo
   b. Jamestown
   c. New York City
   d. Binghamton

6. Which ocean current brings warm water to the southeastern tip of Africa?
   a. Brazil Current
   b. Guinea Current
   c. Agulhas Current
   d. Benguela Current

7. The deflection of Earth’s planetary winds is an example of
   a. the Coriolis effect
   b. the Doppler effect
   c. convection
   d. gravitational pull
8. What is the primary reason New York State is warmer in July than in February?
   a. The altitude of the noon Sun is greater in February.
   b. The insolation in New York is greater in July.
   c. The Earth is closer to the Sun in July.
   d. The Earth is traveling faster in its orbit in February.

9. On which date does the maximum duration of insolation occur in the Northern Hemisphere?
   a. June 21
   b. December 21
   c. March 21
   d. September 23

10. During which month does the minimum duration of insolation occur in New York State?
    a. February
    b. December
    c. September
    d. July

11. Which statement describes how the insolation changes in New York from May 21 through June 21?
    a. The intensity and the duration of insolation both decrease.
    b. The intensity of insolation decreases and the duration of insolation increases.
    c. The intensity and the duration of insolation both increase.
    d. The intensity of insolation increases and the duration of insolation decreases.

12. Mount Kilimanjaro is located in eastern Africa at 3° S. Which climate factor best explains the presence of permanent snow on its peak?
    a. latitude
    b. prevailing winds
    c. elevation
    d. ocean currents

13. Earth’s polar regions have cold, dry climates because the Sun’s rays are at a
    a. low angle, and upper atmospheric air is sinking
    b. low angle, and upper atmospheric air is rising
    c. high angle, and lower atmospheric air is sinking
    d. high angle, and lower atmospheric air is rising

14. A city located near the center of a large continent has colder winters and warmer summers than a city at the same elevation and latitude located on the continent’s coast. Which statement best explains the difference between the cities’ climates?
    a. Air masses originate only over land.
    b. Wind speeds are greater over land than over oceans.
    c. Water changes temperature more rapidly than land.
    d. Land has a lower specific heat than water.
PART II QUESTIONS: FREE RESPONSE

Base your answers to questions 15 through 18 on the graph and map below and on your knowledge of Earth science. The average monthly temperatures for Eureka, California, and Omaha, Nebraska, are plotted on the graph. The map indicates the locations of these two cities.

15. Calculate the rate of change in the average monthly temperature for Omaha during the two-month period between October and December, as shown on the graph.

16. Explain why Omaha, which is farther inland, has a greater variation in temperatures throughout the year than Eureka, which is closer to the ocean.

17. Identify the month with the greatest difference in the average temperature between these two cities.

18. Identify the surface ocean current that affects the climate of Eureka.
19. Explain why the climate at location A is more moist than the climate at location B.

20. State the climate factor that causes a cold climate at location C.

21. Explain why location D has a cooler climate than location E.