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## Lesson 13.1 - Earth Climate

1. What is the difference between weather and climate?

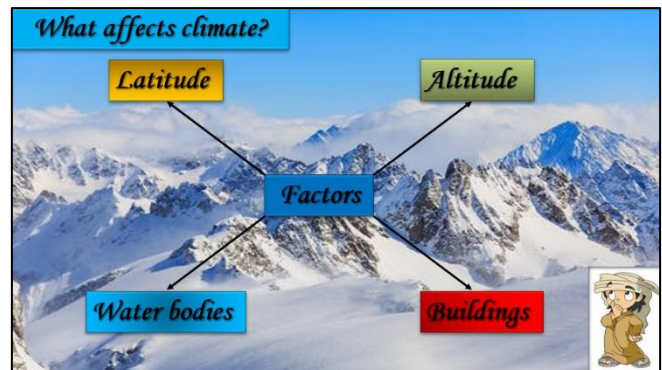
- *Weather* is the atmospheric conditions (air temperature, air pressure, humidity, wind direction and wind speed) in a specific area at a specific time.
- *Climate* is the long-term average weather conditions that occur in a particular region.

2. What does a region's climate depend on?

- Average temperature
- Precipitation
- Change of these variables throughout the year.

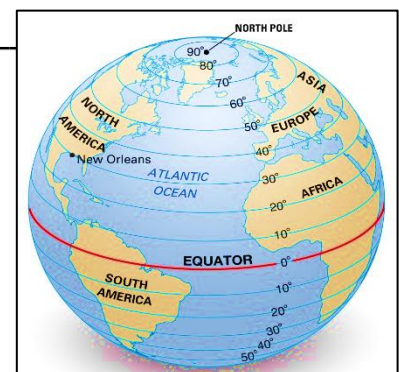
3. What are the factors that affect climate?

- Latitude
- Altitude
- Large bodies of water
- Buildings and concrete



4. The distance north or south of the equator is called \_\_\_\_\_

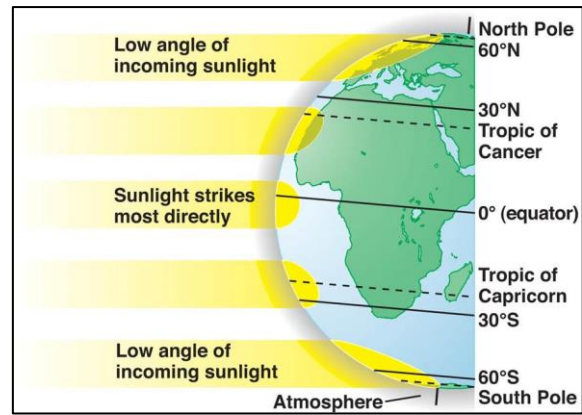
- A. altitude
- B. latitude ✓
- C. elevation
- D. longitude



5. Areas closer to the equator ( $0^{\circ}$ ) receive more solar energy annually than areas farther away from the equator.

State some reasons why this occurs.

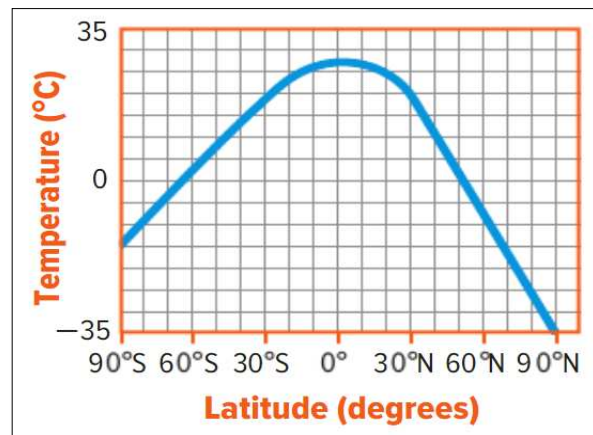
- The curved surface of the Earth.
- The Sun's energy is spread over a larger area.
- As latitude increases,  $0^{\circ}$  to  $90^{\circ}$ , the temperature decreases.



Study the following graph to answer questions 6 and 7.

6. Identify the factor that affects climate, as shown in the graph.

- A. Altitude
- B. Longitude
- C. Latitude ✓
- D. Elevation



7. How does this factor affect climate?

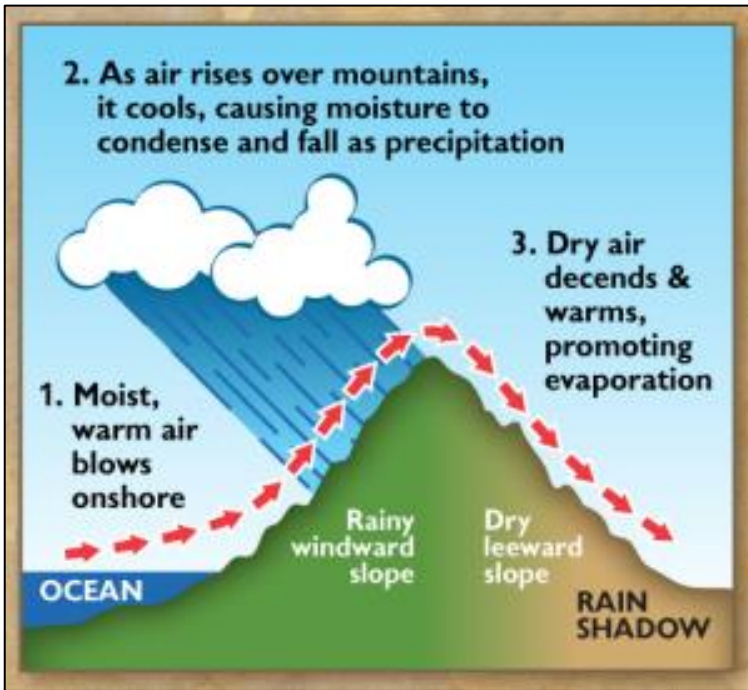
- A. As latitude increases,  $0^{\circ}$  to  $90^{\circ}$ , the temperature decreases. ✓
- B. As latitude increases,  $0^{\circ}$  to  $90^{\circ}$ , the temperature increases.
- C. As latitude decreases,  $90^{\circ}$  to  $0^{\circ}$ , the temperature increases. ✓
- D. As latitude decreases,  $90^{\circ}$  to  $0^{\circ}$ , the temperature decreases.

8. How is temperature influenced by altitude?

- A. Temperature increases as altitude increases
- B. Temperature decreases as altitude increases ✓
- C. Temperature decreases as altitude decreases
- D. Temperature is not affected by altitude.







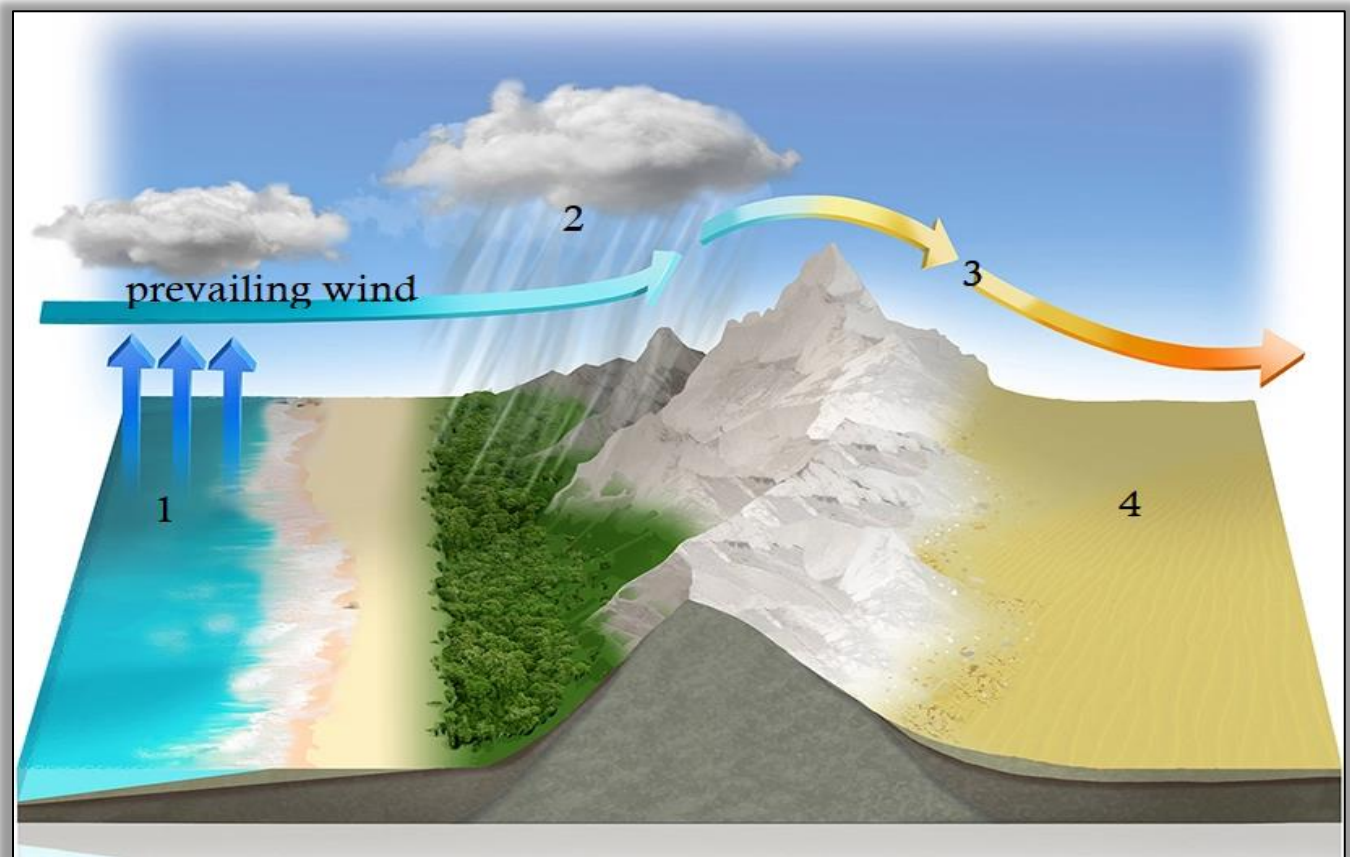
9. What is a rain shadow?

An area of low rainfall on the downwind/leeward slope of a mountain.

10. A rain shadow is created by which factor that affects climate?

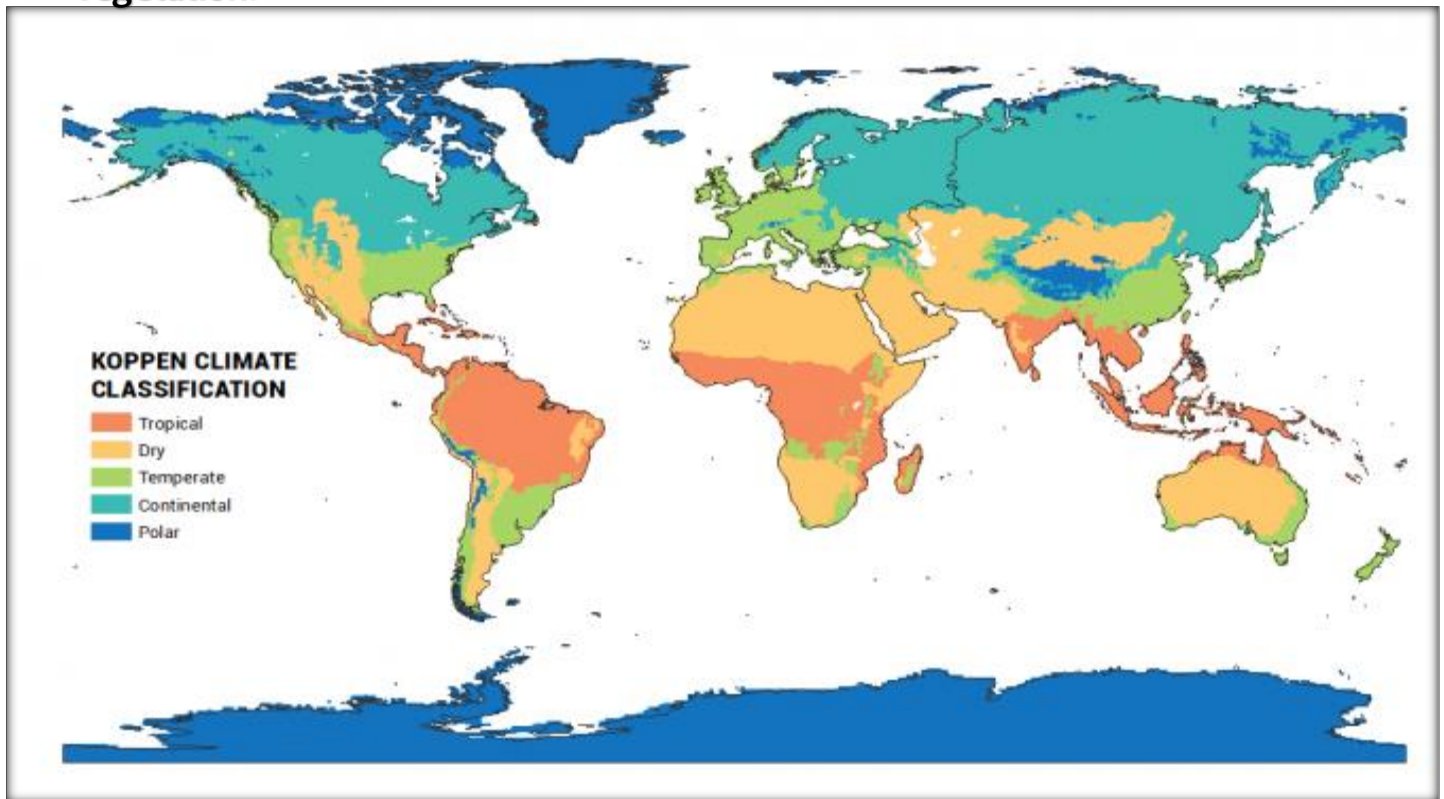
- A. A large body of water
- B. Buildings and concrete
- C. Latitude
- D. Mountains ✓

Use the following diagram to answer questions 11, 12, 13 and 14.



11. What type of air will you find at 1?
- A. moist, cool air  
B. moist, warm air ✓  
C. dry, warm air  
D. dry, wet air
12. What happens to the air as it approaches the area marked 2?
- A. The air sinks and warms up.  
B. The air sinks and cools down.  
C. The air rises and warms up.  
D. The air rises and cools down. ✓
13. What type of air passes over the mountain at 3?
- A. moist, cool air  
B. moist, warm air  
C. dry, warm air ✓  
D. dry, wet air
14. What kind of climate would you expect to find at position 4?
- A. mild  
B. tropical  
C. continental  
D. dry ✓
15. The amount of thermal energy needed to raise the temperature of 1 kg of a material by 1°C is called \_\_\_\_\_.
- A. specific heat ✓  
B. specific wind  
C. specific climate  
D. specific price
16. The specific heat of water is \_\_\_\_\_ than the specific heat of land.
- A. higher ✓  
B. less efficient  
C. lower  
D. more efficient
17. How do large bodies of water influence climate?
- In summer, water is cooler than the air and absorbs thermal energy from the air, keeping air cooler.
  - In winter, water is warmer than the air and releases thermal energy into the air, keeping air temperatures warmer.
  - Climates near coastlines maintain more constant temperatures than land farther from coastlines.

18. The following map shows the different climate regions as classified by Wladimir Köppen. Köppen classified a region's climate by studying its **temperature, precipitation and vegetation.**



Summary of climate types:

Climate type	Description
<i>Tropical</i>	Warm year round, high precipitation
<i>Dry</i>	Hot summers, cooler winter, very low precipitation
<i>Mild/Temperate</i>	Warm summers, mild winters, high precipitation
<i>Continental</i>	Warm summers, cold winters, moderate precipitation
<i>Polar</i>	Cold year round, minimal precipitation

19. Which climate typically has warm summers, cold winters, and moderate precipitation?

- A. continental ✓
- B. tropical
- C. dry
- D. polar

20. Why is one climate different from another?

Difference in latitude, altitude, and proximities to bodies of water, forests and cities all contribute to climate differences.

21. The difference in air temperature between a city and the surrounding rural area.

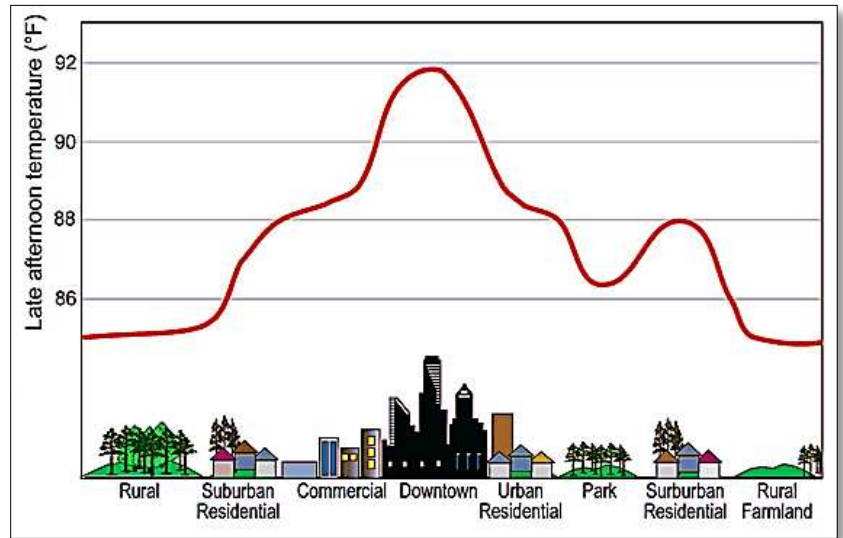
- A. inversion
- B. seasonal variation
- C. microclimate ✓
- D. weather system

22. Which of the following are examples of microclimates?

- A. forests
- B. hilltops
- C. urban areas
- D. all of the above ✓

23. Which area on the graph shows the highest temperature?

- A. park
- B. suburban residential
- C. rural farmland
- D. downtown ✓



24. Which area on the graph shows the lowest temperature?

- A. park
- B. commercial
- C. rural farmland ✓
- D. downtown





## Lesson 13.2 - Climate cycles

1. What do scientists study to learn more about past climates?
  - A. fossilized pollens ✓
  - B. layers of rock
  - C. ice cores ✓
  - D. ocean sediments ✓
  - E. growth rings of trees ✓
  - F. seasonal orbits
2. \_\_\_\_\_ are cold periods lasting from hundreds to millions of years when glaciers cover much of Earth.
  - A. Monsoons
  - B. Drought
  - C. Ice ages ✓
  - D. Heat waves
3. The warm periods that occur during ice ages or between ice ages are called \_\_\_\_\_.
  - A. interglacials ✓
  - B. seasons
  - C. El Niño
  - D. monsoons
4. Name two factors that cause long-term climate cycles.
  - A. shape of Earth's orbit ✓
  - B. changes in tilt of Earth's axis ✓
  - C. gases dissolving and freezing in ice
  - D. study of ice cores
5. Which one of the following factors does not cause long-term climate cycles?
  - A. Changes in ocean circulation.
  - B. Earth's revolution of the Sun.
  - C. The slow movement of the continents. ✓
  - D. Variations in shape of Earth's orbit.

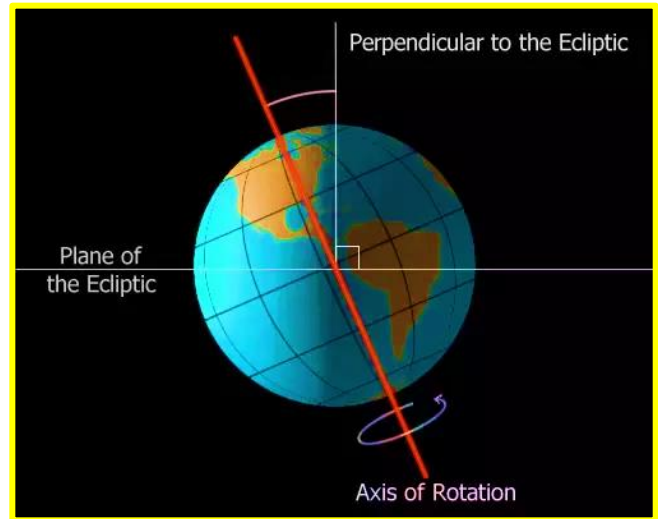


6. What is the current tilt in Earth's axis?

- A.  $22.5^\circ$
- B.  $23.5^\circ$  ✓
- C.  $25.3^\circ$
- D.  $24.5^\circ$

7. What are the effects of Earth's axis tilt?

- A. It causes ocean currents.
- B. It causes winds.
- C. It causes.
- D. It causes seasons. ✓



8. What is the primary cause of seasonal changes on Earth?

- A. Earth's distance from the Sun
- B. Earth's ocean currents
- C. Earth's prevailing winds
- D. Earth's tilt on its axis ✓

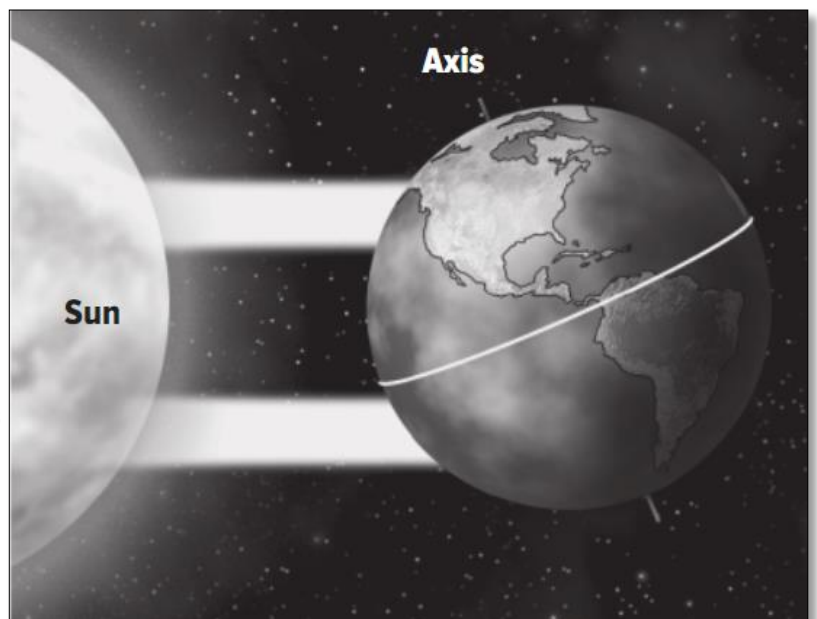
Use the diagram to answer questions 9 and 10.

9. Which season is it in North America?

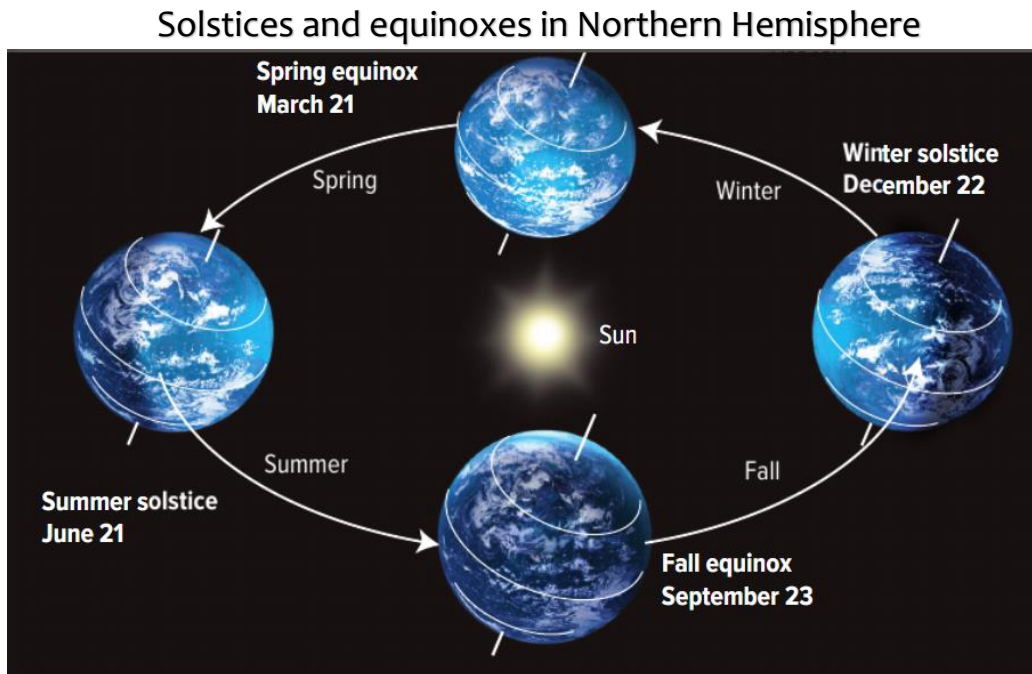
- A. fall
- B. spring
- C. summer ✓
- D. winter

10. Which season is it in South America?

- A. fall
- B. spring
- C. summer
- D. winter ✓

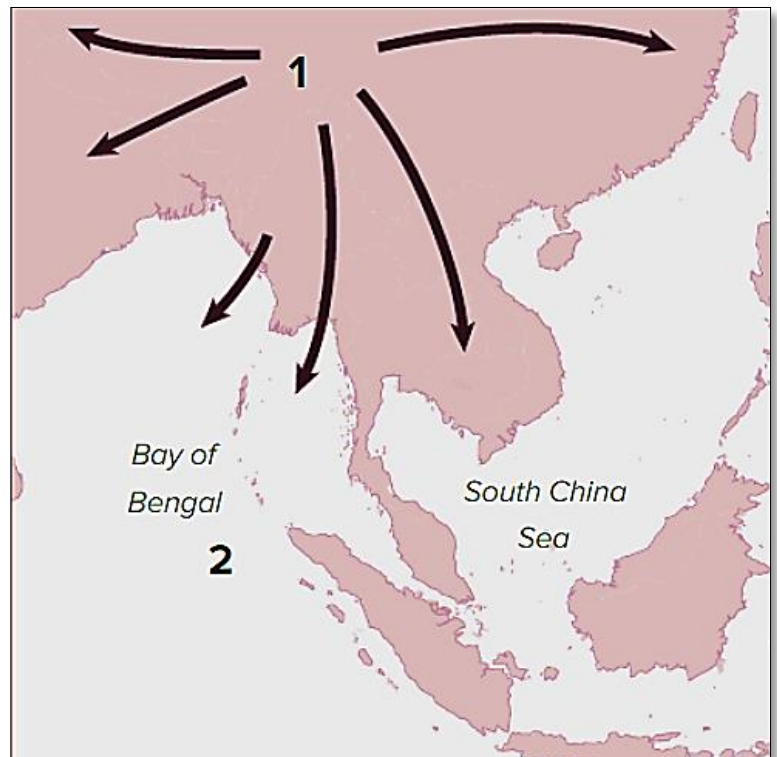


11. Define Solstices and Equinoxes.  
Solstice – start of summer and winter  
Equinox – start of spring and fall



- Use the Solstice and Equinox diagram above to answer questions 12 and 13.
12. Which season is it in the Southern hemisphere in July?
- A. summer
  - B. fall
  - C. winter ✓
  - D. spring
13. Which season is it in the Northern hemisphere in April?
- A. summer
  - B. fall
  - C. winter
  - D. spring ✓

14. During which event do trade winds weaken and the usual pattern of pressure across the Pacific Ocean reverses?
- A. Drought
  - B. El Niño/Southern Oscillation event ✓
  - C. North Atlantic Oscillation event
  - D. Volcanic eruption
15. A \_\_\_\_\_ is a wind circulation pattern that changes direction with the seasons.
- A. monsoon ✓
  - B. hurricane
  - C. tornado
  - D. typhoon
16. In the diagram of the Asian winter monsoon, what does 1 represent?



- A. High pressure ✓
  - B. Increased precipitation
  - C. Low pressure
  - D. Wind speed
17. In the diagram of the Asian winter monsoon, what does 2 represent?
- A. High pressure
  - B. Increased precipitation
  - C. Low pressure ✓
  - D. Wind speed