1. What is the primary energy source that drives all weather events, including precipitation, hurricanes, and tornados?

   A. the Sun  
   B. the Moon  
   C. Earth’s gravity  
   D. Earth’s rotation

2. The diagram below shows a landscape.

Where in the diagram would the air pressure be the greatest?

   A. at the beach  
   B. on top of the mountain  
   C. at the bottom of the clouds  
   D. above Earth’s atmosphere

3. Earth’s atmosphere is divided into layers that are based upon their

   A. water content.  
   B. relative humidity.  
   C. gas content.  
   D. temperature gradient.

4. Where does the energy that heats most of Earth’s surface come from?

   A. melted rock in the center of Earth  
   B. hot rocks from new volcanoes  
   C. sunlight entering Earth’s atmosphere  
   D. plants making food energy for animals

5. Only about 50% of the solar energy directed toward Earth penetrates directly to the surface. What happens to the rest of the radiation?

   A. It is absorbed or reflected by the atmosphere.  
   B. It loses energy traveling through space.  
   C. It is reflected off the Moon and back into space.  
   D. It loses energy overcoming the Sun’s gravity.
6. The diagram above shows four layers of Earth's atmosphere. Which of the following correctly labels the layers represented by A, B, C, and D (from Earth moving upward) in the correct sequence?

A. troposphere, stratosphere, mesosphere, thermosphere  
B. thermosphere, mesosphere, stratosphere, troposphere  
C. troposphere, mesosphere, thermosphere, stratosphere  
D. mesosphere, troposphere, thermosphere, stratosphere

7. Which statement best describes how energy transfer within Earth’s atmosphere can affect a weather condition?

A. During radiation, objects directly transfer heat to each other which affects the air temperature.  
B. During radiation, electromagnetic waves transfer heat and light energy which affects the air temperature.  
C. During convection, objects directly transfer heat to each other which affects the amount of precipitation.  
D. During convection, electromagnetic waves transfer heat and light energy which affects the amount of precipitation.
8. The diagram below shows layers of Earth’s atmosphere.

Which layer of the atmosphere has clouds and weather?

A. troposphere  B. stratosphere  C. mesosphere  D. thermosphere

9. Which of the following pictures best represents the natural greenhouse effect?

10. The main source of energy for wind currents on Earth is
   A. lightning.  B. heat from the sun.
   C. the moon’s gravity.  D. heat from Earth’s interior.

11. Which factor causes global wind patterns?
   A. changes in the distance between Earth and the Moon
   B. unequal heating of Earth’s surface by the Sun
   C. daily changes in the tilt of Earth’s axis
   D. rapid rotation of the Sun on its axis

12. The Sun heats the atmosphere of Earth unevenly. Which of the following is the most likely result of this uneven heating?
   A. Convection in the atmosphere causes a change in air density, resulting in winds.
   B. Conduction through the atmosphere causes evaporation to occur over oceans, resulting in rain.
   C. Radiation from the Sun will reflect through the atmosphere back into space resulting in cooler evenings.
   D. Radiation from the Sun will cause atmospheric moisture to collect over mountain ranges resulting in snowfall.

13. What causes the wind deflection from the north and south poles?
   A. the rotation of Earth on its axis
   B. the oblate shape of Earth
   C. the tilt of Earth’s axis relative to its orbital plane
   D. the difference in total land mass of the two hemispheres
14. The map below shows the continental United States and four arrows representing wind directions. Which arrow best represents the direction of the jet stream that influences weather across the continental United States?

A. arrow 1  B. arrow 2  C. arrow 3  D. arrow 4

15. In the summer, coastal towns usually experience cool ocean breezes, as shown in the diagram below. Which process creates the type of ocean breeze shown?

A. Cool air above the ocean sinks and warm air above the land rises.
B. Cool air above the ocean rises and warm air above the land sinks.
C. Warm water evaporates and condenses above the ocean.
D. Warm water condenses and precipitates above the ocean

16. What occurs when cool air moves from the beach toward the ocean during the night?

A. a land breeze  B. prevailing winds  C. a sea breeze  D. updrafts
17. The picture below shows a place where air currents will form due to the uneven heating of Earth.

In which direction will air currents most likely move?

A. straight down over the land  
B. from the land toward the sea
C. straight up above the sea  
D. from the sea toward the land

18. Which best describes how air pressure can be affected on hot summer days?

A. The air expands and becomes less dense, creating areas of low pressure.
B. The air expands and becomes less dense, creating areas of high pressure.
C. The air expands and becomes more dense, creating areas of low pressure.
D. The air expands and becomes more dense, creating areas of high pressure.

19. What has the most effect on the speed of wind?

A. humidity  
B. temperature  
C. air pressure

20. Earth rotates in an easterly direction. Therefore, southward wind currents in the Northern Hemisphere appear to be deflected to the

A. east.  
B. west.  
C. north.  
D. south.

21. Most warm and cold air masses that enter North Carolina are moved by global winds. Which global winds are responsible for most of the local weather in North Carolina?

A. northeast trade  
B. southeast trade  
C. polar easterlies  
D. prevailing westerlies
22. Which diagram best models the movement of coastal air during the afternoon?

A.  
B.  
C.  
D.  

23. Wind Patterns of Planet X

Where would deserts most likely be found on Planet X?

A. A  B. B  C. C  D. D

24. The first atmosphere that formed above Earth was most likely due to what process?

A. eruption of volcanoes  B. movement of water
C. development of land plants  D. occurrence of violent storms
25. The diagram below illustrates the motion of prevailing winds over oceans on Earth.

If a sailboat sailed from the eastern United States to Europe and then back, which of the following winds would most directly power the sailboat?

A. Polar Easterlies going and Westerlies returning
B. Northeast Trade Winds going and Westerlies returning
C. Westerlies going and Northeast Trade Winds returning
D. Southeast Trade Winds going and Northeast Trade Winds returning

26. The reason that sea and land breezes form is

A. the land heats and cools more slowly than the water.
B. the land heats and cools more quickly than the water.
C. air moves more easily over water than over land.
D. air moves more easily over land than over water.
27. The following diagram shows the layers of Earth’s atmosphere.

Which of these names the layers of Earth’s atmosphere in order, starting with Layer 1?

A. Troposphere, stratosphere, mesosphere, thermosphere, exosphere
B. Troposphere, stratosphere, mesosphere, exosphere, thermosphere
C. Stratosphere, troposphere, thermosphere, mesosphere, exosphere
D. Stratosphere, mesosphere, troposphere, exosphere, thermosphere
28. The following satellite map shows the path of a jet stream above North America.

![Satellite Map of Jet Stream](image)

**Key**

- = jet stream
- = Great Plains area

Based only upon the data of this jet stream, which kind of weather is expected in the Great Plains area?

A. Warm  
B. Cold  
C. Wet  
D. Dry

29. As air rises above Earth’s surface, it becomes less dense. The resulting decrease in air pressure is gradual up to about 15 km above the surface and then pressure decreases very rapidly. Which graph best shows the relationship between height above Earth’s surface and air pressure?

A.  
B.  
C.  
D.
The Atmosphere  

1. Answer: A
2. Answer: A
3. Answer: D
4. Answer: C
5. Answer: B
6. Answer: A
7. Answer: B
8. Answer: A
9. Answer: A
10. Answer: B
11. Answer: B
12. Answer: A
13. Answer: A
14. Answer: A
15. Answer: A
16. Answer: A
17. Answer: D
18. Answer: A
19. Answer: C
20. Answer: B
21. Answer: D
22. Answer: D
23. Answer: C
24. Answer: A
25. Answer: C
26. Answer: B
27. Answer: A
28. Answer: B
29. Answer: B