

Due _____

1. What is the definition for:
 - a. Conduction: The transfer of thermal energy by collisions between particles in matter. (Heats air close to Earth's surface)
 - b. Convection: The transfer of thermal energy by the movement of matter from one place to another (by the flow of heated material). Convection current is the continuous movement of air that occurs in a circular motion.
 - c. Radiation: The transfer of thermal energy by electromagnetic waves. Earth receives energy from the sun in the form of radiation.
 - d. Condensation: The process by which water vapor changes back from a gas into a liquid.
2. How does atmospheric pressure change as it moves away from the Earth?

Atmospheric pressure is greatest near Earth's surface and decreases as you move upward away from sea level.

3. What provides the source for all energy in our atmosphere?

The sun

4. What causes these wind patterns, what type of weather do they cause, and where are they located?
 - a. Jet stream: High altitude winds, located between 6 and 10 km above Earth's surface in both the northern and southern hemispheres. They cause "freak" winds. (Move between 200 – 250 km/h between the troposphere and the stratosphere).
 - b. Doldrums: Along the equator, heating causes air to expand, creating a zone of low pressure. Cloudy, rainy weather develops almost every afternoon. There is little wind.
 - c. Polar easterlies: In the Polar Regions, cold dense air sinks and moves away from the poles. Earth's rotation deflects this wind from east to west.
 - d. Trade winds: Air warmed between the equator and 30 degrees latitude north or south travels toward the poles but gradually cools and sinks. As the air flows back toward the low pressure of the doldrums, the Coriolis Effect deflects the surface wind to the west. Early sailors relied on these winds to navigate global trade routes.

- e. Prevailing westerlies: Near 30 degrees north and south latitude, Earth's rotation deflects air from west to east as air moves toward the Polar Regions. They are responsible for moving much of the weather in the United States and Canada from west to east.

5. What are the different atmospheres? What is their order away from Earth? Explain their temperature and composition?

- a. Troposphere: Lowest layer of the atmosphere. It is closest to the Earth's surface. Holds the majority of Earth's air and has weather. In the troposphere, as altitude increases, air temperature decreases.

- b. Stratosphere: The region of the atmosphere that extends from about 15 km to 50 km. In the stratosphere, as altitude increases, air temperature increases. This occurs because the stratosphere contains the highest concentration of ozone.

- c. Mesosphere: Extends to about 80 km above Earth's surface. Temperatures are very warm.

- d. Thermosphere: Does not have a defined upper limit. Beyond the thermosphere is space. Temperatures are very warm.

6. What affect does the ozone have on reflection and absorption of solar energy? What would happen to life if we lost our ozone layer?

The layer of ozone in the stratosphere absorbs some of the Sun's harmful ultraviolet radiation, causing air temperature to rise. They prevent some radiation from reaching Earth's surface.

7. Draw a picture of what happens when solar energy comes toward and Earth.

(Picture should show some energy being reflected back into space, some being absorbed by the atmosphere, and some being absorbed by land and water on Earth's surface).

8. What do differences in heating and the Coriolis effect do to the Earth's wind and weather patterns?

The Coriolis effect is a deflection in the movement of air and water caused by Earth's rotation. The Sun's uneven heating of Earth's surface forms giant loops, or cells, of moving air. The Coriolis effect deflects the surface winds to the west, or east, setting up belts of prevailing winds that distribute heat and moisture around the globe.

9. Draw a diagram to explain the water cycle.

10. What causes winds?

Winds occur because of differences in temperature and pressure.

11. Which gas makes up the largest quantity in Earth's atmosphere?

Nitrogen

12. What percent of incoming solar radiation reaches and is absorbed by the surface of the Earth?

50%

13. Why do some areas of Earth's surface receive different amounts of radiation ?

The Earth is curved.

14. Why is air above the equator heated more than at any other place on Earth?

The solar rays strike the equator more directly (closer to a 90 degree angle).

15. Why is it warmer near the equator?

At the poles, the beam of light is spread over a large area.

16. What is an inversion layer?

A condition that occurs in the troposphere when warm air sits on top of cold air

17. Why do we have sea and land breezes?

The land heats and cools more quickly than the water.

18. What happens as heated air expands and becomes less dense than the air surrounding it?

The air rises in an updraft

19. What is a downdraft?

A dense column of air sinking towards Earth's surface

20. List the steps in the process of air circulation in the order they occur.

- Energy from the Sun heats up Earth's surface and the air near it.
- As air is heated it expands and becomes less dense.
- Warm air rises into the atmosphere.
- Dense, cold air flows or sinks down to replace the warmer air that is rising.
- Air that has moved closer to Earth's surface warms and rises again.

21. What might happen if the radiation balance (the amount of solar energy received and the amount of thermal energy returned to space) became unequal?

The earth could get warmer, there could be a change in the types of animals and plants that could survive on the surface of the Earth, and the polar ice caps could begin to melt.

22. True or false. The surface of the Earth absorbs energy from the Sun. (True)