

Weather Study Guide 1 Name \_\_\_\_\_ Pd \_\_\_\_ date \_\_\_\_

1. What 2 things drive weather?

*Energy from the sun and moisture*

2. What are the 4 basic steps to "heating" the Earth?

- 1. Electromagnetic energy (U.V., I.R., Visible Light is Radiated from the Sun*
- 2. This energy is absorbed by the surface and transformed to thermal energy*
- 3. Thermal energy is conducted from the surface to the air*
- 4. Energy is distributed through the air by convection.*

3. What process moves energy and moisture around in the Earth's atmosphere?

*Convection*

4. What property of matter drives this process?

*Differences in density*

5. Explain the effect of temperature on the density of the atmosphere.

*As temperature increase the particles of air move faster, spread out from each other causing the air to expand and become less dense than it was.*

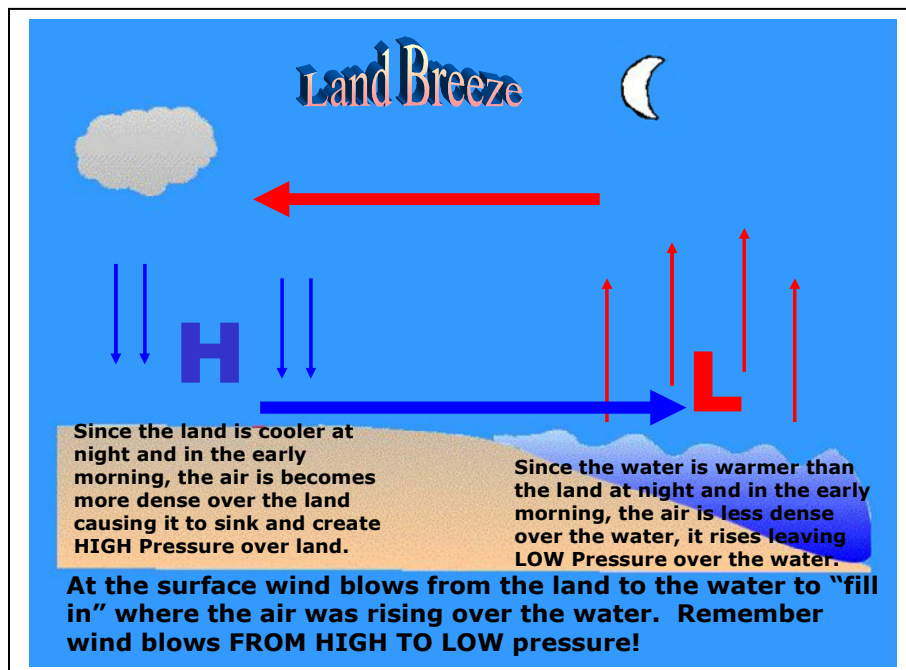
6. Explain the effect of moisture content on the density of the atmosphere.

*Water vapor has less mass than other things that make up the air so air that has high moisture content to the same volume of dry air at the same temperature will have less density*

7. What causes air to rise from the surface into the atmosphere? Describe how this works.

*Air that is less dense than its surroundings will rise. When air is warmer than surrounding air it will expand and become less dense. OR If air has a lot of moisture compared to surrounding air of the same temperature it will be less dense.*

8. Draw a diagram representing a Sea Breeze and explain how it works this way.



9. Which way does the wind blow?

*From High pressure to Low pressure*

10. What must occur at the surface for there to be high pressure?

*Air must sink*

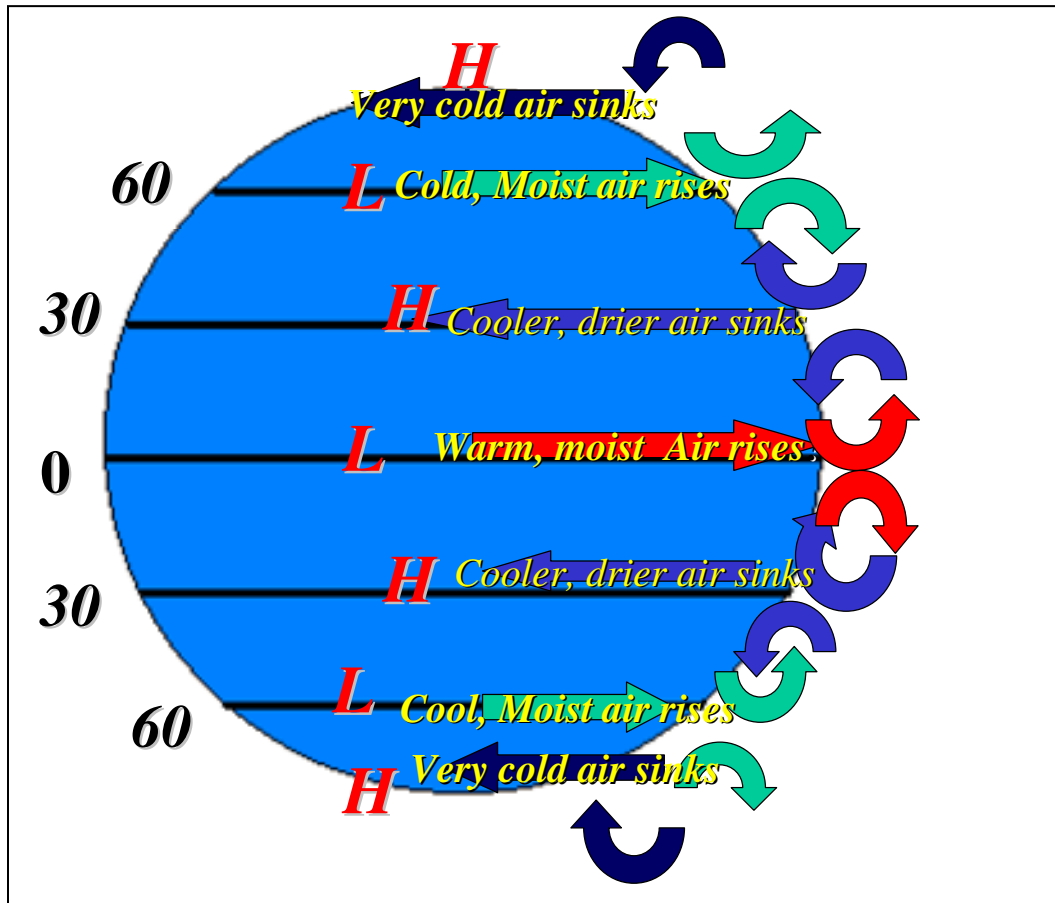
11. What must occur at the surface for there to be low pressure?

*Air must rise*

12. Explain why it is warmer near the Equator than closer to the poles.

*Since the Earth is curved energy from the Sun is more concentrated at the Equator and more "spread out" further away from the Equator. This concentration means that there will be more energy per square meter nearer to the Equator that can be absorbed and transformed to thermal energy.*

13. Below is a diagram of the Earth. Label where the air is rising from the surface and where it is sinking back to the surface. Also label where the resulting high and low pressure systems will be.



14. There is a global circulation cell forms between 0 and 30 degrees latitude. Explain how it forms there.

- Energy is more concentrated at the equator than further away so there is more energy to transform to thermal energy (heat)
- Warm, moist air near the equator expands and becomes less dense than its surroundings causing it to rise leaving low pressure at the surface.
- As the warm moist air rises it begins to cool. Moisture condenses to clouds causing the air to become drier making the air more dense than its surroundings so it sinks creating High pressure near 30 degrees latitude.
- Wind blows from high pressure at 30 degrees latitude back toward Low pressure at the equator, as it flows toward the Equator it warms and evaporates moisture causing it to rise again starting the cycle over again.

15. There is a global circulation cell forms between 30 and 60 degrees latitude. Explain how it forms there.

- Energy from the Sun is not as concentrated at 60 degrees latitude as it is closer to the Equator so temperature is not the main driving force for convection in this cell. There is enough energy to evaporate moisture from the oceans though. Since high moisture content can make air less dense than its surrounding the air at 60 degrees will rise leaving low pressure at the surface.
- As this cool moist air rises it begins to cool further. Moisture condenses to clouds causing the air to become drier, making the air more dense than its surroundings so it sinks creating High pressure near 30 degrees latitude.
- As the wind blows from the high pressure at 30 degrees latitude back toward the Low pressure at 60 degrees it evaporates more moisture so that at 60 degrees it has become less dense than its surroundings again and rises starting the cycle over again.