

# ATMOSPHERIC ENERGY EXCHANGES 2

Name \_\_\_\_\_

Partners \_\_\_\_\_

Give the best answer to the following questions.

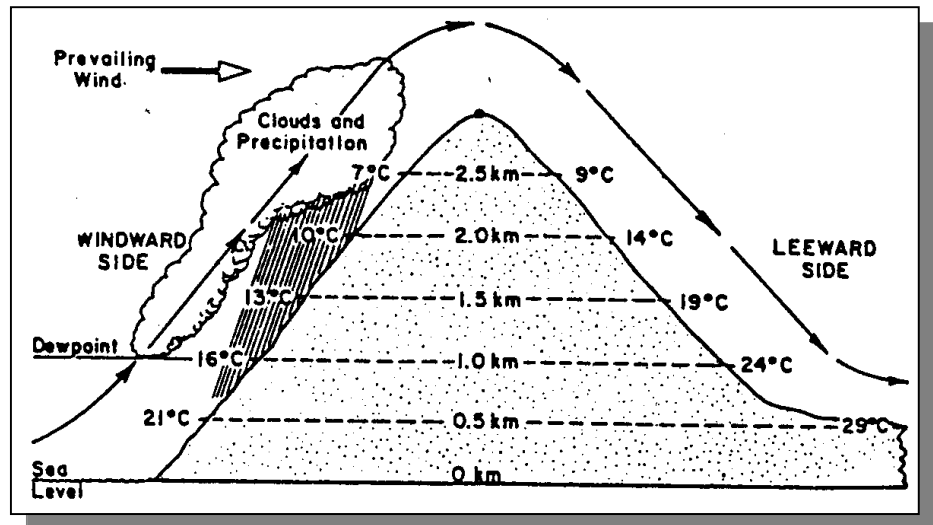
1. On a hot day, LAND / THE OCEAN heats up faster, so the air is less dense over LAND / THE OCEAN.
2. Why do breezes blow from the ocean to land during the day? \_\_\_\_\_  
\_\_\_\_\_
3. Why do breezes blow from land out over the water at night? \_\_\_\_\_  
\_\_\_\_\_
4. In the boxes below, draw 2 diagrams depicting a land breeze and a sea breeze. For each diagram, 1) draw the convection cell with lines and arrows, 2) label the air pressure (H or L) over the land and water, 3) label the temperature (H or L) over the land and water, and 4) draw a Sun if day or a Moon if night.
5. When air rises, it EXPANDS / COMPRESSES.

<b>LAND BREEZE</b>
<b>SEA BREEZE</b>

6. When air expands, it WARMS / COOLS. This is called an \_\_\_\_\_ temperature change.

7. When air cools, EVAPORATION / CONDENSATION can occur.
8. The *dry adiabatic lapse rate* is \_\_\_\_\_
9. Three things are necessary for cloud formation: 1) the air must be \_\_\_\_\_ with water vapor, 2) it must contain condensation \_\_\_\_\_, and the temperature must \_\_\_\_\_.
10. Hurricanes get their energy from \_\_\_\_\_.
11. Frost is *not* frozen dew. Frost forms when \_\_\_\_\_.
12. Clouds are *not* water vapor. Clouds are \_\_\_\_\_.
13. Clouds form when \_\_\_\_\_.
14. In the old days, sailors spent months at sea with no sight of land. On clear days, when land was nowhere in sight, they knew that a single cloud on the horizon might indicate land. Why would this be?

15. The diagram below shows moist air blowing onto the Pacific Coast Range from the Pacific Ocean. As the air sweeps up the windward side of the mountain, it rises and EXPANDS / COMPRESSES, and then WARMS / COOLS at the \_\_\_\_\_ adiabatic lapse rate of  $10^{\circ}\text{C}/\text{km}$ . As the air cools, its water vapor might begin to \_\_\_\_\_, and then as it continues to rise it cools at the \_\_\_\_\_ adiabatic lapse rate of  $6^{\circ}\text{C}/\text{km}$ . After the air passes over the mountain it starts to descend the



leeward side, so it EXPANDS / COMPRESSES, and then WARMS / COOLS at the \_\_\_\_\_ adiabatic lapse rate, so the air on the leeward side is WARMER / COOLER and more MOIST / DRY than the air on the windward side of the range.

16. After a cloud forms, precipitation can only occur if \_\_\_\_\_.
17. Sleet is \_\_\_\_\_.
18. Snow is \_\_\_\_\_.
19. Hail forms when \_\_\_\_\_.