

1.

What are Chinook, Foehn, or Santa Ana winds and how do they form (these are all basically the same type of wind but named differently based on where they occur)?

These winds are warm dry winds which flow down mountain slopes. In California, these winds are often referred to as the Santa Ana Winds. During winter time, a high pressure system tends to form to the East over the Great Basin causing warm, dry air to descend, increasing the risk of wild fires.

5.

Know where winds move up or down in the atmosphere (the three cell circulation model) and the names of these cells.

In the three-cell model of atmospheric circulation, winds move down at the poles and 30° latitude, and up at the equator (around 60° latitude). The cells are named the Hadley cell (where air rises near the equator and sinks around 30° latitude), the Ferrel cell (in the mid-latitudes, with air moving up around 60° latitude), and the Polar cell (where air sinks at the poles and rises around 60° latitude).

8.

What is a jet stream and where are they located? (know which one most commonly affects weather in the US)

A jet stream is a high-altitude, fast-flowing, narrow band of wind that circles the Earth, formed at the boundary between cold and warm air masses. The most common jet stream to affect the weather in the US is the polar jet stream, which flows over North America, Europe, and Asia, guiding storms and influencing temperature patterns

11.

Know the direction ocean currents spin in each hemisphere and how they affect weather. Be able to predict what type of current exists off the coast of particular continents.

Ocean currents spin in a clockwise direction in the Northern Hemisphere and a counter-clockwise direction in the Southern Hemisphere, driven primarily by large, circular systems called gyres and the Coriolis effect.

2.

What is a Katabatic wind and how does this differ from the Chinook winds?

Winds which originate as static masses of very cold air atop mountains. Once forced to move, this very cold dense air cascades down a mountain at very high speeds.

6.

What is the ITCZ, what affects its movement, and how it moves throughout the year? What kind of effect does it have on weather in its vicinity?

ITCZ stands for Intertropical Convergence Zone. It moves (as do all the wind belts) depending on where the sun's maximum rays are. Areas which have the most direct sunlight will heat up to greater amounts, allowing more moisture to be in the air. Hot, moist air creates regions of ascending air and low pressure and therefore constant clouds near this band (usually near the equator). The movement of the ITCZ causes wet and dry seasons in some regions.

9.

What is the significance of the jet stream (i.e. why is it important in knowing about it and in terms of weather prediction)?

The jet stream is significant because it directs weather systems like storms and influences temperature and precipitation patterns.

12.

What is El Nino and La Nina and what causes these events? On what time scales do El Nino and La Nina exist and how often do they occur?

El Nino and La Nina are often referred to as the Southern Oscillation. It involves the periodic weakening and strengthening of the trade winds below the equator causing warm water to slosh back and forth in the Pacific basin. Completes cycle in 2 - 7 years. El Nino or La Nina conditions normally persists for 9 - 24 months at a time.

3.

What is a Country Breeze and why does it occur?

A country breeze is a light, localized wind that blows from the cooler surrounding rural areas into the warmer city center, primarily at night. This effect is most prominent during clear nights. The rock and building materials in cities tend to retain more heat and are warmer during the night. This creates a local area of low pressure causing wind to come in from the surrounding rural areas.

7.

What does a monsoon refer to and what specifically causes the monsoon in India?

Large seasonal changes in Earth's global circulation are called Monsoons. Monsoon does not mean rainy season; rather it refers to a particular wind system that reverses its direction twice a year. During winter, long nights and low sun angle cause the cold Siberian High to form over Russia. This influences most of Asia's climate. During the summer, southern Asian heats up a considerable amount causing warm moist air to blow from the ocean to the land. In India, they experience a shift in pressure and winds throughout the year causing the Asian monsoon..

10.

What is the difference between meridional flow of the jet stream and zonal flow?

When the upper level winds are parallel or nearly parallel to the lines of latitude the wind pattern is termed zonal. When the winds cross the latitude lines at a sharp angle, the wind pattern is termed meridional. In a meridional pattern the jet stream will have highly amplified troughs and ridges.

13.

Explain why some deserts exist where they do. Some are clustered near 30N while some are on certain sides of a particular continent. Why is this?

Most deserts exist in places opposite a mountain range from the direction of the prevailing winds. The reason is that as air is pressed "up" the mountains it generates the conditions for precipitation (rain, snow, etc.) by the time the air has moved over the mountains, it's much less moist. Higher in the atmosphere, the now cold, dry air rises and moves away from the equator. At about 30 degree latitudes in both hemispheres (north and south), the air descends. As it warms, the air expands, condensation and precipitation are infrequent..



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