Wind is an example of

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Wind is the flow of air from regions of high pressure to low pressure. Learn how temperature, Earth"s rotation and the Coriolis force shape different types of wind, s...

Come explore with us!

Temperature and pressure are critical factors in the creation of a windy day.

Wind is all around us. It arrives in many shapes and forms. Wind may be an elegant mood-setter or a furious early warning of a dangerous storm. Although few people give much thought to wind -- unless it"s threatening -- those rivers of moving air drive the weather in ways that rule our environment.

There are many different types of wind. Each forms in different ways. But essential to all are changes in air pressure.

TV weather forecasters regularly point on maps to areas of high and low pressure. And that makes sense because changes in air pressure are what lead to wind -- the flow of air. In fact, wind is Mother Nature"s way of equalizing differences in air pressure.

Air pressure is the force that air exerts toward whatever contains it. The pressure of air in a balloon is higher than that of the air outside. That"s why most of the air will leave a balloon whenever it gets a hole. When it comes to the atmosphere, air pressure describes the weight of air over a given site. It is determined by that parcel of air"s temperature, volume and density.

Expanding air produces regions of "high pressure." These push nearby air away. Contracting air creates zones of "low pressure." They pull nearby air inward. That"s why the wind blows: It moves from regions of high pressure to those where pressure is lower. The zone between the high- and low-pressure areas is known as a pressure gradient, or a zone over which the pressure varies from high to low.

Thermal wind is the first of four main types of atmospheric flow. The most complex type of wind, it drives weather systems across the globe. It"s born from differences in the temperatures between the equator and the poles.

Picture a column of air from the ground to the top of the troposphere (TRO-puhs-sfeer) -- that layer of atmosphere in which we live. As the sun beats down on it, this air heats up and expands. That makes the top of the column rise. This is common near the equator. If a column of air cools, such as at the poles, it contracts and shrinks. That same stack of air -- still weighing the same amount -- will now be shorter and denser.

This means that imaginary surfaces of constant density slope down toward the poles. That slope isn"t constant. These lines rise up and down like bumps and wrinkles in a blanket, depending on local conditions. But the general downward slope allows masses of air to slide toward the poles.

Thermal wind is what is created as those masses flow down this slope, carrying heat away from the equator. Meteorologists refer to this natural movement of solar energy out of the equator as "poleward heat transport." Without it, most folks living outside the tropics would be buried beneath a sheet of ice. The equator would also be hot as a furnace.