Air Pressure and Wind

Essential Standard 2.5

Understand the structure of and processes within our atmosphere.

Learning Objective 2.5.2

Explain the formation of typical air masses and the weather systems that result from air mass interactions.

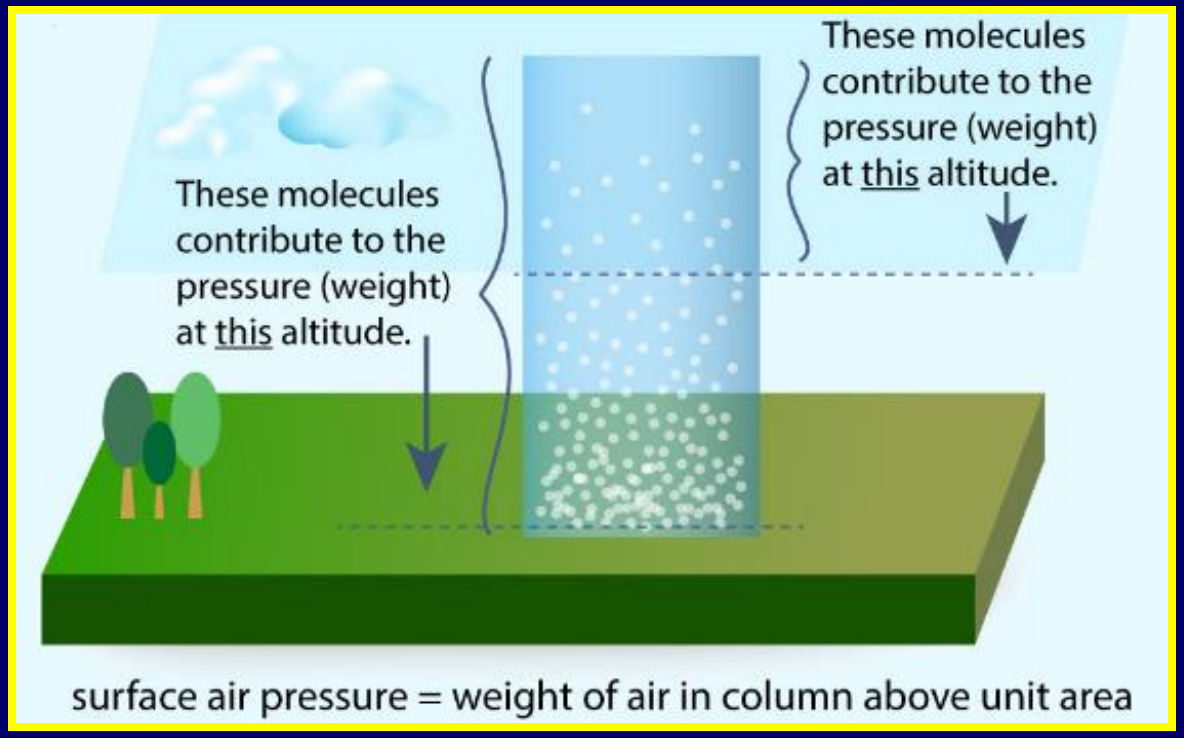
I Can Statements

At the end of this lesson, you should be able to say, with confidence:

- I can distinguish between high and low air pressure systems and explain how they are created.
- I can explain what causes wind.

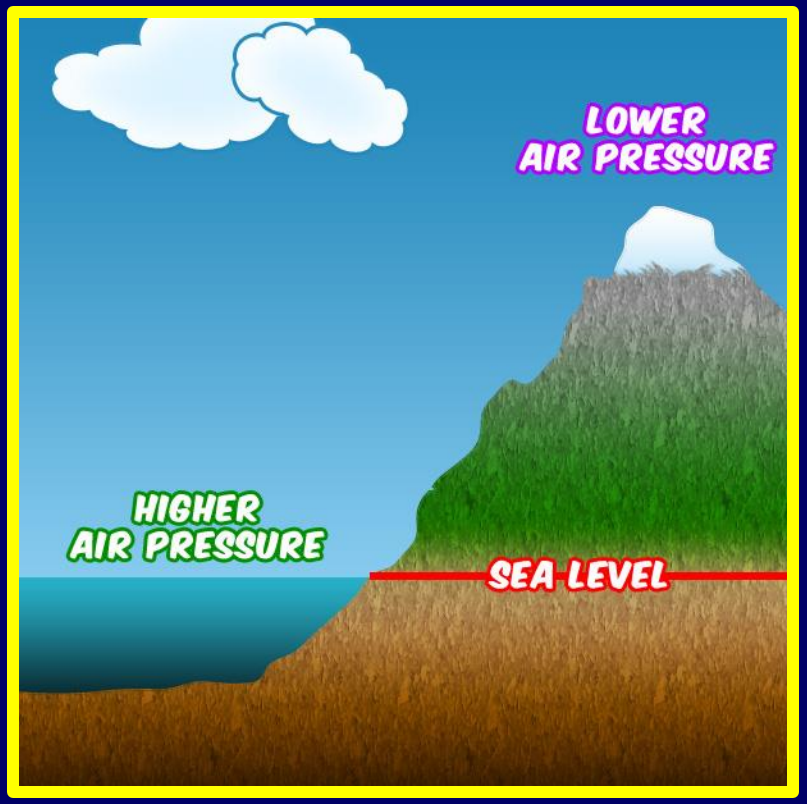
Air Pressure

Air pressure is the weight of the air molecules in the atmosphere pressing down on Earth.



Air Pressure and Altitude

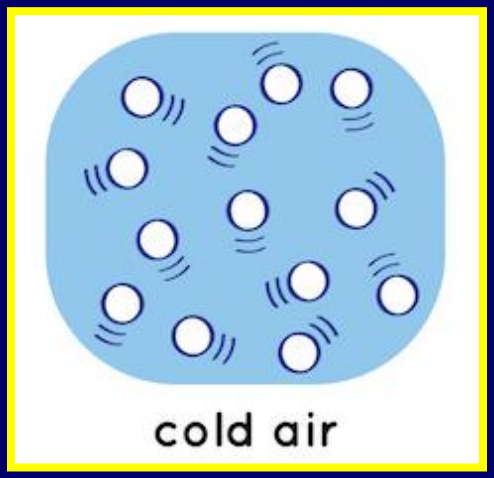
At higher altitudes, the amount of air molecules is less resulting in lower air pressure.

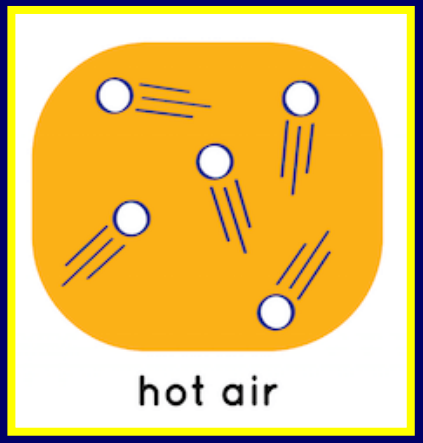


At lower altitudes, the amount of air molecules is greater resulting in higher air pressure.

Rising and Sinking Air

When air is cooled the molecules condense, making the air more dense, which causes the air to sink.

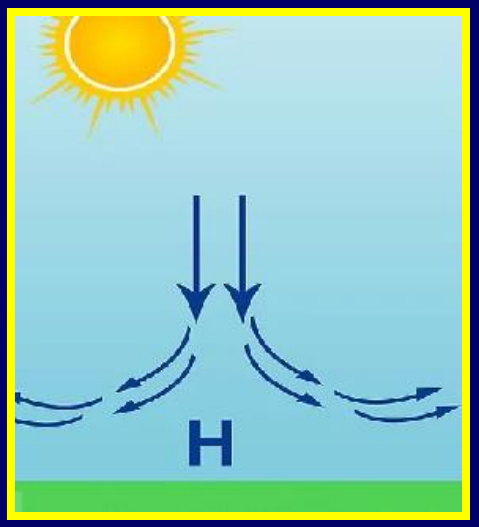


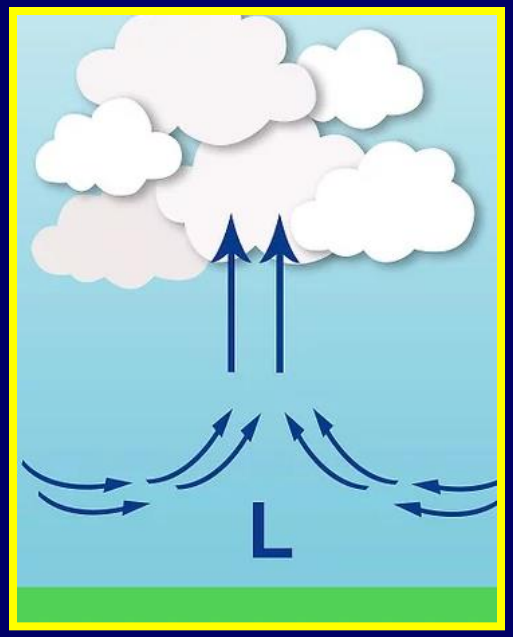


When air is heated the molecules spread out, making the air less dense, which causes the air to rise.

Pressure Systems

As cool air sinks, more air molecules are being added near the ground, resulting in an area of high pressure.

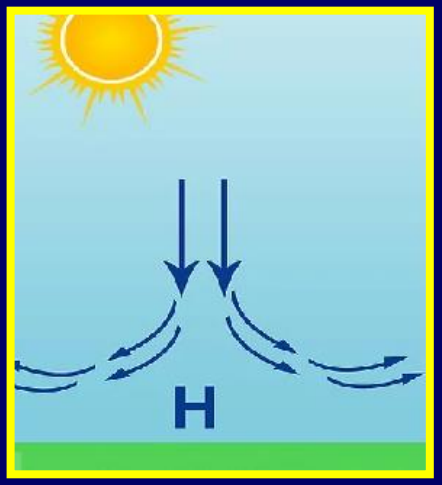




As warm air rises, air molecules are being removed from the ground level, resulting in an area of low pressure.

Wind

In a high pressure system, the cool, sinking air moves outwards as it approaches the ground.



As the air moves over the ground it is warmed and then rises upwards in a low pressure system.

The movement of air from a high pressure system to a low pressure system is called wind.

Wind

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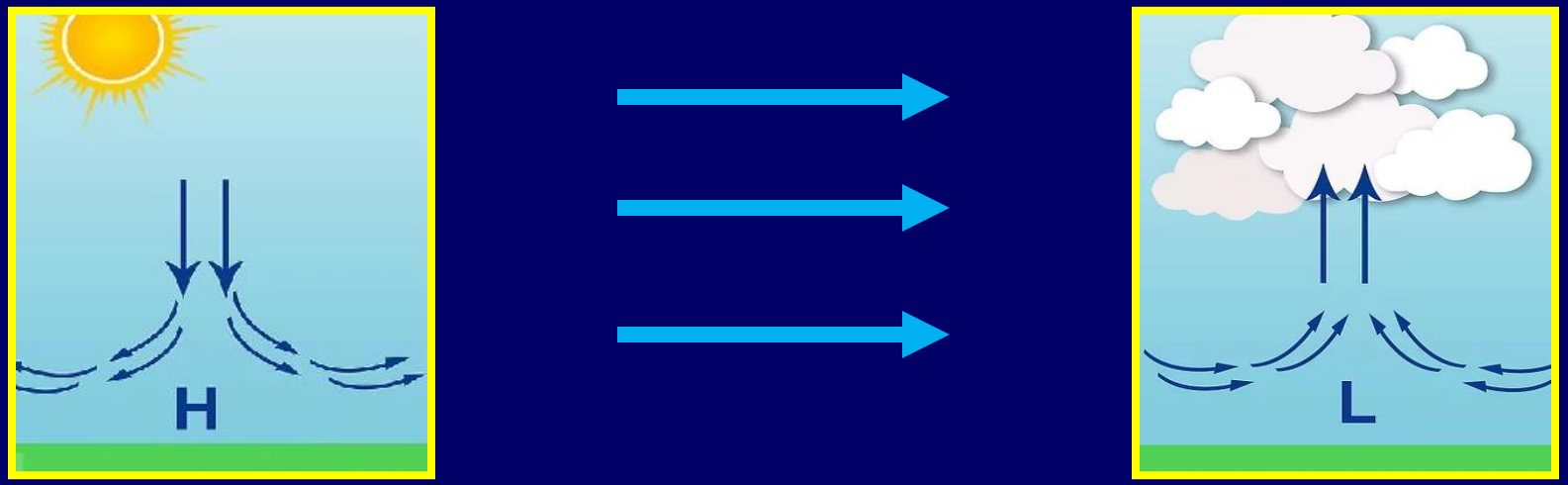


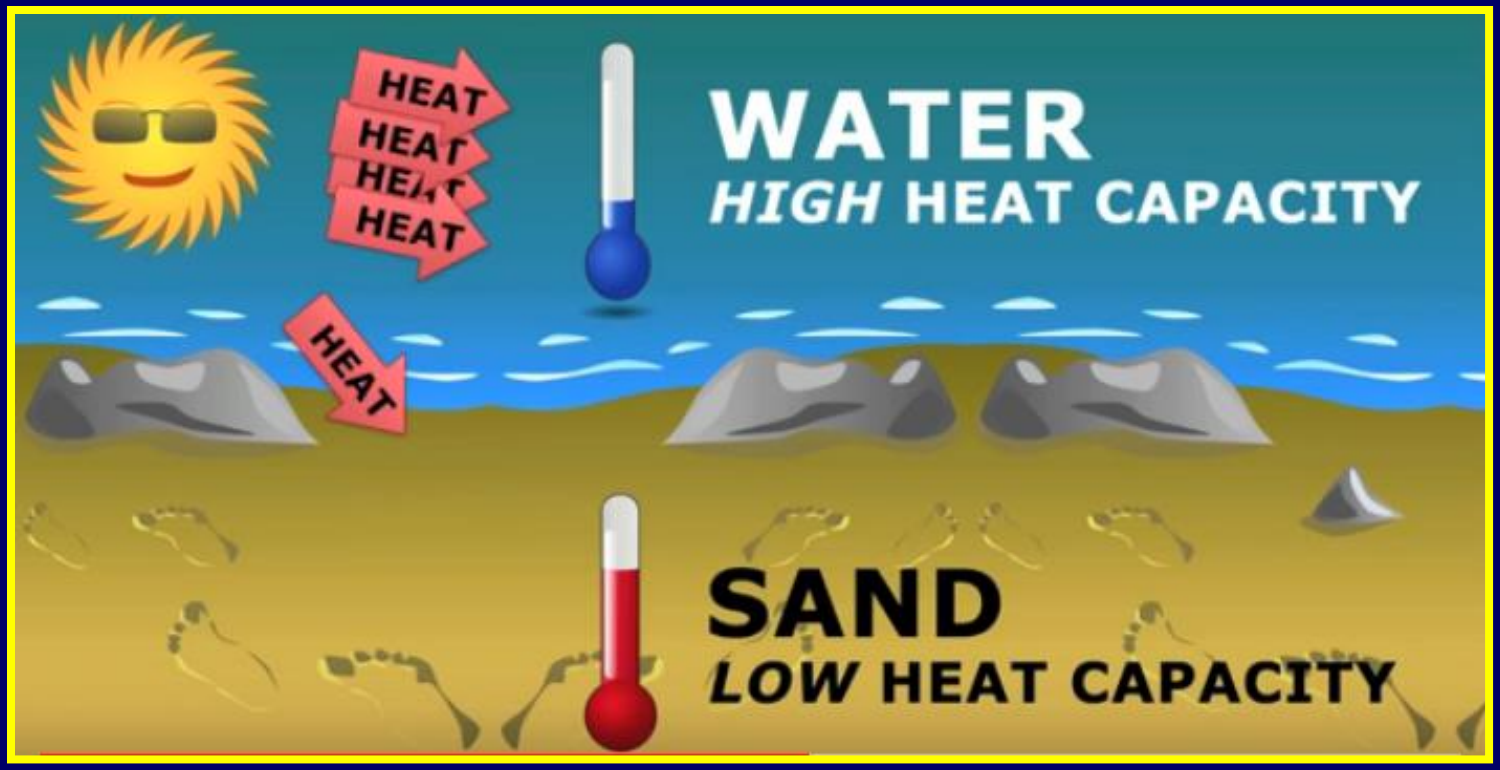
High Pressure

Low Pressure

The larger the difference in pressure, the stronger the wind.

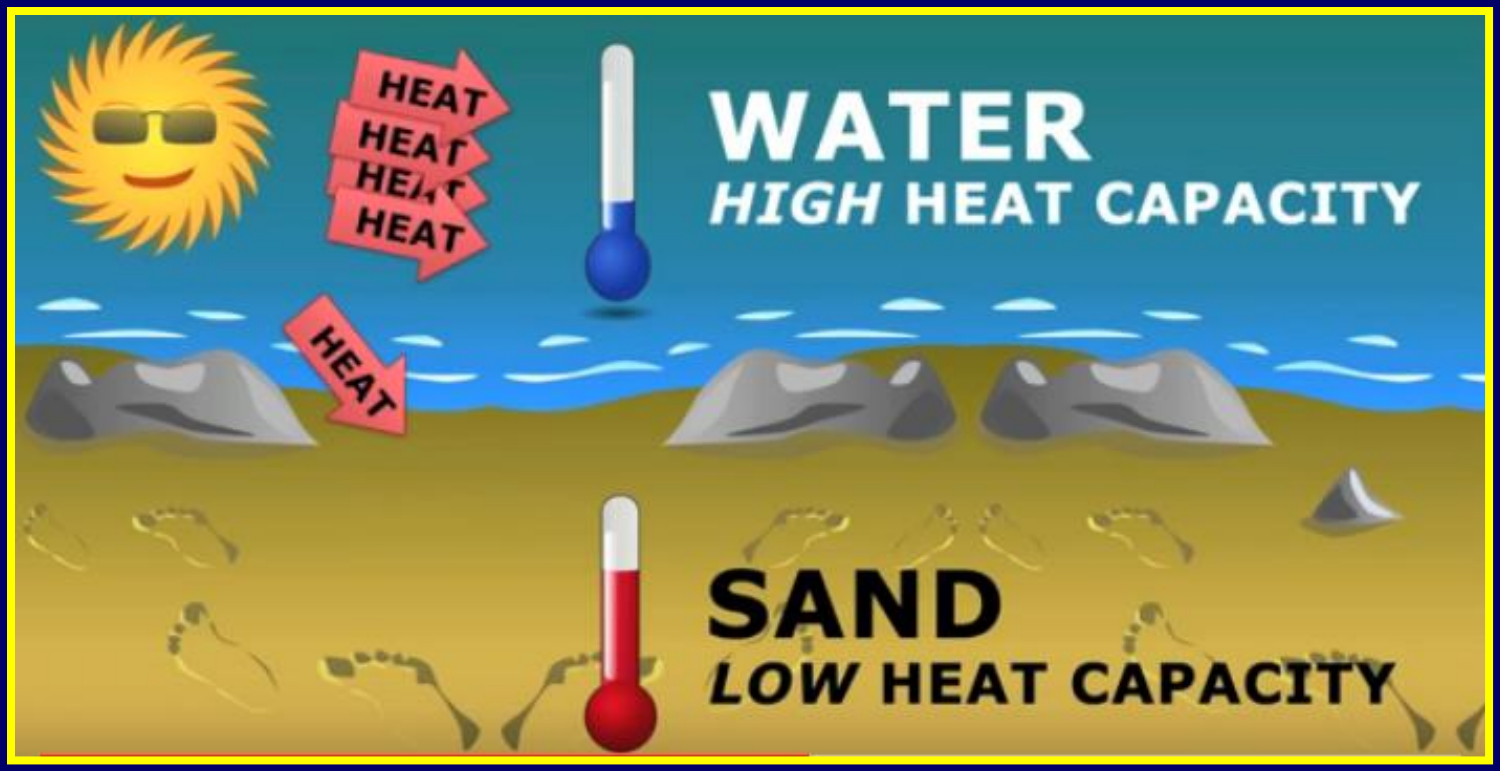
Water's High Heat Capacity

Because water can absorb a lot of thermal energy before increasing in temperature it is said to have a high heat capacity.



Sand's Low Heat Capacity

Sand has a low heat capacity and warms up very quickly.



Uneven Heating

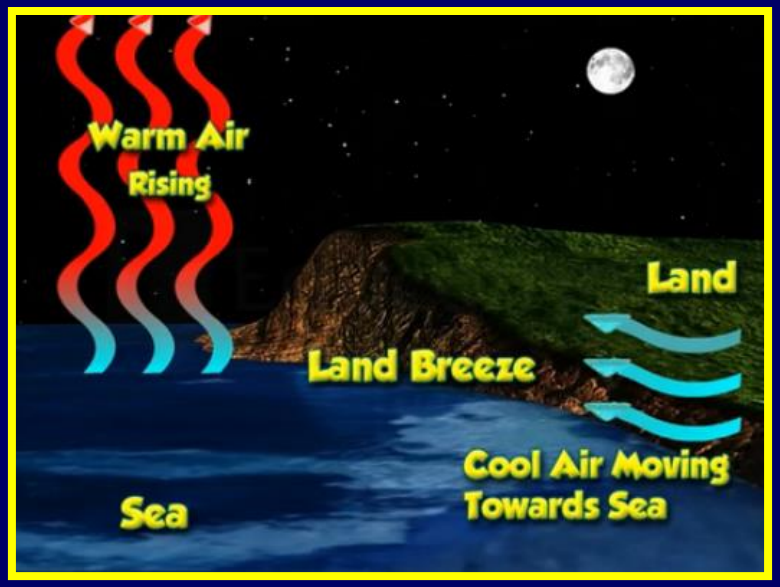
On the coast, the air above the hot sand becomes a lot warmer than the air over the cool water.

Sea Breeze

During the day, the warm air over the land rises. The cool air over the sea moves inland to replace the rising hot air, creating a sea breeze.

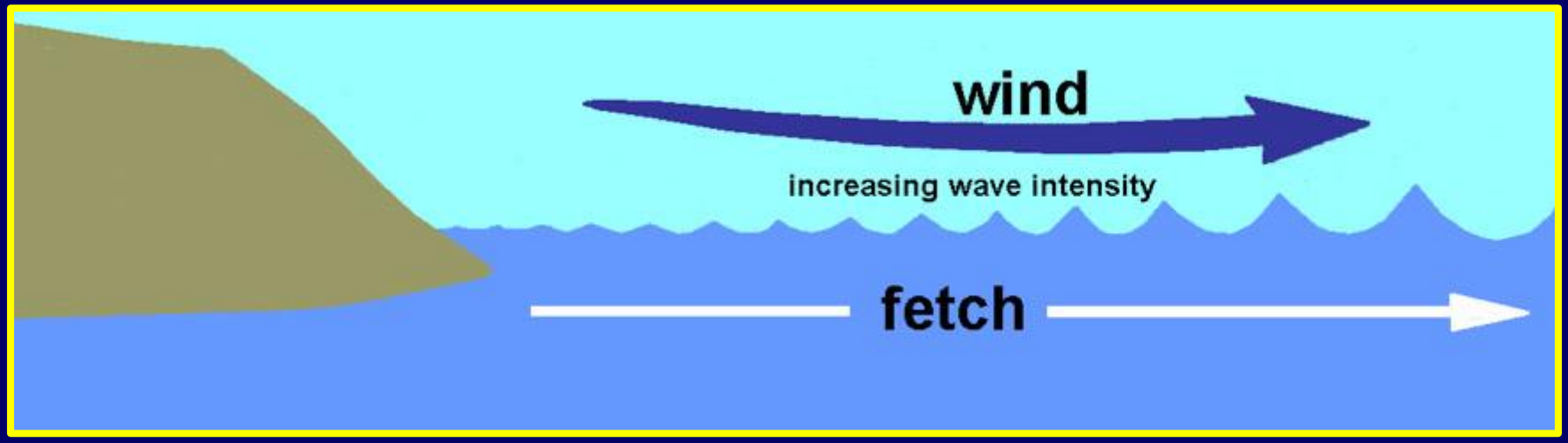
Land Breeze

At night, the land cools down faster than the water. This results in warmer air over the water rising and cool air from the over the land moving into to replace it, creating a land breeze.



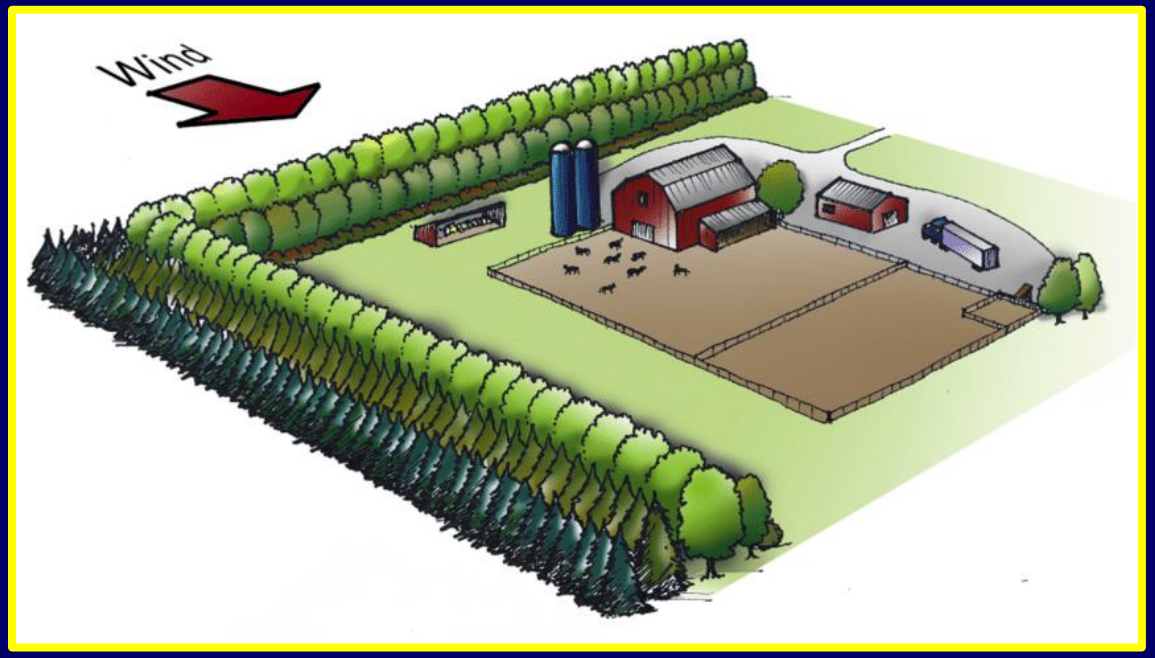
Fetch

Areas that are allow the wind to blow without any interruption are said to have fetch and are associated with strong winds.



Wind Breaks

Farmers and developers often plant lines of trees, called wind breaks, to reduce winds, as well as erosion and structural damage caused by winds.



The End