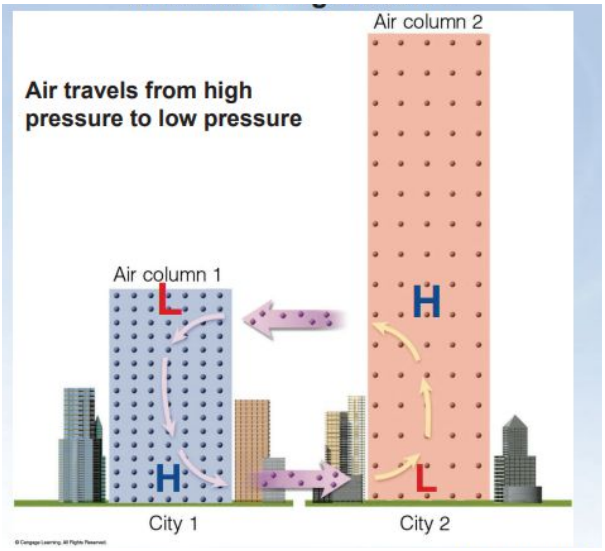
Topic/Objective:	Name: Hannah Daley
Winds/Forces	Class/Period: AOSC200
	Date: 10/22

Essential Question:
Explain the forces that affects wind (Gravity, Pressure Gradient Force, Coriolis). Explain hydrostatic and geostrophic balance and how it pertains to horizontal (East-West or North-South) and vertical (up and down) motion.

Questions:	**Notes:**
What is the trend in Arctic Sea Ice?	● Sea Ice extent in September is decreasing 1980 to present ● We measure compare in September because that is when Sea Ice should be lowest after having all summer to melt.
What is the force of gravity?	● Do not need to know the equation ● The attraction between two objects ● In the atmosphere it is the downward pull
What is the Pressure Gradient Force (PGF)?	● High pressure moving to low pressure ○ Therefore if we have a low pressure system, air is rushing into the center (convergence). Divergence (moving away) is at the center of a high. ● The strength of PGF is dependent on the difference between the pressure divided by the distance ○ Therefore as isobars (lines of constant pressure) are closer together the faster the winds are due to PGF.
..But what is pressure? **There is >60% chance that you will have to draw something like this on an exam**	If you heat a gas it expands (city 2) .100 feet off the ground the cold city (1) has a low pressure system because there is only 1 floor of weight above, while at the same height the the warm city (2) has a high pressure. At the surface this creates a low under the High and a High under the low to create a circulation  He may also have you do this comparing a beach/land and an ocean/body of water.

	Always put the Low at the surface of the hottest surface and alternate High's and Low's around the circulation. Remember that the air above the sand is hotter during much of the day and the air above the ocean is hotter much of the night due to water having a higher specific heat. ● This is called seabreeze (wind off the sea) or lakebreeze (wind of a lake) or bay breeze (wind off of the bay), etc ● This explains how clouds may form over land in the day and over the ocean at night ● This ads frequent afternoon storms near large bodies of water
What is the Coriolis Force? **THIS IS IMPORTANT AND POPULAR EXAM QUESTIONS**	● This is called an apparent force, because it only appears because we are on a rotating surface. From our perspective (on a rotating Earth) objects thrown a long distance look like they are spinning. Although from space it is actually moving straight. ● In the Northern Hemisphere (like us), Coriolis force ALWAYS pulls to the RIGHT ● In the Southern Hemisphere, the Coriolis force ALWAYS pulls to the LEFT ○ Tim likes to ask a cheezy beyonce question about this (to the left to the left) ● AT THE EQUATOR, Coriolis is zero!!! ● At THE POLES, Coriolis force is strongest, therefore Coriolis forces increase as you move away from the equators ● You DO NOT need to know the math behind why it is to the right or left, you just need to memorize this
What is geostrophic wind? **This is used to describe horizontal (East-West, North-South) motions**	● Geostrophic wind is between Coriolis and Pressure Gradient force (PGF). ○ Remember PGF is moving toward the low pressure and its strength is dependent on the difference in pressures and the distance between them ○ Coriolis is the the right in the Northern Hemisphere (NH) and to the right (SH). Coriolis increases as we move away from the equator ● Geostrophic Balance is when Coriolis force= PGF ○ Therefore if PGF increases (seen by isobars close together), Coriolis will have to increase to balance.
What is hydrostatic balance? **This is used to describe the up and down motion (vertical)**	● As described earlier, sometimes we have a high on the surface and a low pressure aloft (above). ○ Pressure gradient force points up! To the low! ● This is not changing in latitude, so coriolis force is not changing ● Therefor the PGF has to be balanced by gravity alone ○ We call this hydrostatic balance

Summary:
Gravity pulls the atmosphere down toward the Earth, this is why the atmosphere is denser at the surface. Air moves from High Pressure to Low Pressure in a principle we call Pressure Gradient Force (PGF). Coriolis is an apparent force, meaning a force that arises due to the Earth rotating, and it pulls objects moving over a far distance to the right in the Northern Hemisphere and to the left in the Southern Hemisphere. Geostrophic Balance occurs in horizontal motion, where Coriolis Force=Pressure Gradient Force. Hydrostatic balance occurs in vertical motion (up and down), where gravity= Pressure Gradient Force. .