WATER CYCLE FRAMEWORK
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From- To	**Caused by**	*drives*	**Process name**	*which is*	**Explanation of process**	**Help ideas and connections**
Atmosphere to Plants	biosynthesis		photosynthesis		$6CO_2(g) + 6H_2O(l) \Leftrightarrow C_6H_{12}O_6(s) + 6O_2(g)$	Photosynthesis and respiration are the only part of the cycle in which molecules change
Biosphere to Atmosphere	metabolic activity		respiration		$C_6H_{12}O_6(s) + 6O_2(g) \Leftrightarrow 6CO_2(g) + 6H_2O(l)$	Respiration, performed by plants and animals is the opposite of photosynthesis
Atmosphere to Clouds	chemical disequilibrium		condensation		Water vapor (gas) molecules bind to form liquid water droplets	Commonly occurs when air masses cool
Clouds to Atmosphere	chemical disequilibrium		evaporation		Bonds between water molecules break	Often driven by temperature rises as when morning clouds "burn off"
Clouds to Oceans or Land surface	gravity		precipitation		Water droplets form on dust particles	Rain, snow, sleet
Atmosphere to Atmosphere	gravity		convection		Winds move water droplets (clouds) and vapor	Even when no clouds are visible, air moves water vapor.
Land surface to Soil	gravity		recharge/discharge		Water percolates into the soil	Water sinks into the ground after heavy rain.
Soil (and biosphere) to Atmosphere	chemical disequilibrium		evapo-transpiration		A combination of release of water from plants and non-biological evaporation.	In areas with significant plant life more water is removed by transpiration.
Soil to Groundwater	gravity		recharge/discharge/infiltration		Water percolates through the soil to the water table	The water table varies from being at the surface to hundreds of feet below the surface
Groundwater to Surface water & Oceans	gravity		discharge		Both gravity and the permeability of the materials determine how fast – typically Feet per year	Fresh water spring miles from coast lines are from groundwater discharge
Surface water and Oceans to Groundwater	gravity		recharge/discharge		Both gravity and the permeability of the materials determine how fast – typically feet per year	When salt water recharge/discharges ground water coastal well become unusable.
Clouds to Glaciers	gravity		precipitation		Ice crystals form on dust particles	Glaciers grow when precipitation exceeds melting and sublimation
Atmosphere to glacier	chemical disequilibrium		deposition		Ice crystals form from vapor	Frost on the pumpkin
Glaciers to	chemical		sublimation		In cold climates ice may	This process

Atmosphere	disequilibrium				convert directly to water vapor	occurs in freezers and cause ice cubes to shrink
Glaciers to Surface water	gravity & chemical disequilibrium		melting & discharge/run off		Water from glacier surface flows down crevasses and along the base.	Glacial melt water is an important resource for mountain communities.
Land surface to surface water (lakes and streams)	gravity		recharge/discharge/runoff		Overland flow of water	Most common in urban areas
Surface water to Oceans	gravity		recharge/discharge/runoff		Rivers flowing into oceans	Rivers enter oceans at deltas