MS-ESS2-6. Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates.			
PE Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates. [Clarification Statement: Emphasis is on how patterns vary by latitude, altitude, and geographic land distribution. Emphasis of atmospheric circulation is on the sunlight-driven latitudinal banding, the Coriolis effect, and resulting prevailing winds; emphasis of ocean circulation is on the transfer of heat by the global ocean convection cycle, which is constrained by the Coriolis effect and the outlines of continents. Examples of models can be diagrams, maps and globes, or digital representations.] [Assessment Boundary: Assessment does not include the dynamics of the Coriolis effect.]	DCI • Variations in density due to variations in temperature and salinity drive a global pattern of interconnected ocean currents. • Weather and climate are influenced by interactions involving sunlight, the ocean, the atmosphere, ice, landforms, and living things. These interactions vary with latitude, altitude, and local and regional geography, all of which can affect oceanic and atmospheric flow patterns. • The ocean exerts a major influence on weather and climate by absorbing energy from the sun, releasing it over time, and globally redistributing it through ocean currents.	CCC • Systems and System Models - Models can be used to represent systems and their interactions—such as inputs, processes and outputs—and energy, matter, and information flows within systems.	Practices Developing and Using Models – *Modeling in 6-8 builds on K-5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems.* Develop and use a model to describe phenomena.
Activity Small Groups: Complete the Pressure & Temperature activity using 1-liter bottles and pressure pumpers.	Question What is the relationship between temperature and pressure?	Objectives / *Next Steps* • Temperature and Pressure have a direct relationship: as temperature increases, so does pressure. *What other factors affect pressure?*	Notes Pressure pumpers described are Jokari® Pump-Cap Fizz-Keepers. Pressure should be released slowly with the cap clutched in one fist and the bottle held firmly in the other. Pressure should be released with a hiss, not a pop! When all groups complete the activity, verify the class's findings.

Small Groups: Complete the Weight of Air activity using 1-liter bottles and pressure pumpers.	What is the relationship between elevation and pressure?	• Air has mass. • Since there is less air at higher elevations, Elevation and Pressure have an inverse relationship – the higher the altitude, the less air there is pushing down, and the lower the pressure. • Elevation and Temperature have an inverse relationship as well – the higher the altitude, the less air there is to capture the sun's energy. *What other factors affect temperature?*	Both the Weight of Air and Pressure & Temperature activities are linked in the same document for easy double-sided printing.
Small Groups / Whole Class Demonstration: Compare the rate of temperature change when you blow hot air directly down at a temperature strip and at an angle, with the dryer at a fixed distance above the strip. Next, compare the effects of the hair dryer on a terrestrial temperature strip and one beside a pan of water.	What influences air and water temperature?	• The closer you are to the equator, the more direct and concentrated the Sun's rays. • Large amounts of water work to moderate / normalize temperature changes. *How do these individual factors create weather and climate?*	When all groups complete the activity, discuss and verify the class's findings in order to ensure all objectives have been met.
Small Groups: Consider different locales to determine what combination of factors influence weather and climate in those regions. Capital city locales to consider: Boston, MA; Denver, CO; Kansas City, KS; Juneau, AK; Springfield, IL.	How do pressure (elevation), latitude (sun exposure) and water (precipitation) combine to determine an area's climate?	• Factors like elevation, sun exposure (latitude), precipitation, and nearby bodies of water all influence an area's overall climate. • The interactions of these factors are complex, and outside influences like geography and air pollution are also factors in climate.	When all groups complete the activity, discuss and verify the class's findings in order to ensure objectives have been met.