

Grade 8				
Ch. 8 Lesson 3				
Earth and Space Science				
Page #	Question	Answer(s)	Links/Sources	Student Resources
289	What do you think caused these trees to grow toward one direction?	Sample answer: Consistent wind direction.\		
289	What happens to molecules of air when air is cooled?	*Air molecules slow down and move closer together. The air becomes for dense.		
289	If air is sinking, what can you infer about its density?	Sample answer: The density has increased.		
289	How unequal were the surface temperatures you collected in the Inquiry Kick-Off at the beginning of the chapter?	Answers will vary depending on the surfaces that were selected and other factors such a amount of light hitting the surface and whether or not the thermometer was held close enough to read the difference in temperature. It would be expected that grassy areas would be cooler than areas of black top.		
289	How can winds be beneficial?	Sample answer: They can help cool the temperature, they can blow away smog and smoke, they can allow people to go sailing. They c		
289	How have you benefitted from the wind?	Sample answer: I enjoy to cool evening breeze. It blows smoke from a campfire away from me.		
289	What causes molecules of warmed air to be less dense?	Sample answer: Warmed air is less dense because the molecules have more kinetic energy and spread apart more with decreases their density.		
289	What happens to air molecules when air is cooled?	Sample answer: They have less kinetic energy.		
289	How is the density of air affected when the air is cooled?	Sample answer: The air's density increases and it sinks.		
290	Is rain more common in areas of low or high pressure?	*Low pressure usually gives rise to precipitation and cloudy skies.		
290	Does wind speed vary from place to place and day to day?	*Have students keep their anemometers in the classroom and collect data over the next week.		
290	In what ways is the wind like the Spirit of God?	John 3:8 says "The wind blows wherever it pleases. You hear its sound, but you cannot tell where it comes from or where it is going. So it is with everyone born of the Spirit.		
290	How do changes in density relate to winds?	Changes in density cause are to rise or sink this up and down movement and the Earth's rotation causes wind.		
290	Is the air pressure in the balloon higher or lower than the air surrounding it?	It is higher.		
290	What happens to the air inside the balloon when you puncture the balloon?	It quickly rushes out.		

290	Which part of the Earth gets the least intense radiation?	The poles.		
290	Why does the warm air create less air pressure?	Because the molecules of warm air have greater kinetic energy and spread out more causing less density.		
291	How can you model the Coriolis effect?	*In this model, the spinning paper models the rotation of the Earth and the attempted straight line is the wind. However, the wind can't be straight because of the Earth's rotation. Reversing the direction of the spinning paper models the difference between winds in the northern and southern hemispheres.		
291	What cause the characteristic spiral shape of storm systems?	*Moist air is pulled into a low pressure region at the center, usually over standing water, like an ocean, then rises and condenses into clouds at the eyewall. It then gets expelled outward at the top into high cirrus clouds. In the Northern Hemisphere, low rain clouds rotate counterclockwise, and the high cirrus clouds rotate clockwise.		
292	How does this relate to the scientific meaning of <i>doldrums</i> ?	*Sample answer: The doldrums describe an area that has little or no wind energy, just as a person who is "in the doldrums" has little energy.		
292	In which latitudes would you sail on the trip to England?	*Sample answer: I would sail between the latitudes 30° and 60° to take advantage of the westerlies.		
292	In which latitudes would you sail on a trip back to America? Explain.	*Sample answer: I would sail between the latitudes 0° and 30° to take advantage of the northeast trade winds.		
292	Which wind system has the greatest effect on weather in your area?	*Westerlies (U.S. and most of Canada).		
292	Why do hurricanes form near the equator, and what variables can affect their paths in the northern hemisphere?	*Sample answer: Air is heated at the equator, causing air to have an upward movement as hurricanes form. Global winds direct their paths.		
292	Where are the trade winds?	*Between the equator and 30° north and south of the equator. Note: Remind students that at the equator there are no winds, the doldrums.		
292	How are westerlies and jet streams similar? How are they different?	*Both are global winds that flow from east to west. The westerlies flow near the Earth's surface and jet streams flow at high altitudes. Jet streams are usually faster than other global winds.		
292	Which leg of your flight would likely be shorter? Explain your reasoning.	*The return flight from Los Angeles to New York may be shorter because the plane is likely to fly with the jet stream so its speed would increase.		

293	What industry is most concerned with the jet stream?	*The airplane industry.		
293	What would you call a wind that blows from north to south?	*A northerly wind.		
293	What other factors might affect whether the jet stream moves northward or southward from its usual location?	*Sample answer: Climate change. Note: According to the National Weather Service, two factors cause the movement of the jet stream north or south. These two factors are atmospheric heating by solar radiation creating large-scale polar circulation cells and the Coriolis force acting on those cells.	https://www.weather.gov/jetstream/jet#:~:text=The%20earth's%20rotation%20is%20responsible,relative%20to%20the%20Earth's%20axis.	
293	In your own words, what is a local wind?	Sample answer: It is a wind that affects local weather		
293	What is the main idea on this page?	Local winds and jet streams.		
293	Why do eastbound airplanes try to fly within the jet stream?	Sample answer: They can achieve faster flight times.		
293	What advantage would there be from doing this?	Sample answer: Faster flight times and fuel savings.		
293	What about westbound airplanes, do they try to fly in the jet stream?	No, it is not practical.		
294	How do heating and cooling rates of land and water compare?	*Land heats and cools faster than water. Water retains heat and provides a moderating effect on climate.		
294	What causes the air to move as it does in a sea breeze and land breeze?	*During the day, Sun heats the land more than water. A low pressure system forms over the land and a higher pressure system forms over the water. Wind blows from the water to the land. At night, the air over land becomes cooler and denser than the air over the water. The denser, cooler air sinks and moves out toward the sea.		
294	Why do sea breezes occur most often in spring and summer months?	*Greater temperature differences occur between the ocean and the land.		
294	When are land breezes the strongest?	*At night.		
294	At what time of day do sea breezes form?	During the daytime.		
294	How do they form?	Sample answer: As air heats up over the land, it rises and draws the air from the ocean onto the land.		
294	What generates the energy that drives this process.	The Sun.		
294	What process forms these breezes?	Sample answer: As the air over the land cools off after the Sun sets, it gets more dense and sinks and flows to the sea causing the land breeze.		
294	Which material heated up more quickly?	Sample answer: The soil. Note: there may be some variation due to how much soil and water are used and the amount of moisture in the soil.		

294	Which material cooled down more quickly	Sample answer: The soil. See note above.		
294	How would the wind form between the two cups during the day (when the lamp is on) and at night (when the lamp is off)?	Sample answer: The wind would flow from the cup of water to the cup of soil during the "day" and from the cup of soil to the cup of water at "night."		
295	What effect do you think the fan will have on the temperature of the water in the bowls?	Sample answer: I think the bowl closest to the fan will evaporate the fastest. The bowl that receives not effect of the fan will evaporate the slowest.		
295	What is wind chill?	Sample answer: The cooling effect caused by wind blowing over a surface.		
296	How does the uneven heating of the atmosphere by the Sun cause air movement, or wind?	*Students should be able to relate how uneven heating and cooling of Earth surfaces act together in generating air movement and wind.		
296	Why might this be important to search-and-rescue helicopter pilots?	Sample answer: So they can know how to adjust their flying to avoid these up drafts and down drafts in order to fly safely.		
296	What other activities would be affected by this kinds of breezes?	Sample answer: Sailing, hang gliding, campfires, as well as other outdoor activities.		
	* Means the answer is found in the TE.			