absorb to soak up or take in  (SRB, IG)

air the mixture of gases surrounding Earth  (SRB, IG)

air mass one huge body of air that has relatively uniform temperature and humidity  (IG)

air pressure the force exerted on a surface by the mass of the air above it; also called atmospheric pressure  (SRB, IG)

atmosphere the layer of gases surrounding Earth. Its layers include the troposphere, stratosphere, mesosphere, thermosphere, and exosphere.  (SRB, IG)

atmospheric pressure the force exerted on a surface by the mass of the air above it; also called air pressure  (SRB, IG)

axis an imaginary axle that a planet spins on  (SRB)

bar the unit of measurement for air pressure. A bar is equal to the pressure exerted by the air in the atmosphere at sea level.  (IG)

barometer a weather tool that measures air pressure  (SRB, IG)

bimetallic strip a narrow band made of two metals stuck together  (SRB)

blizzard a severe storm with low temperatures, strong winds, and extreme snow  (SRB)

boundary current a large-scale ocean current along the coastline  (SRB)

carbon dioxide (CO₂) a greenhouse gas found in Earth’s atmosphere. Carbon dioxide is created by natural and human-made processes.  (SRB, IG)

carbon sequestration the process of removing carbon dioxide from the atmosphere, typically by storing it underground  (IG)

climate change the change in our climate due to increased greenhouse gases and energy usage  (IG)

climatologist a scientist who studies climate  (IG)

climatology the study of a region’s climate over 30 or more years  (IG)

cold front a zone where a faster-moving cold air mass collides with a warm air mass, resulting in brief, intense precipitation  (IG)

compress to push particles closer together  (IG)

condensation the process by which water vapor changes into liquid water, usually on a surface  (IG)
condensation nuclei tiny surfaces on which water may condense (IG)

conduction energy transfer by contact between particles (SRB, IG)

constraint a restriction or limitation (SRB, IG)

convection energy transfer during which hot fluid rises and cold fluid sinks, creating a cycle (SRB, IG)

convection cell a mass of fluid flowing in a cycle in one place (SRB, IG)

Coriolis effect the cause of winds near the equator in the Northern and Southern Hemispheres to curve west (SRB, IG)

criterion (plural: criteria) requirement (SRB, IG)

cumulonimbus clouds that are piled up from low to high levels and bring rain (SRB)

density the amount of mass in a sample of matter compared to the volume of that sample (SRB, IG)

dew point the temperature at which air is saturated with water vapor and vapor condenses into liquid (IG)

differential heating the concept that different materials heat up at different rates (IG)

doldrums the calm area around the equator (SRB)

drought a less-than-normal amount of rain or snow over a long period of time (SRB)

dust devil a small rotating wind that becomes visible when it collects dust and debris (SRB)

dust storm a severe weather in which strong winds carry large quantities of dust over an area (SRB)

El Niño a flow of unusually warm water in the eastern Pacific Ocean. It causes many changes in weather in other places. (SRB, IG)

emission a substance being let out into the atmosphere (IG)

energy transfer the movement of energy from one place or form to another; the process that drives the cycle of convection (IG)

engineering problem a challenge that needs to be solved by an engineer by identifying the design requirements and limitations (IG)

equilibrium when air moves from an area of high pressure to one of low pressure, making the air density equal (IG)

equinox a day of the year when the Sun’s rays shine straight down on the equator (SRB)

evaporation the process by which liquid water changes into water vapor (IG)

evidence data used to support claims. Evidence is based on observation and scientific data. (IG)
**exosphere** the layer of the atmosphere above the thermosphere. The exosphere marks the transition from the atmosphere to space. (SRB, IG)

**expand** to get bigger; to take up more space (IG)

**flash flood** a short, rapid, unexpected flow of water and debris (SRB)

**flood** a large amount of water flowing over land that is usually dry (SRB)

**fluid** substance that can flow, such as a gas or liquid (SRB, IG)

**forecast** to predict future events or conditions, such as weather (IG)

**global warming** a worldwide warming trend on Earth that affects global weather (SRB, IG)

**greenhouse effect** the process in which greenhouse gases “trap” heat by absorbing and radiating heat energy so it doesn’t pass through the atmosphere and exit to space (IG)

**greenhouse gas** a gas that absorbs and radiates energy in the atmosphere, trapping thermal energy (SRB, IG)

**groundwater** water stored below Earth’s surface (SRB, IG)

**Gulf Stream** a warm boundary current in the North Atlantic Ocean (SRB)

**gyre** a large system of rotating ocean currents (SRB, IG)

**Hadley cell** a huge convection cell that covers much of Earth at the equator (SRB)

**hail** precipitation in the form of small balls of ice (SRB)

**heat** observable evidence of energy (IG)

**horse latitudes** the windless areas around 30 degrees north and south of the equator (SRB)

**humidity** water vapor in the air (IG)

**hurricane** a cyclone or severe rotating tropical storm that produces high winds in the Northern Hemisphere east of the International Date Line (SRB)

**hygrometer** a weather tool that measures humidity (SRB)

**ice core** a sample from deep, ancient ice near Earth’s poles that provides information about the gas content of the atmosphere in the past (IG)

**infrared** radiant energy that is beyond the red end of the visible spectrum (SRB, IG)

**insulation** material that can reduce energy transfers (SRB, IG)

**isobar** smooth, non-intersecting lines on a map that represent air pressure over a large region (IG)
jet stream a narrow band of fast-moving high-altitude wind flowing west to east that affects weather conditions on Earth  (SRB, IG)

kinetic energy energy of motion  (SRB, IG)

land breeze a wind that blows from land to sea  (SRB, IG)

latitude the distance north or south from the equator measured in degrees; a factor that affects local weather and climate  (SRB, IG)

lightning a bright flash of light caused by an electric discharge between two clouds or from a cloud to Earth  (SRB)

mass the amount of matter in an object or sample  (SRB, IG)

matter anything that has mass and takes up space  (SRB, IG)

mesosphere the layer of the atmosphere above the stratosphere  (SRB, IG)

meteorologist a scientist who studies the weather  (IG)

meteorology the scientific study of weather  (IG)

methane (CH\textsubscript{4}) a variable gas in the atmosphere; a greenhouse gas  (SRB)

microburst a short, very intense downdraft or air  (SRB)

millibar (mb) the unit that meteorologists use when reporting air pressures on a weather map; equal to 1/1000 of a bar  (IG)

model an explanation or representation of an object, system, or process that cannot be easily studied  (SRB, IG)

nitrogen (N\textsubscript{2}) a colorless, odorless gas that makes up about 78 percent of Earth’s atmosphere  (SRB)

nonrenewable a material that cannot be replaced once used up  (SRB)

North Star the reference star pointed to by the North Pole  (SRB)

ocean current a global water pattern affected by winds, differences in water density, tides, and landmasses  (SRB, IG)

orbit the path and length of time one object takes to travel around another object  (SRB)

oxygen (O\textsubscript{2}) a gas that makes up about 21 percent of Earth’s atmosphere  (SRB)

ozone (O\textsubscript{3}) a form of oxygen that forms a thin layer in the stratosphere  (SRB)

paleoclimatology the study of long-term climate trends extending to ancient times  (IG)
**particle** an atom or a molecule; what everything is made of  
  (IG)

**permanent gas** a gas in the atmosphere for which the amount stays constant. Oxygen (O$_2$) and nitrogen (N$_2$) are permanent gases.  
  (SRB, IG)

**photosynthesis** a process used by plants and algae to make sugar (food) out of light, carbon dioxide (CO$_2$), and water (H$_2$O)  
  (SRB)

**planet** an object that orbits a star and is massive enough for its own gravity to force it into a spherical shape  
  (SRB)

**pollutant** harmful waste  
  (IG)

**precipitation** rain, snow, sleet, or hail that falls to the ground  
  (IG)

**prediction** an estimation about a future event based on data or experience  
  (IG)

**pressure** a continuous force applied to the surface of an object, measured in units per square area  
  (IG)

**prevailing wind** a predictable wind produced by the combination of high- and low-pressure areas and the Coriolis effect  
  (SRB, IG)

**radiant energy** energy that travels through air and space  
  (SRB, IG)

**radiation** energy that is radiated or transmitted through space in the form of rays, waves, or particles  
  (IG)

**radiosonde** an instrument sent into Earth’s atmosphere to measure temperature, air pressure, humidity, and wind  
  (SRB)

**ray** a thin beam or line of radiant energy, such as light  
  (IG)

**renewable** able to be replaced or restored by nature  
  (SRB)

**revolution** one complete orbit around something  
  (SRB)

**rip current** a strong local ocean current that moves directly away from shore  
  (SRB)

**rotation** spinning on an axis  
  (SRB)

**salinity** the amount of dissolved salt in water  
  (SRB, IG)

**saturated** when air contains as much water vapor as it can at a certain temperature  
  (IG)

**sea breeze** a wind that blows from sea onto land  
  (SRB, IG)

**season** a period of the year identified by changes in hours of daylight and weather  
  (SRB)

**severe weather** out-of-the-ordinary and extreme weather conditions  
  (SRB, IG)

**solar angle** the angle at which light from the Sun strikes the surface of Earth  
  (IG)
solar energy radiant energy from the Sun  (SRB)
solstice a day of the year when the North Pole is angled farthest toward or away from the Sun  (SRB)
star a large, hot ball of gas radiating huge amounts of energy  (SRB)
state a kind or form of matter. The three common states of matter are solid, liquid, and gas.  (IG)
step leader a downward path of electric charge from a cloud to Earth, producing lightning  (SRB)
straight-line wind a strong wind that has no rotation  (SRB)
stratosphere the layer of the atmosphere above the troposphere. The ozone layer is in the stratosphere.  (SRB, IG)
temperature a measure of how hot or cold the air is  (IG)
thermal energy radiant energy that heats  (SRB, IG)
thermometer a instrument that measures thermal energy as temperature  (SRB)
thermosphere the layer of the atmosphere above the mesosphere  (SRB, IG)
thunder a loud, explosive sound created by lightning  (SRB)
thunderstorm severe weather that results from cold air flowing under a warm, humid air mass over the land, resulting in lightning, thunder, heavy precipitation, and possible tornadoes  (SRB)
tornado a rapidly rotating destructive column of air that extends from a thunderstorm to the ground. Wind speeds can exceed 400 kilometers (km) per hour in a tornado.  (SRB)
trade wind the predictable moderate wind from between 5° and 25° north or south latitude  (SRB)
transpiration the continuous process by which water travels through plants and releases as water vapor  (IG)
troposphere the layer of the atmosphere that begins at Earth’s surface and extends upward for an average of 15 kilometers (km). Weather happens in the troposphere.  (SRB, IG)
typhoon a cyclone or severe tropical storm that produces high winds in the Pacific north of the equator and west of the International Date Line  (SRB)
updraft a forceful vertical air current  (SRB)
vacuum space containing no particles of air or anything else  (SRB)
variable gas an atmospheric gas whose amount changes based on the environment. Carbon dioxide (CO₂), methane (CH₄), and ozone (O₃) are variable gases.  (SRB, IG)
vortex a tornado-like swirling column of wind or water  (SRB)
**warm front** a zone where a faster-moving warm air mass collides with a cold air mass, resulting in prolonged, light precipitation  (SRB)

**water cycle** the repeating sequence of condensation and evaporation of water on Earth, causing clouds and rain and other forms of precipitation  (IG)

**water vapor** \((\text{H}_2\text{O})\) the gaseous state of water; a variable gas that is found in Earth’s atmosphere  (SRB)

**weather** the condition of the air around us  (IG)

**weather factor** a variable property of weather, such as temperature, humidity, air pressure, or wind  (SRB)

**weight** the measurable pull or force between Earth and the matter in an object or substance  (IG)

**wildfire** a fire occurring in nature that can be driven by winds  (SRB)

**wind** air in motion  (IG)