

### **States of Matter**

Heat: the movement of thermal energy from a warmer object to a cooler object

Matter: anything that takes up space and has mass

Mass: the amount of matter in an object

Volume: the amount of space that a sample of matter occupies

Solid: matter that has a definite shape and definite volume

Liquid: matter with a definite volume but no definite shape

Gas: matter that has no definite volume and no definite shape

Vapor: the gas state of a substance that is normally a solid or a liquid at room temperature

kinetic energy: the energy an object has due to its motion

Temperature: A measure of the average kinetic energy of all the particles in a sample in an object

thermal energy: the total potential and kinetic energies of an object

melting: the change of matter from a solid to a liquid, thermal energy must be added

Freezing: the temperature at which matter changes from liquid state to a solid state

Vaporization: the change in state of a liquid into a gas

Evaporation: vaporization that occurs only at the surface of a liquid

Boiling: vaporization that occurs within a liquid

Condensation: change of state from a gas to a liquid

Sublimation: the change of state from a solid to a gas without going through the liquid state

Pressure: the amount of force applied per unit of area

### **Heat Transfer**

Conduction: heat transfer by direct contact of particles

Convection: thermal energy is transferred by the movement of matter; this happens in gases and liquids; WARM MATTER RISES AND COOLER MATTER SINKS; this makes gas and liquid flow in a pattern

Radiation: heat is transferred through electromagnetic rays; matter is not needed at all to transfer energy; thermal energy travels through space

Conductor: a material that transfers energy easily; metals

Insulator: a material that does not easily transfer thermal energy or electric current between its particles

thermal energy: Total amount of kinetic energy of all particles within a material

kinetic energy: energy of motion

potential energy: stored energy

Temperature: Average kinetic energy of particles within a material

Celsius: metric degrees for measuring temperature

Transfer: When energy stays as the same form but is moved from one object to another object

### **Water Cycle**

Weather: The daily conditions of the atmosphere in terms of temperature, atmospheric pressure, cloud cover, wind, and moisture.

Climate: The weather conditions prevailing in an area in general or over a long period.

Hail: ice pellets larger than 5 millimeters in diameter formed in cumulonimbus clouds by strong updrafts of wind

Sleet: clear ice pellets precipitation, forms when rain falls through layer of freezing air

Snow: a solid form of precipitation composed of ice crystals in complex hexagonal form

Rain: liquid precipitation

water cycle: the continuous process by which water moves from Earth's surface to the atmosphere and back

Evaporation: a process at which molecules at the surface of a liquid absorb enough energy to change to the gaseous state

Condensation: water vapor cools and becomes a liquid

Precipitation: when water in the form of ice, rain, sleet, hail, or snow, falls to Earth

Transpiration: the water that plants give off as part of their respiratory process (they "breathe" in carbon dioxide and "breathe" out oxygen - in this process, they also make water)

Runoff: when precipitation hits the ground, it is either absorbed, or it flows over the surface of the earth

### **Atmosphere**

Atmosphere: a mixture of gases that surrounds Earth. Contains 78% nitrogen, 21% oxygen, 0.93% argon, 0.039% carbon dioxide, and small amounts of other gases, including water vapor

Altitude: height above sea level or the earth's surface

greenhouse effect: earth's atmosphere traps solar radiation, caused by gases such as carbon dioxide, water vapor, and methane

global warming: An increase in the average temperature of the earth's atmosphere, enough to cause climate change.

Troposphere: The lowest layer of the atmosphere and contains weather. Temperature decreases with higher altitude. Root tropo=turn/mix up

Stratosphere: the layer of the atmosphere that is above the troposphere. Temperature increases with higher altitude. Root strato=layered

Ozone: a form of oxygen gas inside the stratosphere, absorbs ultraviolet rays from the sun and then releases some of this energy in the form of heat.

Mesosphere: the layer of the atmosphere between the stratosphere and thermosphere. Temperature decreases with higher altitude. Root meso=middle

Thermosphere: Upper most layer of Earth's atmosphere; has two layers ionosphere and exosphere. Temperature increases with altitude. Root thermo=heat

Exosphere: The region where the atmosphere thins out and merges with space. Root exo=outside

### **Air Masses and Fronts**

Continental Polar: A cold, dry air mass that forms over land in polar regions.

Continental Tropical: A warm, dry air mass that forms over land in tropical regions.

Maritime Polar: A cold, moist air mass that is formed over the ocean in polar areas.

Maritime Tropical: A warm, moist air mass that is formed over the ocean in tropical areas.

Warm Front: A warm air mass moving into the area.

Warm Front Weather: Steady rain or drizzle, warming temperatures.

Cold Front: A cold air mass moving into the area.

Cold Front Weather: Heavy precipitation, possibly thunderstorms. Cooling temperatures.

Stationary Front: Air masses are not moving.

Stationary Front weather: Weather conditions will remain the same.

Occluded Front weather: Difficult to predict. Will be a combination of warm and cold front weather depending on the current atmospheric conditions.

Occluded Front: Warm air becomes trapped between two colder air masses.

Air Mass: A large body of air that has the same characteristics of temperature and moisture content as the part of earth's surface over which it formed.

### **Weather**

Wind: air that moves horizontally, named by direction from which it comes

Front: the boundary where two different air masses meet

sea breeze: wind that blows from sea to land

land breeze: wind that blows from land to sea

jet stream: moves west to east and changes location based on global conditions

gulf stream: a warm current that flows out of the Gulf of Mexico and northward through the Atlantic Ocean

convection cell: a circular pattern of rising and sinking air and wind

Prevailing Westerlies: winds that occur in the United States and move our weather

Polar Easterlies: cold, dry air that comes from the east at the poles

Weather: what the atmosphere is like at any given time

Coriolis Effect: the curving path of a moving object caused by Earth's Rotation

Climate: a pattern of weather over time

trade winds: winds that occur near the equator

Hurricane: a large rotating storm with high speed winds that forms over warm waters in tropical areas

Isobar: an imaginary line or a line on a map or chart connecting or marking places of equal barometric pressure

El Nino: a climate pattern where the water in the Pacific Ocean near the equator gets hotter than usual and affects the atmosphere and weather around the world

La Nina: a climate pattern where the water in the Pacific Ocean along the equator gets colder than usual and affects the atmosphere and weather around the world

mountain breeze: wind that blows from the mountain down to the valley

valley breeze: wind that blows from the valley up the side of the mountain

Atmosphere: blanket of gases that surround the Earth

Troposphere: layer of the atmosphere closest to the Earth's surface where weather occurs

air pressure: force that air exerts on Earth's surface and anything on it

### **Weather Tools**

Thermometer: measures the temperature of the air in degrees Celsius and Fahrenheit

Barometer: measures the air pressure

rain gauge: measures the amount of rain that has fallen over a specific period of time

wind vane: instrument that determines the direction from which the wind is blowing

Anemometer: measures wind speed

weather maps: indicate atmospheric conditions above a large portion of the Earth's surface.

Hygrometer: measures the amount of water vapor in the air/measures humidity

Compass: a navigational instrument for finding directions

weather satellites: used to photograph and track large-scale air movements

Meteorologists: people who gather and study weather data to predict weather conditions

### **Severe Weather**

Hurricane: a intensely low-pressure storm with sustained winds exceeding 74 mph

Eye: the center of a hurricane; area of sinking air

Eye Wall: The strongest winds of a hurricane surrounding the eye

Storm Surge: a huge mass of ocean water rushing on land as a result of a hurricane or tropical storm

Category 1: 74 to 95 mph with the storm surge of 4 to 5 feet

Category 2: 96 to 110 mph with the storm surge of 6 to 8 feet

Category 3: a hurricane that involves winds 111-130 mph

Category 4: a hurricane that involves winds that are 131-155 mph

Category 5: a hurricane that involves winds are over 155 mph

Tornado: a violent, whirling column of air in contact with the ground

Thunderstorm: a storm with thunder and lightning and typically also heavy rain or hail.