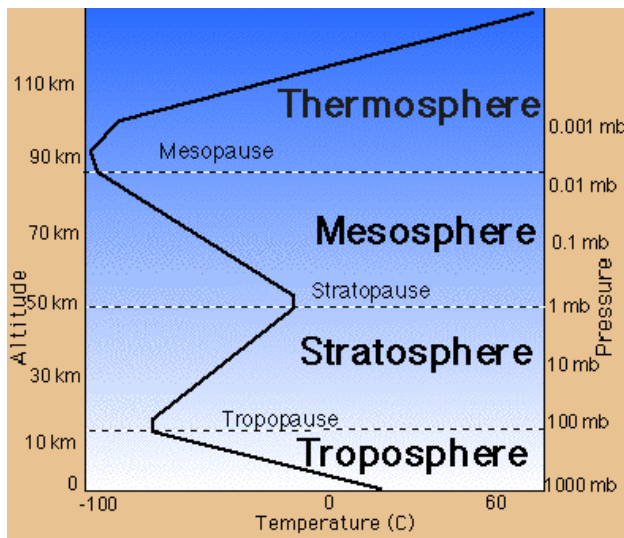


METEOROLOGY: The study of the atmosphere.

Weather: the condition of the atmosphere at a given time and place.

The Atmosphere: the layer of gases that surrounds the Earth's surface.

- Composition
 - 78% Nitrogen
 - 21% Oxygen
 - 1% Other gases (Ar, CO₂, He, H₂O)
- **Layers: 1 - Ionosphere, 2 - Stratosphere, 3 - Troposphere**
 - **Ionosphere:** upper-most layer; contains high level of ions (charged atoms)
 - **Thermosphere**
 - Absorb solar radiation, causing rise in temp.
 - **Mesosphere**
 - meso = middle
 - **Stratosphere**
 - Where jets fly
 - Ozone, O₃
 - Absorbs 99% of Sun's UV radiation
 - Temp. increase w/ altitude due to ozone absorbing solar radiation
 - **Troposphere:** closest to surface of Earth
 - Where Earth's weather occurs
 - Temp. decrease w/ altitude
 - (moving away from Sun-heated surface of the Earth)

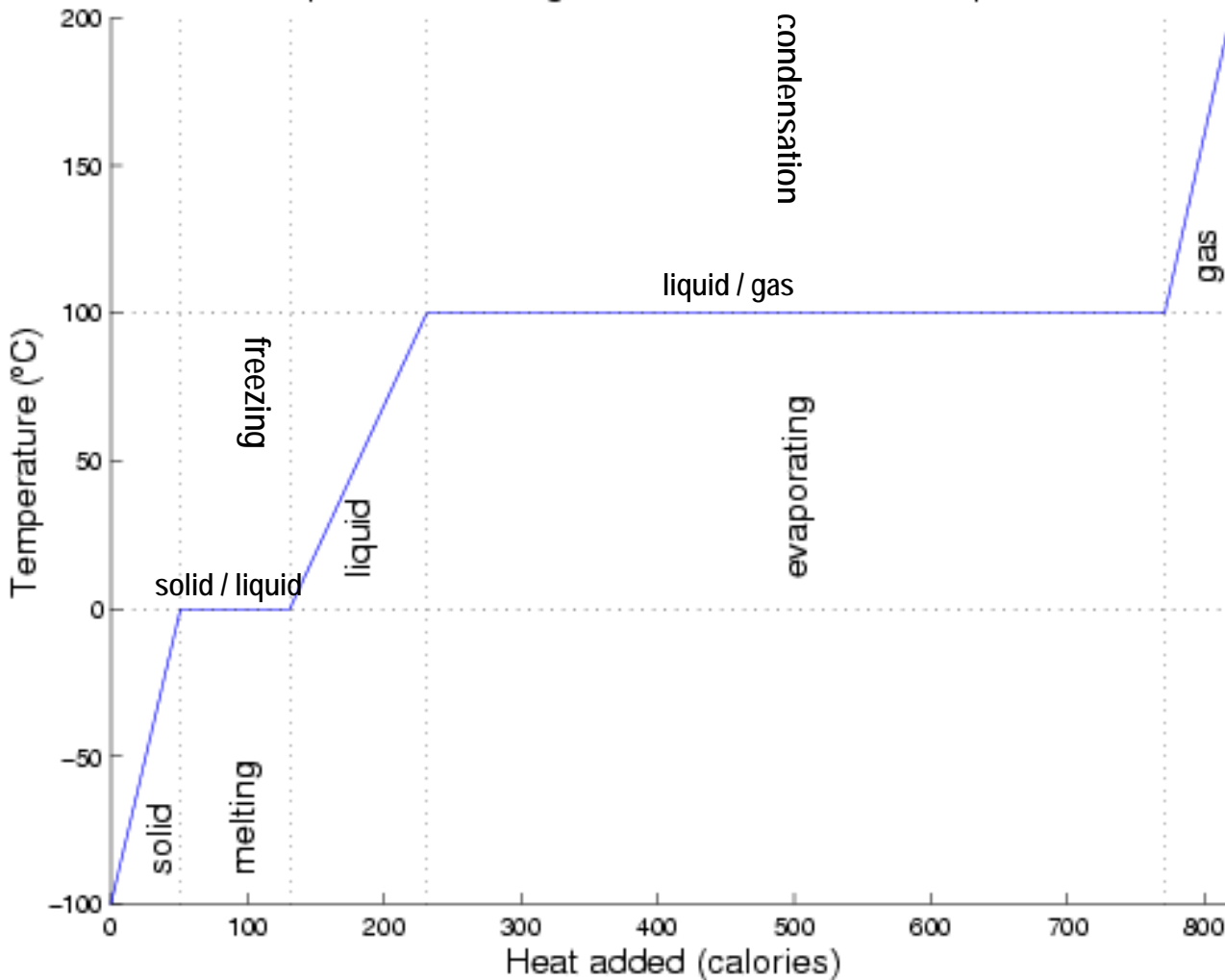


- **Factors That Affect the Atmosphere: 1 - Heat, 2 - Moisture, 3 - Air Pressure**
 - **Heat:** the TOTAL kinetic energy of molecules in a system
 - **Source: the Sun**
 - Exothermic nuclear reactions
 - 100 % Insolation from the sun
 - 70% absorbed
 - (51% absorbed by surface)
 - (16% absorbed by O₃, H₂O vapor, dust)
 - (3% absorbed by clouds)
 - 30% reflected out to space
 - (20% reflected by clouds)
 - (6% reflected by air molecules, dust)
 - (4% reflected by surface)
 - Modes of transfer:
 - **Radiation:** heat transfer through space (no physical contact)
 - **Conduction:** " " " physical contact
 - **Convection:** " " " circulation of molecules
 - **Temperature:** the AVERAGE kinetic energy of molecules in a system
 - Measured with a **thermometer** (units: **metric = °C** or **customary = °F**)

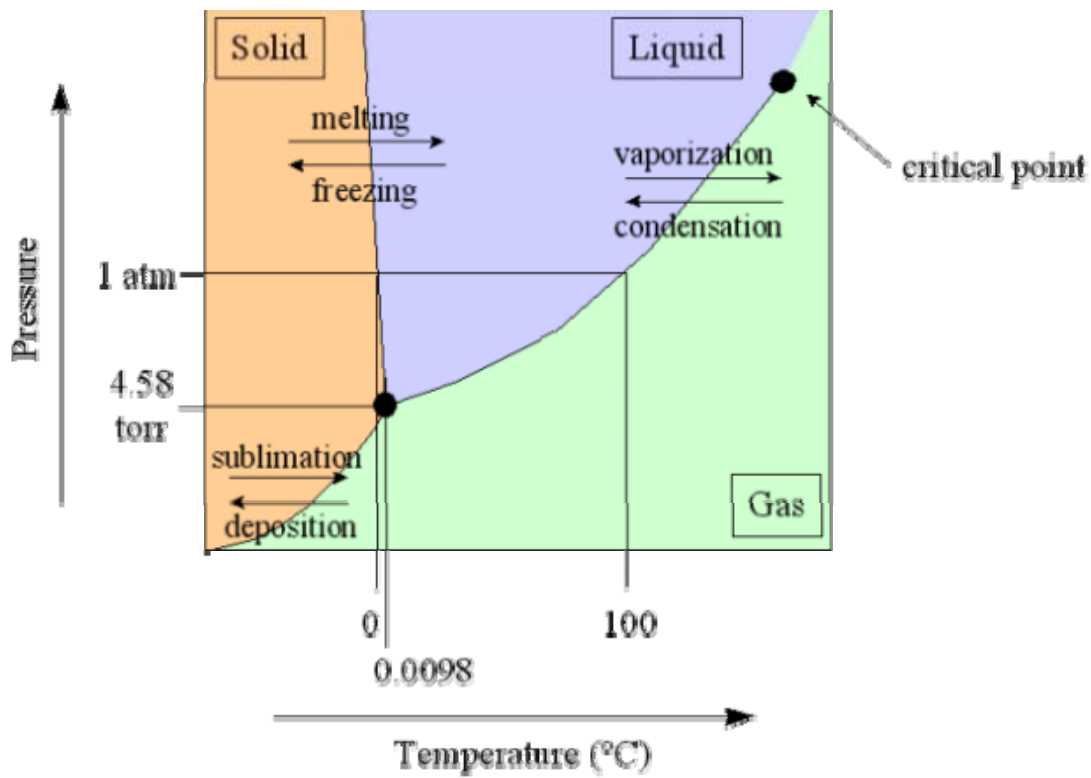
- A warm 1000 gallon pool has a lower temperature than 1 cup of boiling water
- A warm 1000 gallon pool has more heat than 1 cup of boiling water

- **Moisture:** the amount of H₂O in a system
 - **States of H₂O :** solid (ice), liquid (water), gas (water vapor)
 - **Water cycle:** driven by energy from solar radiation
 - Evaporation → Condensation → Precipitation → Run-Off

Heat required to take 1 gram of ice at -100°C to vapor at 200°C



- **Humidity:**
 - **Specific humidity:** amount of moisture in the air
 - **Capacity:** air's ability to hold water
 - Higher temp. air can hold more moisture than lower temp air
- **Dew Point:** the temperature at which the vapor in the air condenses.
 - **Relative humidity:** specific humidity / capacity
 - Stated as a %
- **Air Pressure:** the force of gravity acting upon molecules in the atmosphere per unit area.
 - Measured with a **barometer** (Units: **metric = millibars**, **customary = inches of mercury, Hg**; atmospheres (atm))
 - **Causes wind**
 - Wind blows from high to low pressure
 - **High air pressure conditions:**
 - Clear sunny weather
 - Air is pulled downward and increases in temperature
 - Water droplets evaporate into vapor
 - **Low air pressure conditions:**
 - Cloudy rainy weather
 - Air is lifted upward and decreases in temperature
 - Vapor condenses into water droplets



THE "GREENHOUSE" EFFECT

- The major greenhouse gases (GHG) are H₂O, CO₂, CH₄

