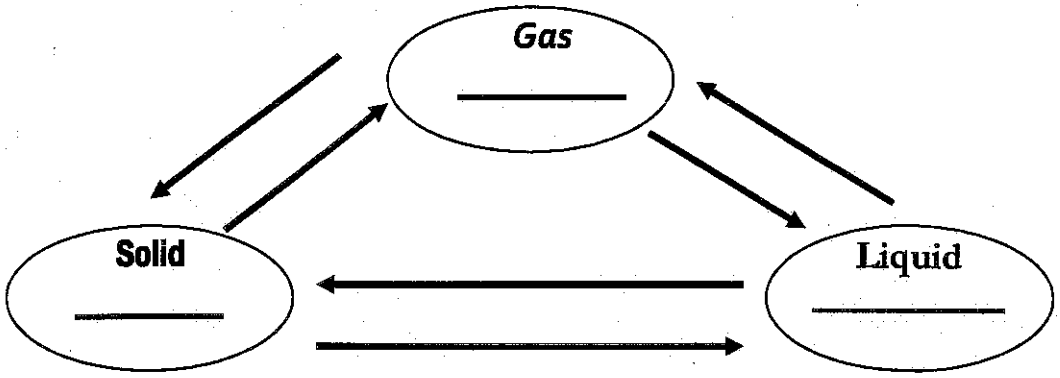
Humidity, Clouds, & Precipitation
Ch 24 Notes - Earth Science

Name:_____
Date:_____ Hr:____

6.01 Phase Changes (p. 479-480)

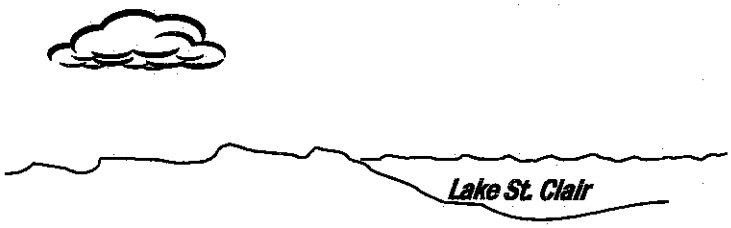
Complete the diagram showing processes changing the phase of H_2O



- **Define latent heat:**

(In class)

- When latent heat is absorbed by H_2O...
  (include on the diagrams)
- When latent heat is released from H_2O...
  (include on the diagrams)
- Diagram how H_2O changes state in the atmosphere.



6.02 Humidity (p. 480-483)

Define **humidity**:

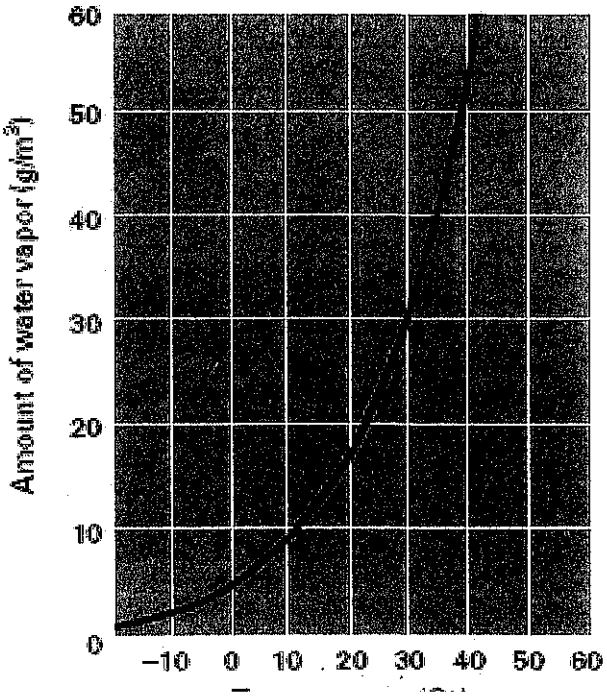
Define **water vapor capacity**.

Measure how **capacity** changes
at 10°C = _____

at 20°C = _____

at 25°C = _____

As air temperature increases, water vapor capacity _____



Name:_____
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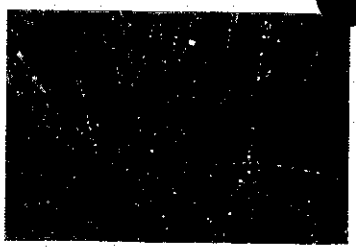
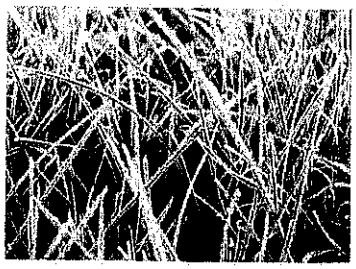
Define **dew point** temperature.



Today **dew** forms on your grass. ***Describe how it forms.***



Tomorrow **frost** forms on your grass. ***Describe how it formed.***

6.03 Cloud and Fog Formation

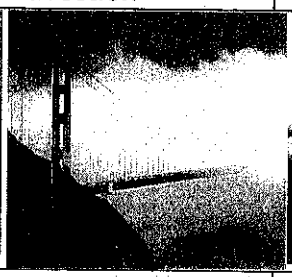
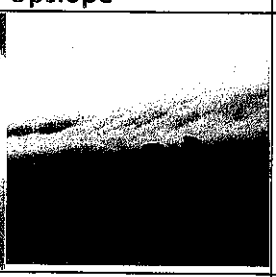
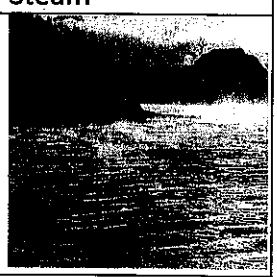
Clouds are made of H_2O as a_____ and (at low temps) a _____ state of matter.

Describe **condensation nuclei** *(hint: see 5.01 notes)*

Describe <u>other</u> ingredients needed for cloud formation:

Describe generally how **FOG** forms.

Contrast how each of the 4 types of fog forms:

Radiation	Advection	Upslope	Steam
			

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Cloud formation:

Cloud Formation	Convective Cooling	Frontal Wedging	Orographic Lifting
Description			
Diagram			

Basics Cloud Classification: (describe and DRAW each main type of cloud)

Cumulus *Stratus* *Cirrus*

Describe what each prefix/suffix adds to the cloud type:

alto *cirro* *nimbo/nimbus*

6.04 Precipitation (p. 489-490): Describe characteristics of the following precipitation:

Type	*Liquid or Solid?*	*Physical Description + How it forms*	*When (season) does it form?*
Rain			
Freezing Rain			
Snow			
Sleet			
Hail		***Why is some hail larger?***	

Lake Effect Snows

by Carl Wozniak

As we move into the winter months, those of us living near the edges of the Great Lakes find ourselves once again ocassionally set upon by the gods of the Lakes. A unique weather system occurs along lee shores in which massive snowfalls from blue-black, dense clouds are interspersed with periods of intense sunshine—the lake effect snows.

The lake effect snow showers extend a maximum of 20-30 miles inland and, frequently, folks just outside the belt have beautiful weather. Many are amazed when travelling just a few miles shoreward that they find intense "white-out" conditions and impassable roads. The storms can dump 2-4 feet of snow in a relatively short time, effectively crippling towns and causing massive damage due to weight loads.

Lake effect storms frequently occur when the weather map does not indicate an apparent cause for a snowstorm and, in fact, may occur under high pressure conditions. The storms may also have an effect over very limited geography. Heavy snows between weather stations may not even be recorded, and one town may escape the devastation that occurs in a neighboring town only a few miles away.

Lake effect snows have almost no counterpart outside the Great Lakes area. To form such a storm, a large body of water must exist upwind; the area must be sufficiently cold to produce snow, but not cold enough to cause a massive freeze of the water body; the water body must be large enough to warm the air, but not warm it too much; and a landmass of continental dimensions must exist upwind to supply cold air.[1]

The process of forming the lake effect snow is essentially as follows:

1) Cold Arctic air drives out of Canada and sweeps across the Great Lakes;
2) The cold air passes over the much warmer lakes, becoming warmer itself and picking up moisture;
3) The warmer air rises and cools adiabatically, forming clouds;
4) The warmed air reaches the shoreline and is further raised through oro graphic lifting;
5) The moisture is released from the clouds as they cool due to increased alti tude and reduced temperature over the much cooler land.[2]

While many factors determine the extent of the lake effect, probably the one of most consequence in determining which areas will be affected is *fetch*, the distance across open water that the air mass has travelled. This explains why, here in the Upper Peninsula, the Keweenaw Peninsula and Munising are significant targets for lake effect snowstorms. The Keweenaw itself is hit hard due to the broad expanse of open water north and northwest of it, and because of the high hills along its spine. With northwest winds, Marquette is in the shadow of the Keweenaw, but Munising, 45 miles down the coast, is not.

Lake effect snowstorms are just another example of the unique nature of living surrounded by one-fifth of the world's fresh water supply, and a fascinating diversion from boring weather.

[1] Eichenlaub, Val. *Weather and climate of the Great Lakes region.* Univ. of Notre Dame Press. 1979. p. 145.

[2] Ibid., pp. 148-150.