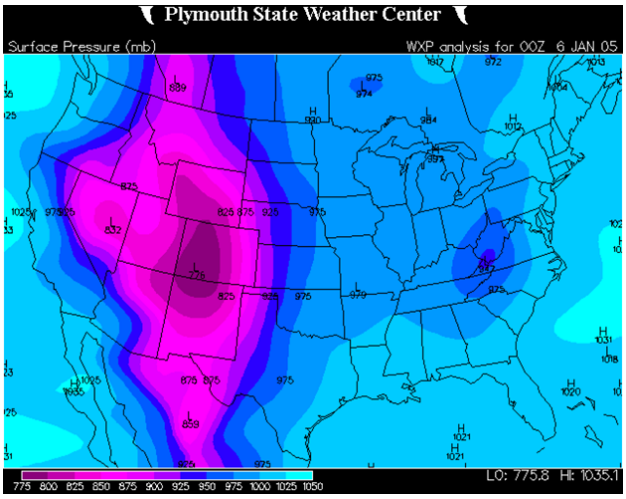
Answers to Clicker Questions

Chapter 1

- What component of the atmosphere is most important to weather?
  - A. Nitrogen
  - B. Oxygen
  - C. Carbon dioxide
  - D. Ozone
  - E. Water

- What location would have the lowest surface pressure?
  - A. Chicago, Illinois
  - B. Denver, Colorado
  - C. Miami, Florida
  - D. Dallas, Texas
  - E. Los Angeles, California



- What is responsible for the distribution of surface pressure shown on the previous map?
  - A. Temperature
  - B. Elevation
  - C. Weather
  - D. Population

- If the relative humidity and the temperature at Denver, Colorado, compared to that at Miami, Florida, is as shown below, **how much absolute water vapor is in the air between these two locations**?
  - A. Denver has more absolute water vapor
  - B. Miami has more absolute water vapor
  - C. Both have the same amount of water vapor

    Denver

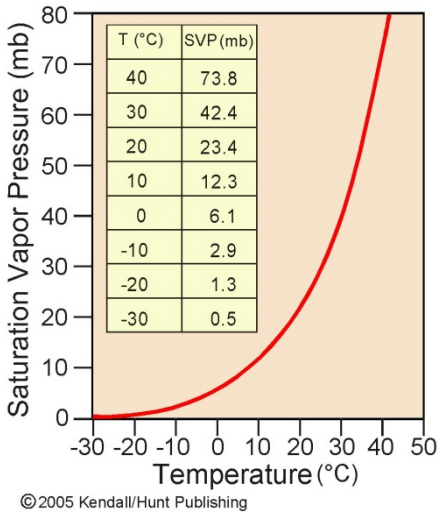
    10°C Air temperature

    50% Relative humidity

    Miami

    20°C Air temperature

    50% Relative humidity



Chapter 2

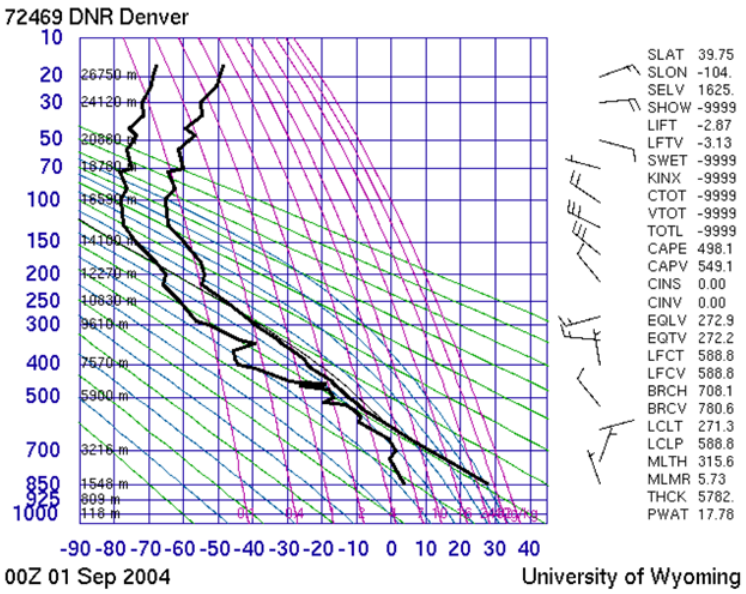
- Convert our local time of 9:45am MST to UTC
    A. 0945 UTC
    B. 1545 UTC
    C. 1645 UTC
    D. 2345 UTC

- A weather observation made at 0400 UTC on January 10th, would correspond to what local time (MST)?
    A. 11:00am January10th
    B. 9:00pm January 10th
    C. 10:00pm January 9th
    D. 9:00pm January 9th

- A weather observation made at 0600 UTC on July 10th, would correspond to what local time (MDT)?
    A. 12:00am July 10th
    B. 12:00pm July 10th
    C. 1:00pm July 10th
    D. 11:00pm July 9th

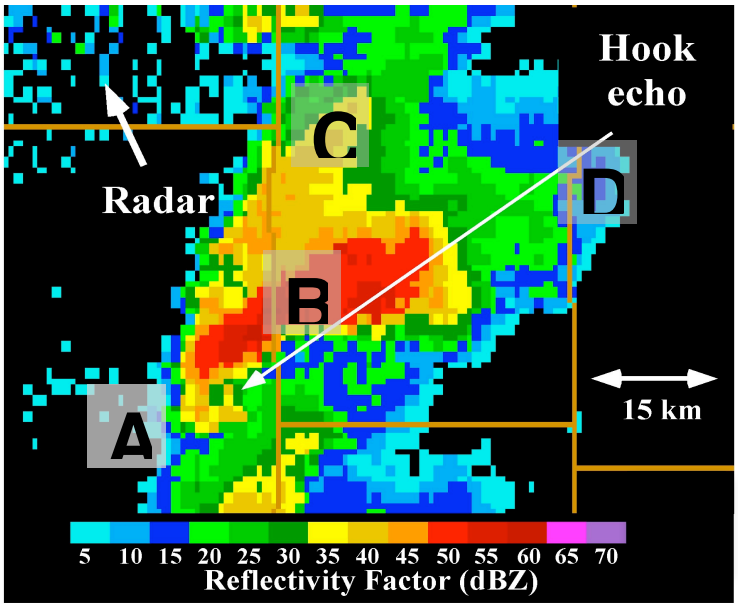
- A rawinsonde measures all of the following variables except:
    - Temperature
    - Dew point temperature
    - Precipitation
    - Wind speed
    - Wind direction

- What can a Doppler weather radar measure?
    - Position of precipitation
    - Intensity of precipitation
    - Radial wind speed
    - All of the above
    - Only a and b



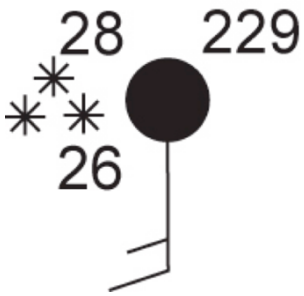
- In this sounding from Denver, the tropopause is located at a pressure of approximately:
  - 700 mb
  - 500 mb
  - 300 mb
  - 100 mb

- Which letter on this radar reflectivity image has the highest rainfall rate?
  - A
  - B
  - C
  - D



Chapter 3

- Using this surface station model, what is the temperature? (Assume it's in the US)
  - 26 °F
  - 26 °C
  - 28 °F
  - 28 °C
  - 22.9 °F
- Using this surface station model, what is the current sea level pressure?
  A. 28 mb
  B. 26 mb
  C. 229 mb
  D. 1022.9 mb
  E. 922.9 mb



- Using this surface station model, what is the wind speed?
  A. Calm
  B. 5 kts
  C. 10 kts
  D. 15 kts
  E. 55 kts
- Using this surface station model, what is the current significant weather?
  A. No significant weather
  B. Moderate rain
  C. Moderate snow
  D. Moderate hail
  E. Fog
- This symbol  is used on a surface station model to indicate what type of significant weather?
  A. Rain
  B. Fog
  C. Freezing Rain
  D. Heavy Snow
  E. Thunderstorm

- An isobar is a contour line of:
  A. Constant pressure
  B. Constant temperature
  C. Constant dew point temperature
  D. Constant wind speed
  E. Constant wind direction

- You would expect to find strong winds on a weather map where the pressure gradient is _____, which is also where the isobars are _____.
    A. Large, spaced far apart
    B. Large, spaced close together
    C. Small, spaced far apart
    D. Small, spaced close together

- Using this upper air station model, what is the temperature?
    A. −30 °F
    B. −30 °C
    C. 8 °F
    D. 8 °C
    E. 54.0 °C

- Using this upper air station model, what is the dew point temperature? (Dew point temp = Temp - Dew point depression)
    A. −30 °C
    B. 8 °F
    C. 8 °C
    D. −38 °F
    E. −38 °C
- Using this upper air station model, what is the wind speed?
    A. 70 kts
    B. 50 kts
    C. 30 kts
    D. 20 kts
    E. Calm
- Using this upper air station model, what is the wind direction?
    A. Northeast
    B. Southeast
    C. Northwest
    D. Southwest
    E. No direction (Calm)
- An area of low heights on a constant pressure map is referred to as a _____.
    A. A ridge
    B. A trough
    C. A jetstreak
    D. A valley
- What do we use to get the data that is displayed twice a day on upper air weather maps?
    A. Radar
    B. ASOS weather stations
    C. Rawinsondes
    D. Satellite imagery

- True or false: Isobars are normally shown on constant pressure maps.
    A. True
    B. False

Chapter 6

- An air parcel is considered _____ if it rises vertically and then returns to its original position (sinks).
    A. Stable
    B. Unstable
    C. Neutral
- As an air parcel rises it _____ and its temperature _____ adiabatically.
    A. Expands, warms
    B. Expands, cools
    C. Compresses, warms
    D. Compresses, cools
- True or false: An adiabatic process is one in which an air parcel does not mix with its environment or exchange energy with its environment.
    A. True
    B. False
- The value of the dry adiabatic lapse rate is _____.
    A. 0 °C / km
    B. 6 °C / km
    C. 10 °C / km
    D. 15 °C / km
- As a saturated air parcel rises in the atmosphere it will cool at the _____ which has a value of _____.
    A. Environmental lapse rate, 5 °C / km
    B. Moist adiabatic lapse rate, 6 °C / km
    C. Dry adiabatic lapse rate, 10 °C / km
    D. Environmental lapse rate, 15 °C / km
- What is the temperature of a saturated air parcel that is lifted 2 km if its initial temperature is 15 °C?
    A. −5 °C
    B. 3 °C
    C. 15 °C
    D. 27 °C
    E. 35 °C
- If an air parcel is _____ than its environment it will _____.
    A. Cooler, rise
    B. Cooler, sink
    C. Warmer, rise
    D. All of the above
    E. Both b and c

- The vertical temperature profile measured by a rawinsonde gives us the _____.
    A. Dry adiabatic lapse rate
    B. Moist adiabatic lapse rate
    C. Environmental lapse rate
- Measurements from a rawinsonde indicate that the environmental lapse rate in a layer of the atmosphere is **15 deg C / km**. Based on this information the stability of this layer of the atmosphere would be _____.
    A. Stable
    B. Unstable
    C. Conditionally unstable
    D. Neutral if saturated, stable if unsaturated
    E. Neutral if unsaturated, unstable if saturated
- Measurements from a rawinsonde indicate that the environmental lapse rate in a layer of the atmosphere is **4 deg C / km**. Based on this information the stability of this layer of the atmosphere would be _____.
    A. Stable
    B. Unstable
    C. Conditionally unstable
    D. Neutral if saturated, stable if unsaturated
    E. Neutral if unsaturated, unstable if saturated
- Measurements from a rawinsonde indicate that the environmental lapse rate in a layer of the atmosphere is **8 deg C / km**. Based on this information the stability of this layer of the atmosphere would be _____.
    A. Stable
    B. Unstable
    C. Conditionally unstable
    D. Neutral if saturated, stable if unsaturated
    E. Neutral if unsaturated, unstable if saturated
- Measurements from a rawinsonde indicate that the environmental lapse rate in a layer of the atmosphere is **6 deg C / km**. Based on this information the stability of this layer of the atmosphere would be _____.
    A. Stable
    B. Unstable
    C. Conditionally unstable
    D. Neutral if saturated, stable if unsaturated
    E. Neutral if unsaturated, unstable if saturated
- A **negative** environmental lapse rate indicates that temperature _____ as you go up in height, which we call an _____.
    A. Increases, inversion
    B. Increases, adiabatic process
    C. Decreases, inversion
    D. Decreases, adiabatic process

- Air parcels can be lifted by:
    A. Cold air displacing warmer air along a front
    B. As air blows up against mountains
    C. As air diverges at the surface
    D. All of the above
    E. Only a and b
- A cumulonimbus cloud would form in a(n) ____ environment and by definition _____.
    A. Stable, is precipitating
    B. Stable, is NOT precipitating
    C. Unstable, is precipitating
    D. Unstable, is NOT precipitating
- The appearance of a "watery sun" through a cloud is an indication that the cloud type is:
    A. Cumulus
    B. Stratus
    C. Cirrostratus
    D. Altostratus
    E. Nimbostratus
- Thin, high, wispy clouds are called:
    A. Cumulus
    B. Stratus
    C. Cirrus
    D. Nimbus

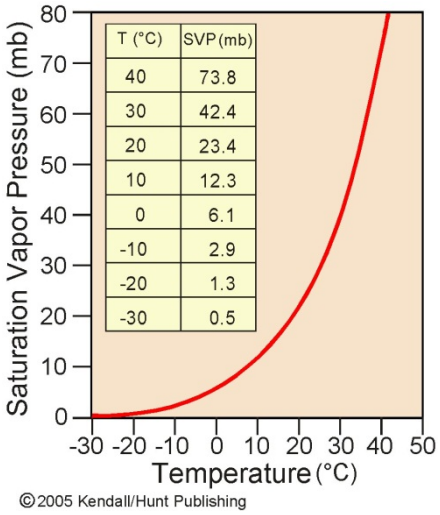
Clicker Quiz #1

- The layer(s) in the atmosphere in which the temperature decreases with height are the:
    A. Troposphere only
    B. Troposphere and stratosphere
    C. Troposphere and mesosphere
    D. Troposphere and thermosphere
- The **surface pressure** would be the highest in:
    A. New York, NY
    B. Chicago, IL
    C. Denver, CO
    D. Leadville, CO
- The ozone layer is what causes the temperature to _____ with height in the _____.
    A. Increase, troposphere
    B. Increase, stratosphere
    C. Increase, mesosphere
    D. Decrease, troposphere
    E. Decrease, stratosphere
- True or false: A southerly wind is a wind that is blowing from the north to the south.

A. True
B. False

- If the relative humidity and the temperature at Denver, Colorado, compared to that at Miami, Florida, is as shown below, what is the vapor pressure between these two locations?
  A. Denver has higher vapor pressure
  B. Miami has higher vapor pressure
  C. Both have the same vapor pressure

  Denver
  20°C Air temperature
  20% Relative humidity
  Miami
  20°C Air temperature
  60% Relative humidity

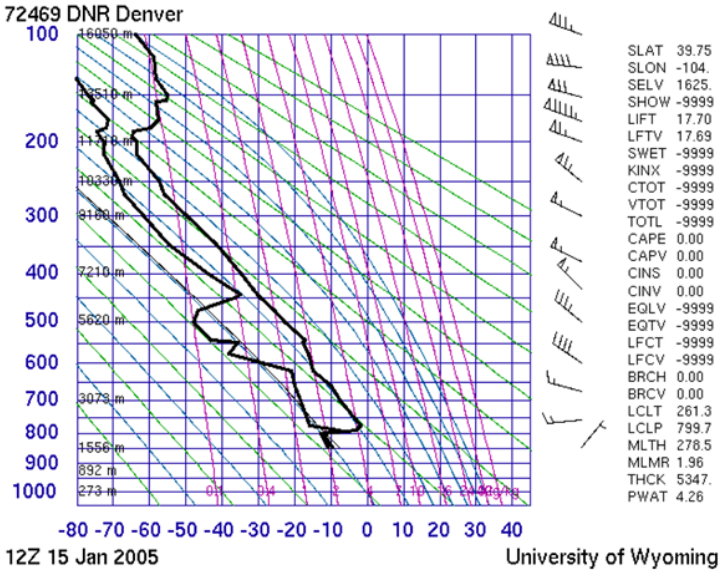


RH = vapor pressure / saturation vapor pressure x 100%

- Latent heat is _____ the atmosphere when liquid water evaporates into water vapor, and this causes a local _____.
  A. Released to, cooling
  B. Released to, warming
  C. Absorbed from, cooling
  D. Absorbed from, warming

- The seasons are caused by
  A. The phase of the moon
  B. The changing distance between the sun and the earth
  C. The speed of rotation of the earth
  D. The tilt of the earth's axis
- A temperature of 5 °C would be _____ in Fahrenheit.
  A. 37 °F
  B. 9 °F
  C. 41 °F
  D. −5 °F
- If the air temperature and dew point temperature were both 10 °C, then the relative humidity would be:
  A. 10 %
  B. 50 %
  C. 100%
  D. >100%

Clicker Quiz 2

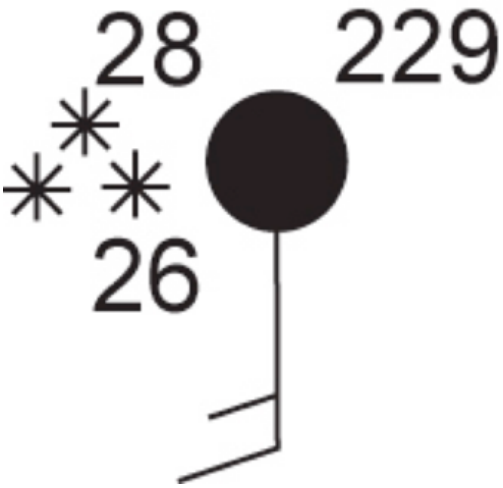


- What time was the given 12Z Denver sounding measurement taken at in local time (MST)?
  - A. 6:00 am
  - B. 6:00 pm
  - C. 5:00 am
  - D. 5:00 pm
- At what approximate pressure level is there an inversion in this sounding?
  - A. 300 mb
  - B. 500 mb
  - C. 600 mb
  - D. 800 mb
- In the U.S. rawinsonde measurements are routinely made _____ per day.
  - A. Once
  - B. Twice
  - C. Three times
  - D. Four times
- True or false: There are more surface observing stations in the U.S. than rawinsonde sites.
  - A. True
  - B. False
- In order to determine the intensity of precipitation, a radar measures the _____ energy returned to the radar.
  - A. Visible
  - B. Infrared
  - C. Microwave
  - D. None of the above
- If the radar reflectivity over Boulder was 60 dBZ, and 30 dBZ over Denver, what can you say about the precipitation in these locations?
  - A. The intensity of precipitation in Boulder is greater than in Denver
  - B. The intensity of precipitation in Denver is greater than in Boulder
  - C. The intensity of precipitation is the same in both locations
  - D. Radar reflectivity does not provide information about precipitation
- A bright region on a visible satellite image could be:
  - A. A forest
  - B. The ocean surface
  - C. Snow covered ground
  - D. All of the above
  - E. None of the above

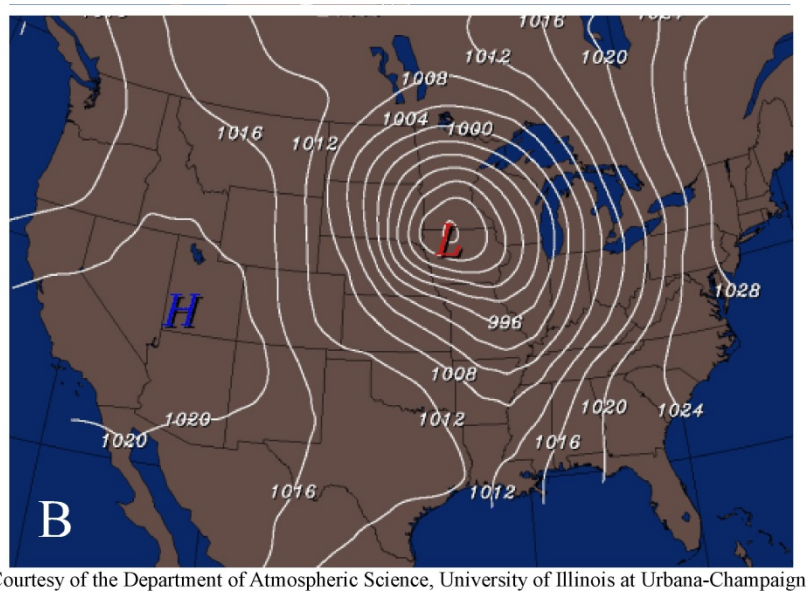
- A dark region on an infrared satellite image could be:
    A. A warm object
    B. A cold object
    C. Snow
    D. A cloud
- A cloud that is bright on a visible satellite image but darker on an infrared satellite image is likely to be:
    A. In the lower troposphere
    B. In the middle troposphere
    C. In the upper troposphere
    D. In the stratosphere

Clicker quiz 3

- Using this surface station model, what is the dew point temperature?
    A. 26 °F
    B. 26 °C
    C. 28 °F
    D. 28 °C
    E. 22.9 °F



- Using this surface station model, what is the current sea level pressure?
    A. 28 mb
    B. 26 mb
    C. 229 mb
    D. 1022.9 mb
    E. 922.9 mb
- Using this surface sea level pressure map, over which location would you expect the strongest surface winds?
    A. California
    B. Texas
    C. Colorado
    D. Nebraska
    E. Florida



Courtesy of the Department of Atmospheric Science, University of Illinois at Urbana-Champaign

- An isotherm is a line of constant:
    A. Pressure
    B. Temperature
    C. Dew Point Temperature
    D. Wind Speed
- Using this upper air station model, what is the temperature?
    A. −30 °F
    B. 8 °F
    C. −30 °C
    D. 8 °C
    E. 54.0 °C
- Using this upper air station model, the 8 in the lower left corresponds to the _____.
    A. Dew point temperature
    B. Dew point depression
    C. Relative humidity
    D. Visibility
- An air parcel is considered _____ if it rises vertically and then continues to rise, which will happen if it is _____ than its environment.
    A. Stable, warmer
    B. Unstable, warmer
    C. Neutral, cooler
    D. Stable, cooler
    E. Unstable, cooler
- As an air parcel sinks it _____ and its temperature _____ adiabatically.
    A. Expands, warms
    B. Expands, cools
    C. Compresses, warms
    D. Compresses, cools
- As an unsaturated air parcel rises in the atmosphere it will cool at the _____ which has a value of _____.
    A. Environmental lapse rate, 5 °C / km
    B. Moist adiabatic lapse rate, 6 °C / km
    C. Dry adiabatic lapse rate, 10 °C / km
    D. Environmental lapse rate, 15 °C / km