
WEATHER
Review Note Cards

Weather

Thermometer

Weather instrument that measures air temperature

Units include °F, °C, and °K

ESRT 13

Weather

Sling Psychrometer

Weather instrument that measures relative humidity and dewpoint

ESRT 12

Weather

Sling Psychrometer

- Dry bulb = air temperature
- Wet Bulb-Cool due to Evaporation
- "Depression" = difference between wet and dry-bulbs

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Weather

Barometer

Weather instrument that measures air pressure

Units include mb and inches

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Weather

Anemometer

Weather instrument that measures wind speed

Units include knots or mph

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Weather

Weather Vane

Weather instrument that measures wind direction

Winds are always named for where they are coming from, NOT where they are going to

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Weather

Atmosphere

- Shell of gas surrounding planet
- Formed from outgassing of volcanoes
- Divided into layers based on temperature changes

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Weather

Atmosphere Layers

- Troposphere-Weather occurs where the water vapor is
- Stratosphere-Ozone layer
- Mesosphere
- Thermosphere

- Boundaries are called "pauses"
- Based on Temperature Difference

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Weather

Conduction

Heat transfer through molecular contact (Solids)

Example: burning your hand on a hot frying pan

Weather

Convection

Heat transfer through density differences (Fluids)

Example: lava lamp

Weather

Radiation

Heat transfer through wave motion (Space)

Example: Sunlight traveling through space to Earth

Weather

Electromagnetic Energy

Divided by Wavelength

Know difference between short and long wavelength

Weather

Scatter

Energy redirected in many directions

Weather

Absorb

To take energy in-dark surface

Weather

Reflect

Redirect energy off shiny surface

Weather

Refract

Energy is bent

Weather

Radiate

Energy is given off-dark colors

Weather

Energy Absorption and Reflection

Dark, Dull and Rough-
good absorbers, good radiators

Light, Shiny and Smooth-
good reflector

Weather

Latent Heat

Water can only do one thing at a time:

Change Phase
or
Change Temperature

Weather

Phase Changes

- Evaporation-Liquid to Gas
- Condensation-Gas to Liquid
- Melting-Solid to Liquid
- Freezing-Liquid to Solid

Weather

Absolute Zero

The temperature at which all molecular motion stops.
0 °K

Hotter something is-higher kinetic energy

Colder something is-lower the kinetic energy

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Weather

Clouds

Cloudless days and nights generally are colder

Cloudy days are cooler

Cloudy nights warmer-clouds absorb energy

Act like a blanket!!

Weather

Greenhouse Effect

- Visible light (short waves) enter the atmosphere.
- It is absorbed by the surface
- Reradiated as infrared (long waves) which cannot escape the atmosphere. This causes temperatures to rise.

Greenhouse Gases: CO_2, Water Vapor, Methane

Weather

Station Model

Symbol that summarizes large amounts of weather observations in a small space.

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Weather

Station Model
(pressure conversion)

LONG TO SHORT

- Drop the "10" or "9"
- Drop the decimal point
- Drop the units

SHORT TO LONG

* Between 000-499
    * Add a 10, add a decimal, add units
* Between 500 and 999
    * Add a 9, add a decimal, add units

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Weather

Moisture Capacity

The amount of space in the air that is available to hold water vapor

- The higher the temperature, the more available space
- As temperature drops, the capacity decreases
- Temperature is the key!!!!

Weather

Relative Humidity

The amount of water vapor in the air compared with the amount that could fit in the air at a given temperature.

- Measured in %
- 100% relative humidity = Saturated
- 100% relative humidity occurs when the air temp. = the dewpoint
- Look for clouds and precipitation!!!!!

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Dew Point

The temperature at which the air becomes saturated.

- The air is saturated when it is holding all the water vapor it can at that temperature
- When the temperature drops to the dewpoint, condensation will occur and clouds will likely form

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Air Temperature = Dew Point

- It will Precipitate outside!!!!
- Humidity is close to 100%
- Look for clouds as a key!!!!!!!!

Weather

Cold Air

- Has a lower capacity to hold moisture
- Gets filled very quickly with water
- Has higher relative humidity

Weather

Warm Air

- Has a Higher capacity to hold moisture
- Gets filled very slowly with water
- Has lower relative humidity

Weather

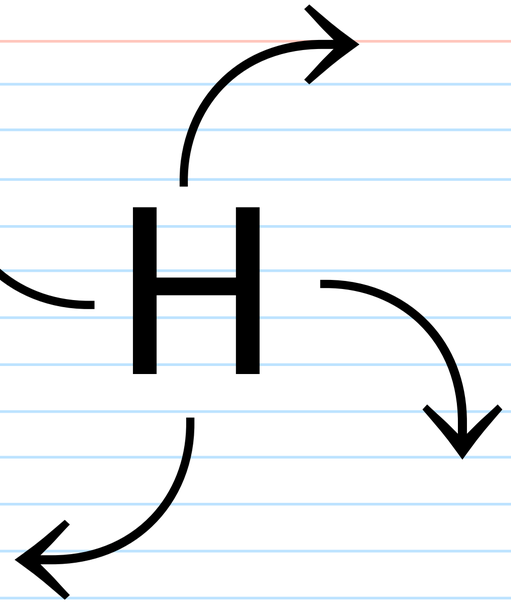
Isobars

*Lines that connect points of equal air pressure on a weather map
*Show where ares of high and low pressure are
*Close together = high winds

Weather

High Pressure

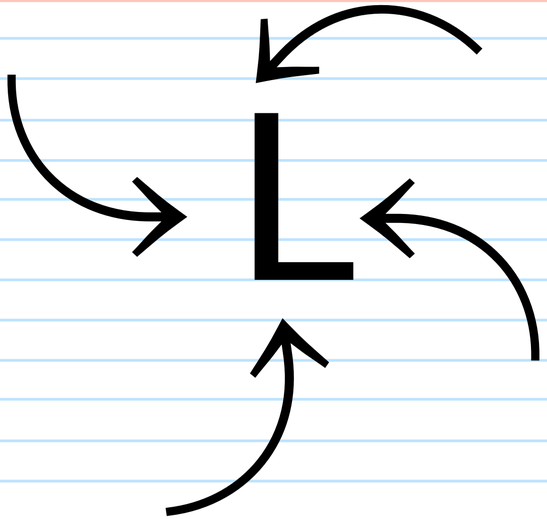
*Sinking air
*High is dry (low humidity, no clouds)
*Winds are clockwise and away



Weather

Low Pressure

- Rising air
- Low is lousy (humid and cloudy)
- Winds are counter-clockwise and inward



Weather

Winds

- Always blow from areas of High pressure to areas of low pressure
- Curved to the right in the northern hemisphere and to the left in the southern hemisphere because of the coriolis effect
- The higher the pressure gradient, the faster the wind speed (shown by tightly packed isobars)

Weather

Global Winds

Equator

*Rising air= Low Pressure= Wet weather

30 North/South

*Sinking air= High Pressure= Dry weather

60 North/South

*Rising air= Low Pressure= Wet weather

90 North/South

*Sinking air= High Pressure= Dry weather

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Weather

Specific Heat

- How quickly or slowly something heats up or cools off
- Water has the highest (heat and cool slowly)
- Lead has the lowest (heat and cool quickly

Weather

Sea-Breeze

Weather

Land-Breeze

Weather

Coastal vs. Inland Climate

- Coastal = less extreme, warmer winters and cooler summers
- Inland = more extreme, warmer summers, cooler winters
- Caused by the high specific heat of the water holding on to heat energy

Weather

Cloud Formation

- Air rises
- Air expands
- Air cools to it's dewpoint
- Water vapor condenses
- Clouds form if condensation nuclei (dust/smoke particles) is present

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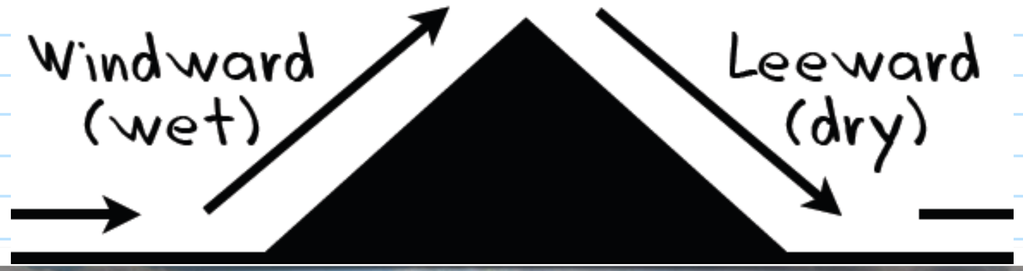
Orographic Effect

- Air is forced to rise when wind blows into a mountain
- Air expands, cools to its dewpoint and condenses into clouds
- On the other side of the mountain, air sinks, compresses, warms and dries out



Weather

Cold Front

- Leading edge of a cold air mass
- Dense, fast moving cold air forces warm air to rise causing storms
- A short period of heavy precipitation occurs right along the front

Weather

Warm Front

- Leading edge of a warm air mass
- Warm, slow moving air rises up the back side of a cold air mass
- A long period of light precipitation occurs out ahead of the front

Weather

Occluded Front

- When a cold front “catches up” to a warm from
- A mid-latitude cyclone forms
- Moves west to east across the US
- Large storm

Weather

Mid-Latitude Cyclone

Weather

Stationary Front

- Front that does not move
- Warm and cold air moving together in opposite directions

Weather

Hurricane

- Tropical cyclone
- Extremely low pressure, high winds
- Forms in South Atlantic, travels towards Florida

Weather

Climate

- The average temperature and moisture conditions for an area over a long period of time
- Affected by:
  - Altitude
  - Latitude
  - Proximity to water
  - Ocean Currents
  - Mountains
  - Prevailing Winds