**Unit 6: Weather- Understanding Weather Variables**

**Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Block:\_\_\_\_\_\_\_\_\_\_\_**

**Weather:**

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_-are individual pieces of information that describe specific conditions of the atmosphere.

 Examples:

**Forecasting** – is making \_\_\_\_\_\_\_\_\_\_\_\_\_\_ based upon ­­­­­­­­\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_conditions of the atmosphere.

🡨 **Weather Stations**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_- provide a picture of the weather conditions at a given time🡪

1. **Temperature:**

- measured in °C/F (less commonly, Kelvin or K)

Room Temperature according to pg. 13 of the ESRT: \_\_\_\_\_\_\_\_\_\_\_\_**°**F or \_\_\_\_\_\_\_\_\_\_\_\_\_\_**°**C

1. **Barometric Pressure:**
* Measured in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (mb), \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of mercury (“), and atmospheres (atm).
* Air pressure depends on how \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ packed the molecules are and how \_\_\_\_\_\_\_\_\_\_\_\_\_ they are.
* ****Sea Level Pressure or “One atmosphere”is equal to **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**mb OR**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_”** of mercury ( on pg. 13 ESRT)
* **Barometer:**
* At sea level there is \_\_\_\_\_\_\_\_\_\_\_\_\_\_ lbs. of pressure/inch

Relationships:

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: Why? Air \_\_\_\_\_\_\_\_\_\_\_\_\_ when \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(Density ↓)
2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: Why? Air \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ when \_\_\_\_\_\_\_\_\_\_ (Density ↑)

*A change in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ causes the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of air. The exchange of air from regions of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to \_\_\_\_\_\_\_\_\_\_\_\_\_\_ pressure= \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_!*

1. **Wind Speed and Direction**
	* Wind is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_of air.
	* *Wind occurs because of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_on earth.*
	* The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_the difference in\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_the wind speed. Speed is given in mph or in knots.
	* Wind is named for the direction \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ it comes (a “SW” wind blows NE)
	* An \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ measures wind speed/direction
	* Air flows from regions of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to \_\_\_\_\_\_\_\_\_\_\_\_\_\_ Pressure
	* And is **\_\_\_\_\_\_\_\_\_\_\_\_\_\_** where the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** ( ∆Pressure (high-low)/Distance)

Draw and label diagrams of a sea breeze and a land breeze including information on relative temperatures (cool vs. warm), pressures (high vs. low), and the direction the air moves vertically (rising or sinking) and the direction the air moves horizontally between the zones of land and sea (wind).

|  |  |
| --- | --- |
| **Sea Breeze (Day)** | **Land Breeze (Night)** |
|  |  |

1. **Dew Point Temperature:** temperature at which water vapor will \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_to become drops of water or ice crystals.
	1. It indicates how \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_the air is
	2. The air must be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ for this to happen
	3. The dewpoint temperature depends on the amount of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in the air;

It DOES NOT depend on the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* 1. A \_\_\_\_\_\_\_\_\_\_\_\_\_ dewpoint temperature indicates a \_\_\_\_\_\_\_\_\_\_\_\_ concentration of water vapor.

**How to Measure Dew Point Temperature:**

* Using a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |  |  |
| --- | --- | --- | --- |
| **Dry Bulb** | **Wet Bulb** | **Dry-wet** | **DPT** |
| **26°C** | **20 °C** |  |  |
| **6 °C** | **5 °C** |  |  |
| **12 °C** | **8 °C** |  |  |
| **18 °C** | **17 °C** |  |  |
| **14 °C** | **14 °C** |  |  |
| **0 °C** | **-3 °C** |  |  |

* This will yield two temperatures: A “\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_” temperature and “\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_” temperature
* In order to find the dew point, you must find the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ between the dry and wet bulb temperatures (\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_)and your ESRT **page \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (Dew Point Chart)**

**Dry Day:**

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_of moisture will evaporate.
* The wet bulb will be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_than the dry bulb.

**Humid/Wet Day:**

* A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_of moisture will evaporate.
* ****The wet bulb will \_\_\_\_\_\_\_\_\_\_\_\_\_\_ be much cooler than the dry bulb.

**Dew Point and Cloud Formation:**

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_temperature and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ temperature determine the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ at which water vapor will condense to form \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in the sky, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_ on the ground… On a dry day, the air must cool \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in order to form a cloud (lower DP temp), thus the air must rise \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ into the troposphere for condensation to occur.

1. **Absolute Humidity: refers to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

Fact: Water vapor molecules are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_than Nitrogen molecules. This means that \_\_\_\_\_\_\_\_\_\_\_\_\_\_ air is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ than dry air

As a result:

* As\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (H20 molecules replace N molecules)

 If air pressure decreases, air can \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, thus holding more \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Making the connection: Why does the air feel more humid during the summer months?**

1. **Relative Humidity**

-It compares the amount of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_in the air (%), to the amount the air can \_\_\_\_\_\_\_\_\_\_ which is based upon the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

-As air temp \_\_\_\_\_\_\_\_\_\_\_\_\_\_, Relative humidity will \_\_\_\_\_\_\_\_\_\_

-A 100% RH means the air is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

-At ground level this will indicate \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

*Making the connection: Why is it always more humid, wet, or “dewy” during the morning hours of the day as compared to the afternoon?*

Relationship of Relative Humidity to Air Temperature:

**Relative Humidity Problems using pg. 12 of ESRT**

1.)What is the RH if the dry bulb temperature is

10 ˚ C and the wet bulb is 8˚C? \_\_\_\_\_\_\_\_

2.)If the difference between the dry and wet bulb is 6 C˚, and the relative humidity is 41%, what is the Dry bulb temperature ?\_\_\_\_\_\_\_\_\_

3.) What is the relative humidity if the dry bulb temperature is 18 C and the Dewpoint is 18 C? \_\_\_\_\_\_\_\_

what is likely to form at ground level?

Using the graph, at what time of day would you predict precipitation to occur in Syracuse using information on air temperature and dew point? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**In Summary:**

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| **HEAVY AIR (High Pressure)**  | **Light Air (Low Pressure)** |
|  |  |