Unit 6 Part 2 - Meteorology Notes Name: _____

Air Masses and Fronts
Date:
SWBAT: Identify the 4 types of air masses, where they originate, and their characteristics. Identify the fronts associated with the movement of these air masses

Wind	• Wind is the movement of air from places of _____ pressure to places of _____ pressure • Wind moves in large masses called _____ ○ **Air masses also move from areas of high pressure to areas of low pressure** • These air masses retain the characteristics of _____

Describing Air Masses	Humidity	Temperature
	_____ (dry air) vs. _____ (moist air) • Depending on if the air mass forms over land or water depends on if it carries a lot of moisture	_____ (warm air) vs. _____ (cold air) vs. _____ (coldest air) • The temperature of the air mass depends on if it formed closer to the equator or closer to the poles

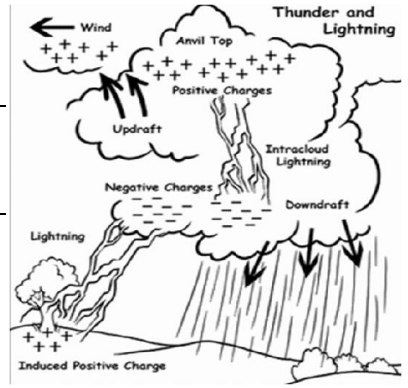
		Humidity	
		Continental	Maritime
Temperature	Tropical		
	Polar		
	Arctic		

Front	Definition: • **Along a front, warmer, less dense air is always forced upwards** • 4 types of fronts

Type of Front	**Map Symbol**	**Associated Weather**	**Characteristics**
Warm Front		• Marked by long and steady rain	• A warm front occurs when warm air _____ into an area covered by cooler air. • Takes a long time for warm air to displace colder air
Cold Front		• **Marked by _____ precipitation/thunderstorms for a _____ of time**	• A cold front forms when cold, dense air quickly moves into an area occupied by warm air • Compared to speed of warm front, cold fronts move very fast
Stationary Front		• Mild precipitation can occur on a stationary front	• **If fronts are not moving towards each other, but rather _____ a stationary front occurs.**
Occluded Front		• This will force the warm front up into the air, which will lead to heavy rain	• Cold fronts move faster than warm fronts • **When an active _____, an occluded front forms**

Thunderstorms and Tornadoes
Date:
SWBAT: Describe the stages of thunderstorm formation, define lightning and thunder, and describe the necessary conditions for tornado development.

Term	Description		
Thunderstorms	**Definition:** • There are ~ 4,000 thunderstorms per day worldwide	**Thunderstorms form when warm, humid air rises into colder air in an _____**	
Cold Front Thunderstorms	Cause:	• Strong and last for: • Can also have tornadoes and hail.	Occur in:
Warm Air Thunderstorms	Cause:	• Less violent and last:	Occur in:
Three Stages of a Thunderstorm	<u>Cumulus</u> Strong _____ blow _____ air higher until the vapor condenses, forming a cumulus clouds	<u>Mature</u> _____, warm air forming _____ clouds • Updrafts continue and downdrafts begin as rain starts to fall • Thunder and lightning begin	<u>Dissipating</u> Strong _____ stop warm, moist air currents from rising. • Water vapor supply suddenly decreases so the cell dies down
Lightning	• Negative charges near the _____ and positive charges near the _____ • Negative charges will rush toward ground and positive charges near ground rise toward cloud		
Thunder	• The extreme heat from lightning causes air to _____ resulting in a loud noise • The air expands faster than speed of sound and creates a sonic boom.		
Tornado	Definition: **The center of a tornado is characterized by its** _____	Tornado Intensity: EF0- EF5 **Measured on:** • Measures how much damage is done by the tornado and wind speed	
Tornado Alley	Location:	Air Mass Interaction:	
Tornado Warning System	**Watch** • Conditions are conducive to the development of tornadoes in and close to the watch area. • _____ area • Can last 3-5 hours	**Warning** • A tornado has been sighted by spotters or indicated on radar and is occurring or imminent in the warning area. • _____ area • Can last 30 min – 1 hour	



Hurricanes
Date:
SWBAT: Identify the ingredients for hurricane formation and describe the rating scale.

<table>
<tr><th>Term</th><th colspan="4">Description</th></tr>
<tr><td>Hurricanes</td><td colspan="4">Definition:

• Hurricanes go by different names in other parts of the world, these severe tropical storms can be called:

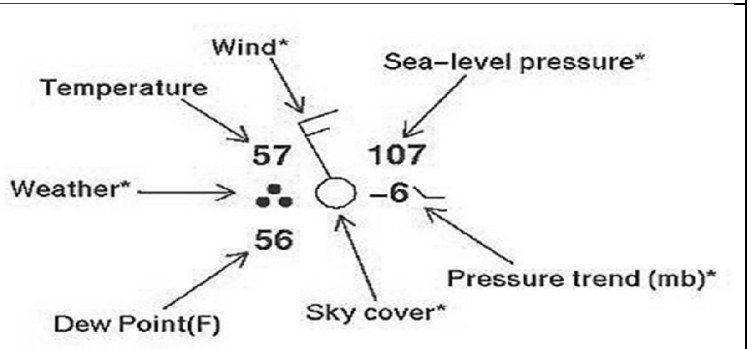
○ In the Pacific they are called _____
○ In the Indian Ocean they are called cyclones</td></tr>
<tr><td>Parts of a Hurricane</td><td colspan="2">_____ – center of the hurricane
• Calmest and warmest part of the storm.</td><td colspan="2">_____ – Thick clouds surrounding the eye with the most intense winds of the hurricane</td></tr>
<tr><td>Stages of a Hurricane</td><td>_____:
Is the first stage of consisting of a mass of thunderstorms that have only a slight wind circulation.</td><td>_____:
Whirling area of low pressure and storm activity with sustained winds up to 38 mph.</td><td>_____:
Sustained winds over 39 mph. This is the stage when the storm is given a name.</td><td>_____:
Winds over 74 mph</td></tr>
<tr><td>Storm Surge</td><td colspan="4">• Greatest _____ from hurricanes comes from the storm surge.
• Storm Surge - a combination of high tide and water that is pushed onshore by the strong winds of a hurricane; can produce surges 1-5.4+ meters.
• Most deaths from hurricanes are by _____ due to the storm surge.</td></tr>
<tr><td>Hurricane Classifying</td><td colspan="4">Hurricanes are classified according to intensity using the _____
<table>
<tr><th>Category</th><th>Sustained Winds (mph)</th><th>Surge (ft)</th><th>Damage</th></tr>
<tr><td>1</td><td>74-95</td><td>4-5</td><td>Minimal</td></tr>
<tr><td>2</td><td>96-110</td><td>6-8</td><td>Moderate</td></tr>
<tr><td>3</td><td>111-130</td><td>9-12</td><td>Extensive</td></tr>
<tr><td>4</td><td>131-155</td><td>13-18</td><td>Extreme</td></tr>
<tr><td>5</td><td>156+</td><td>19+</td><td>Catastrophic</td></tr>
</table></td></tr>
<tr><td>Hurricane Warning System</td><td colspan="2">_____:
issued several days before landfall</td><td colspan="2">_____:
issued 24 hours before landfall</td></tr>
<tr><td>Hurricane Season</td><td colspan="4">South East:

• The interaction between ocean _____ and _____ masses contributes to the formation of hurricanes during the late summer</td></tr>
</table>

Weather Maps and Forecasting

Date:

SWBAT: Use station models to interpret weather maps and identify tools meteorologists use to forecast the weather.

<table>
<tr><th>Term</th><th colspan="4">Description</th></tr>
<tr><td>Station Models</td><td colspan="2">• Meteorologists collect data from all over the country to help them predict the weather.
• The data is represented in a station model, which is comprised of symbols that stand for different things. The data represented includes:</td><td colspan="2"> 
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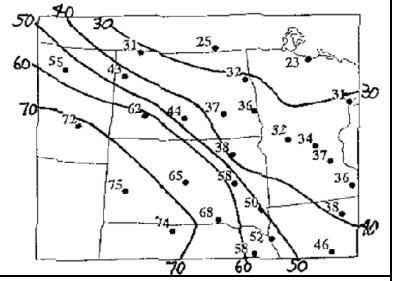
<tr><td>Weather Maps</td><td colspan="4">Once you have collected data from all of your station models, you can put it together and form a weather map.</td></tr>
<tr><td></td><td colspan="2">Isobars:

• _____ spaced = increased wind speed.

• _____ spaced = calm winds.
• Closed circles = areas of high or low pressure.</td><td colspan="2">Isotherms:
  </td></tr>
<tr><td></td><td>Cold Front:</td><td>Warm Front:</td><td>Occluded Front:</td><td>Stationary Front:</td></tr>
<tr><td>Weather Instruments</td><td>What is it?

What does it measure?</td><td>What is it?

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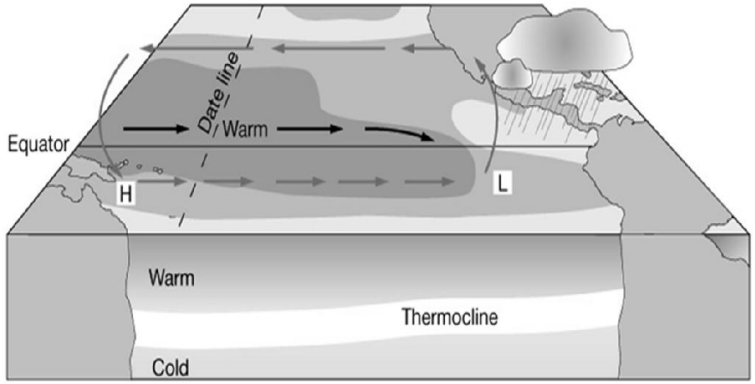
<tr><td></td><td colspan="4">• These instruments typically measure conditions in the lower atmosphere.
• A radiosonde:

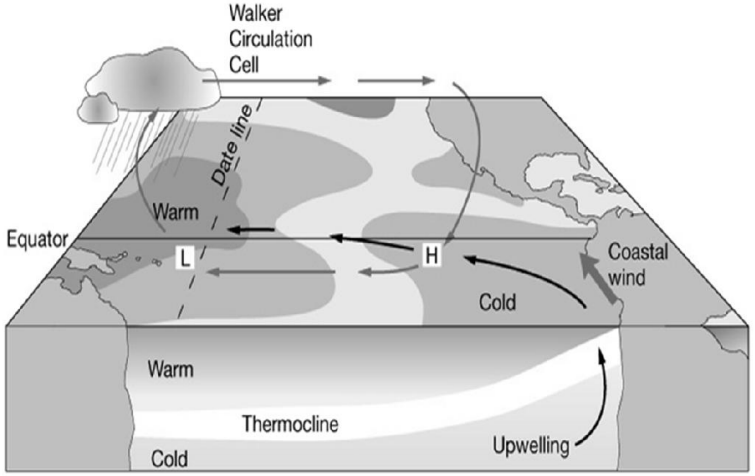
• Satellites can be used to determine weather conditions in the upper atmosphere.</td></tr>
</table>

El Niño and La Niña
Date:
SWBAT: Identify the causes of El Niño and La Niña and the weather patterns they create.

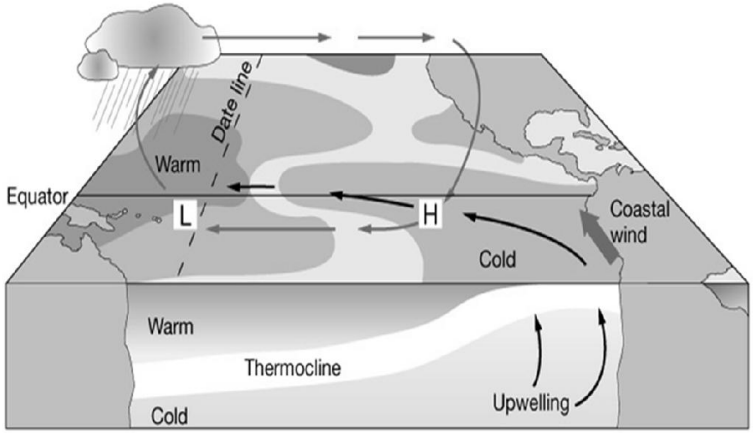
Term	Description				
Normal Conditions	Air Pressure:	Trade Winds:	Pacific warm pool on western side	Thermocline:	Upwelling:
El Niño-Southern Oscillation (ENSO)	Air Pressure:	Trade Winds:	Warm pool migrates eastward	Thermocline:	Downwelling • Lower _____ _____ • Corals particularly sensitive to warmer seawater
Global consequences of El Niño	El Niño has global consequences and is both an atmospheric and oceanic phenomena				
	_____ in SE Asia and Australia	_____ and increased rainfall in S. America	Strong _____ on US West Coast	Northward displacement of Jet Stream	_____ trade winds	Causes more winter rain in Texas, mild winter in Midwest
ENSO Events	Strong conditions influence global weather • **Flooding, drought, erosion, fires, tropical storms, harmful effects on marine life**				
La Niña	Opposite of:	Surface temperatures in the eastern Pacific are _____ than average	Winter-lots of colder than normal air blows over the Pacific Northwest, but warms the rest of the US	Trade winds are especially _____	Can also increase _____
ENSO Event	• El Niño warm phase about every 3 to 8 years • _____ • Phases usually last 12 to 18 months • Currently in an El Nino!				



El Niño conditions



Normal conditions



La Niña conditions