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

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| 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  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (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 | Temperature  \_\_\_\_\_\_\_\_\_ (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 |

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|  | | **Humidity** | |
| Continental | Maritime |
| **Temperature** | Tropical |  |  |
| Polar |  |  |
| Arctic |  |  |

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| 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.

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| 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 | Cumulus  Strong \_\_\_\_\_\_\_\_\_\_ blow \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ air higher until the vapor condenses, forming a cumulus clouds | Mature  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, warm air forming \_\_\_\_\_\_\_\_\_\_\_\_\_\_ clouds   * Updrafts continue and downdrafts begin as rain starts to fall * Thunder and lightning begin | | | | Dissipating  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 | | | | | | http://00.edu-cdn.com/worksheet-image/214140/lightning-diagram-earth-science-fifth.gif |
| 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** | | | **Warning** | | | |
| * Conditions are conducive to the development of tornadoes in and close to the watch area. * \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ area * Can last 3-5 hours | | | * 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.

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| Term | Description | | | | |
| Hurricanes | 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 | | | | |
| Parts of a Hurricane | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ – center of the hurricane   * Calmest and warmest part of the storm. | | | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ – Thick clouds surrounding the eye with the most intense winds of the hurricane | |
| Stages of a Hurricane | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_:  Is the first stage of consisting of a mass of thunderstorms that have only a slight wind circulation. | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_:  Whirling area of low pressure and storm activity with sustained winds up to 38 mph. | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: Sustained winds over 39 mph. This is the stage when the storm is given a name. | | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: Winds over 74 mph |
| Storm Surge | * 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. | | | | |
| Hurricane Classifying | **Hurricanes are classified according to intensity using the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** | | | | |
| **Category** | **Sustained Winds (mph)** | **Surge (ft)** | | **Damage** |
| 1 | 74-95 | 4-5 | | Minimal |
| 2 | 96-110 | 6-8 | | Moderate |
| 3 | 111-130 | 9-12 | | Extensive |
| 4 | 131-155 | 13-18 | | Extreme |
| 5 | 156+ | 19+ | | Catastrophic |
| Hurricane Warning System | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_:  issued several days before landfall | | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_:  issued 24 hours before landfall | | |
| Hurricane Season | South East:   * **The interaction between ocean \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ masses contributes to the formation of hurricanes during the late summer** | | | | |

Weather Maps and Forecasting

Date:

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

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| Term | Description | | | | | | | |
| Station Models | * 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: | | | | | plotstation.jpg | | |
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| Weather Maps | Once you have collected data from all of your station models, you can put it together and form a weather map. | | | | | | | |
| Isobars:   * \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ spaced = increased wind speed. * \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ spaced = calm winds. * Closed circles = areas of high or low pressure. | | | | | http://web.gccaz.edu/~lnewman/gph111/topic_units/Images%20for%20online%20lecture_lab/iso12c.gifIsotherms: | | |
| Cold Front: | Warm Front: | | | Occluded Front: | | | Stationary Front: |
| Weather Instruments | What is it?  What does it measure? | What is it?  What does it measure? | | | What is it?  What does it measure? | | | What is it?  What does it measure? |
| What is it?  What does it measure? | | | What is it?  What does it measure? | | | What is it?  What does it measure? | |
| * These instruments typically measure conditions in the lower atmosphere. * A radiosonde: * Satellites can be used to determine weather conditions in the upper atmosphere. | | | | | | | |

El Niño and La Niña

Date:

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

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| 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! | | | | | | | | | |

