**Climate and Climate Change ppt Worksheet**

**Objectives:**

* describe the transfer of energy between atmosphere, land masses, and oceans
* describe differential heating and cooling
* describe oceanic and atmospheric circulation patterns
* describe climates and microclimates

**Important Vocabulary:**

* climate
* weather
* microclimate
* latitude
* differential heating and cooling

**Climate**

* Climate is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ prevailing conditions at a particular place taken over time and based on records taken.
* Includes average \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ over time.

**Weather**

* Weather is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ atmospheric conditions at a given time.

**Factors that Determine Climate**

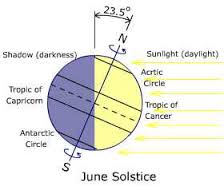
1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. Atmospheric circulation patterns

3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ circulation patterns

4. Geography of an area

5. Solar activity

**Latitude**

* Latitude is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ measured in degrees north or south.
* Light rays strike the earth more \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ at the \_\_\_\_\_\_\_\_\_\_\_\_\_\_ so the equator is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ than areas in the northern and southern hemisphere where the sun strikes the earth at an angle.

**REMEMBER THIS!!!**

* **Weather is the atmospheric conditions on** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.**
* **Climate is the** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **weather conditions determined by temperature and precipitation.**

**Microclimate**

* A local atmospheric zone where the \_\_\_\_\_\_\_\_\_\_\_\_ differs from the surrounding area is known as a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* A microclimate exists inside the bird of paradise flower. The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is very different on the inside compared to the outside of the flower.
* The term may refer to areas as small as a few square feet or as large as many square miles.
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

More Examples:

* Bodies of \_\_\_\_\_\_\_\_\_\_\_\_\_ may \_\_\_\_\_\_\_\_\_ the local atmosphere and create a microclimate.
* Heavily urban areas where brick, concrete, and asphalt absorb the sun's energy, heat up, and\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ that heat to the ambient air.
  + The resulting \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is a kind of microclimate.

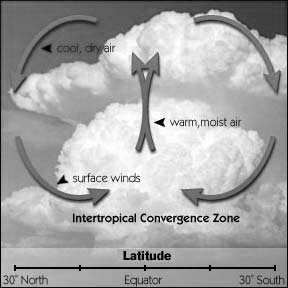
**Factors that affect Climate and Weather**

* Land masses and oceans (nearness to oceans)
* Number of days and hours of sunlight
* Air circulation patterns (direction of winds)
* Differential heating and cooling
* Oceanic circulation patterns

**Air Circulation Patterns**

* \_\_\_\_\_\_\_\_\_\_ air \_\_\_\_\_\_\_\_\_\_\_ because it is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ than warm air.

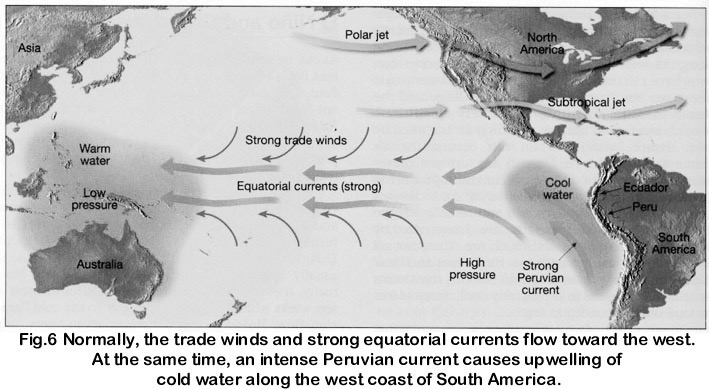
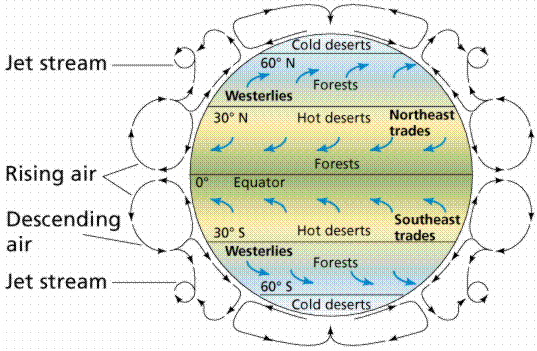
- cold air sinks and then warms

 - \_\_\_\_\_\_\_\_\_\_\_ air \_\_\_\_\_\_\_\_\_\_\_\_\_, expands and then cools.

* When warm air cools, water vapor may \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to form rain, snow, or fog.

**Oceanic Circulation Patterns**

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ - winds in the western pacific strengthen and push \_\_\_\_\_\_\_\_\_\_\_\_\_ water eastward.
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ – \_\_\_\_\_\_\_\_\_\_ water in the eastern pacific gets pushed westward. It is the opposite phase of El Nino.
* As El Nino brings in warm water eastward, and La Nina brings in cool water, the \_\_\_\_\_\_\_\_\_\_\_ temperature above is affected and thus affects the temperature on \_\_\_\_\_\_\_\_\_\_\_.

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**REMEMBER THIS!!!**

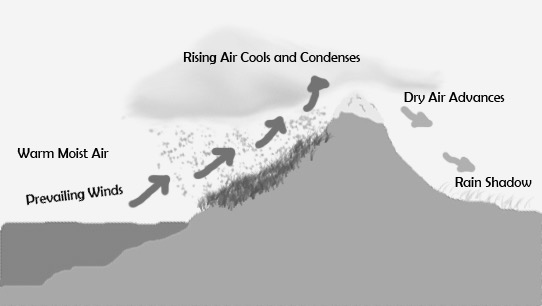
* **Nearness to large bodies of water and ocean currents affects climate.**
* **Climate determines where plants grow.**
* **Climate is determined by long range temperature and precipitation patterns.**
* **Climate determines which organisms are found in a particular area.**

**Land Masses and Oceans**

* Wind blowing over water creates a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ effect.

**Rainshadow Effect**

* An area having relatively little\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ due to the effect of a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, such as a mountain range, that causes the prevailing winds to lose their moisture before reaching it.



It rains a lot on the side of the mountain \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the body of water, but is \_\_\_\_\_\_\_\_\_\_ on the inland side of the mountain.

**Differential Heating and Cooling**

* \_\_\_\_\_\_\_\_\_\_\_\_\_ masses heat up more \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and cool more quickly than large bodies of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* Have you ever taken a walk on the dry beach on a sunny day?
  + Did you find that in the early afternoon the sand was much warmer than the water?
  + That’s \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_!
* Water is a \_\_\_\_\_\_\_\_\_\_\_\_ conductor of \_\_\_\_\_\_\_\_\_\_\_\_\_\_, thus it needs to gain \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ than the sand or dry land in order for its temperature to increase.
* On the other hand, \_\_\_\_\_\_\_\_\_\_\_ loses its heat much \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
  + But your toasted toes would perhaps mislead your mind!
* Earth's \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are far more important than the land as a source of the heat energy which drives the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* Not only do the oceans cover more than \_\_\_\_\_\_\_\_\_\_\_\_ of the Earth's surface, they also \_\_\_\_\_\_\_\_\_\_\_\_\_\_ more \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_ more \_\_\_\_\_\_\_\_\_\_\_\_ than land.
* Additionally the oceans \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ longer.
* The Sun's rays also penetrate the oceans to a depth of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, but only heat up the \_\_\_\_\_\_\_\_\_ layer of the sand or soil.
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ has to \_\_\_\_\_\_\_\_\_\_\_ more energy than the sand (dry land) in order for the temperature to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**REMEMBER THIS!!!**

**Differential Heating and Cooling**

* **Sea heats up slowly and cools slowly.**
* **Land heats up quickly and cools quickly**.