El Niño was originally recognized by fisherman off the coast of South America as the appearance of unusually warm water in the Pacific ocean around Christmas. El Niño means The Little Boy or Christ Child in Spanish.

La Niña means The Little Girl. La Niña is sometimes called El Viejo, anti-El Niño, or simply "a cold event".
In normal, non-El Niño conditions, the trade winds blow toward the west across the tropical Pacific. These winds pile up warm surface water in the west Pacific, so that the sea surface is about 1/2 meter higher at Indonesia than at Ecuador.
Normal Conditions

Thermocline

Jan 97
Reduced upwelling to cool the surface and cut off the supply of nutrient rich thermocline water. The result was a rise in sea surface temperature and a drastic decline in primary productivity, the latter of which adversely affected higher tropic levels of the food chain, including commercial fisheries in this region. The weakening of easterly trade winds. Rainfall follows the warm water eastward, with associated flooding in Peru and drought in Indonesia and Australia.
El Nino Conditions
La Niña Conditions

Equator

Thermocline

120°E  80°W
**El Niño** and **La Niña** refer to variations in oceanic and atmospheric conditions of the tropical Pacific. These conditions impact weather and climate up to the global scale.

**Directions:** Hold the device so **Long-Term Average** appears in the bottom center of the large window. In the large window is a schematic of the tropical Pacific Ocean and atmosphere along the equator. (The vertical scale is greatly exaggerated.) Over the long term, fair weather prevails in the eastern tropical Pacific while stormy weather is frequent in the western tropical Pacific. Look at the smaller windows for average atmospheric and oceanic conditions in the western, central, and eastern Pacific.

To investigate **El Niño** conditions, pull the insert out of the sleeve until **El Niño** appears in the bottom center of the large window. Note that stormy weather has moved eastward from its long-term location. Study information on oceanic and atmospheric conditions appearing in the smaller windows.

To find the differences between **El Niño** and long-term average conditions, compare the red lines in the small windows describing **El Niño** to the black markings along the sides of the windows representing long-term average conditions. Measured from the long-term averages, the differences are called anomalies. Anomalies are often used to describe the strength of **El Niño**.

Sometimes, **El Niño** alternates with **La Niña**, a period of oceanic/atmospheric conditions essentially opposite **El Niño**. To learn more about **La Niña**, remove the slide insert and turn it to the other side. Then slide the insert back into the sleeve until **Long-Term Average** appears in the bottom center of the large window. Now push the insert to the **La Niña** position and note that stormy weather has shifted westward because of stronger trade winds. To find the differences (anomalies) between **La Niña** and long-term average conditions, compare the blue lines in the small windows describing **La Niña** to the black markings along the sides of the windows representing long-term average conditions.
Long-Term Average

Wind Speed
El Niño and La Niña refer to variations in oceanic and atmospheric conditions of the tropical Pacific. These conditions impact weather and climate up to the global scale.

Directions: Hold the device so Long-Term Average appears in the bottom center of the large window. In the large window is a schematic of the tropical Pacific Ocean and atmosphere along the equator. (The vertical scale is greatly exaggerated.) Over the long term, fair weather prevails in the eastern tropical Pacific while stormy weather is frequent in the western tropical Pacific. Look at the smaller windows for average atmospheric and oceanic conditions in the eastern, central, and western tropical Pacific.

To investigate El Niño conditions, pull the insert out of the sleeve until El Niño appears in the bottom center of the large window. Note that stormy weather has moved eastward from its long-term location. Study information on oceanic and atmospheric conditions appearing in the smaller windows.

To find the differences between El Niño and long-term average conditions, compare the red lines in the small windows describing El Niño to the black markings along the sides of the windows representing long-term average conditions. Measured from the long-term averages, the differences are called anomalies. Anomalies are often used to describe the strength of El Niño.

To learn more about La Niña, remove the slide insert and turn it to the other side. Then slide the insert back into the sleeve until Long-Term Average appears in the bottom center of the large window. Now push the insert to the La Niña position and note that stormy weather has shifted westward because of stronger trade winds. To find the differences (anomalies) between La Niña and long-term average conditions, compare the blue lines in the small windows describing La Niña to the black markings along the sides of the windows representing long-term average conditions.

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¡El Niño! and ¡La Niña! refer to variations in oceanic and atmospheric conditions of the tropical Pacific. These conditions impact weather and climate up to the global scale.

**Directions:** Hold the device so Long-Term Average appears in the bottom center of the large window. In the large window is a schematic of the tropical Pacific Ocean and atmosphere along the equator. (The vertical scale is greatly exaggerated.) Over the long term, drier weather prevails in the eastern tropical Pacific while stormy weather is frequent in the western tropical Pacific. Look at the smaller windows for average atmospheric and oceanic conditions in the western, central, and eastern Pacific.

To investigate El Niño conditions, pull the insert out of the sleeve until El Niño appears in the bottom center of the large window. Note that stormy weather has moved eastward from its long-term location. Study information on oceanic and atmospheric conditions appearing in the smaller windows.

To find the differences between El Niño and long-term average conditions, compare the red lines in the small windows describing El Niño to the black markings along the sides of the windows representing long-term average conditions. Measured from the long-term averages, the differences are called anomalies. Anomalies are visible in the small windows.

Sometimes, El Niño alternates with La Niña, a period of oceanic/atmospheric conditions essentially opposite El Niño. To learn more about La Niña, remove the slide insert and turn it to the other side. Then slide the insert back into the sleeve until Long-Term Average appears in the bottom center of the large window. Now push the insert into the La Niña position and note that stormy weather has shifted westward because of stronger trade winds. To find the differences (anomalies) between La Niña and long-term average conditions, compare the blue lines in the small windows describing La Niña to the black markings along the sides of the windows representing long-term average conditions.
**El Niño** is a naturally occurring weather/climate phenomenon, typically lasting 12 to 18 months, featuring warming of surface ocean waters in the central and eastern tropical Pacific. During **El Niño**, cold water upwelling is suppressed (drastically reducing marine productivity) off the coasts of Ecuador and northern Peru, unusually heavy rains fall in adjacent coastal regions, while rainfall is significantly reduced in the western tropical Pacific.

On average, warm waters in the western tropical Pacific produce relatively low air pressure and heavy rainfall, while air pressures are higher and rainfall is less above the cooler surface waters of the central and eastern tropical Pacific. The prevailing air pressure pattern across the tropical Pacific drives the trade winds, blowing from the east along the equator and helping to maintain cold upwelling in the eastern tropical Pacific and warm waters in the western tropical Pacific. Every 2 to 7 years, **El Niño** conditions develop as air pressure rises over the western tropical Pacific and falls over the central tropical Pacific as part of the Southern Oscillation, a see-saw variation in air pressure between the western and central tropical Pacific. Easterly trade winds weaken and at times reverse direction, blowing towards the east over the western tropical Pacific. Warmer waters drift eastward and the main region of rainfall shifts into the central tropical Pacific.

**El Niño** may alternate with **La Niña**, a period when trade winds are significantly stronger than the long-term average and sea surface temperatures are lower than usual over a broad area of the eastern tropical Pacific and somewhat higher than usual in the west.

**El Niño** and **La Niña** trigger weather extremes worldwide with major economic consequences. Changes in atmospheric circulation over the tropical Pacific impact the weather beyond the tropics. Regions of high sea surface temperature heat the atmosphere, producing towering thunderstorms which help drive atmospheric circulation altering the course of jet streams and moisture transport into higher latitudes. Maps to the right show typical worldwide December through February climate anomalies associated with **El Niño** and **La Niña**.
3 Month Temperature Outlook

A  Above Normal
N  Normal
B  Below Normal

http://www.cpc.ncep.noaa.gov/
Examine ¡El Niño!-¡La Niña! with the slide insert pushed all the way into the device so that **Long-Term Average** appears in the indentation along the bottom of the large window. (Note: If La Niña appears when fully inserted, pull the slide out, flip it to the other side, and reinsert.)

1. Look at the large window. It displays a schematic of the Pacific Ocean along the equator (greatly exaggerated in the vertical). The scene depicts the ocean surface with atmosphere above and a vertical cross-section of the ocean below. Fair weather appears in the eastern tropical Pacific while *(fair)* *(stormy)* weather prevails in the western tropical Pacific.
2. Small windows depict conditions in the western, central, and eastern portions of the tropical Pacific. Dark blue triangles below the atmosphere windows and above the ocean windows point to the locations in the large window where conditions portrayed in the small windows are observed. The windows to your left represent a location in the (eastern) (western) tropical Pacific.