

El Niño's Powerful Reach

Educational Activities

Thar She Blows

Summary:

Participants learn how El Niño's form and the effect El Niño has on global wind patterns.

Grade Level:

Primary (grades 4-6)

Intermediate (grades 7-9)

Time Needed:

one, 90-minute class or
two, 45-minute classes

Learning Objectives:

- Understand what El Niño is and where it occurs
- Understand how winds affect El Niño's and El Niño's affect winds

Materials:

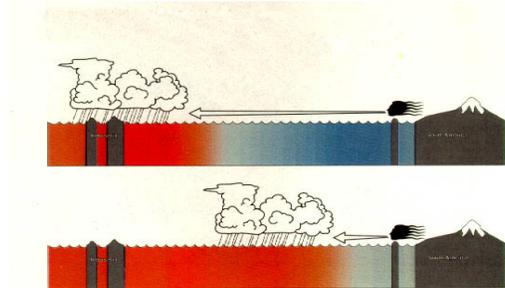
- Umbrellas
- Construction Paper
- Glue
- Markers
- Yarn
- World maps worksheets
- "Fishing poles" or yard sticks with string attached to paper fish
- Water Hose
- Empty Canteen
- Surfboard

Background:

Props:

In the normal condition, the student(s) representing the coasts of Indonesia and Australia can have umbrellas. In the El Niño condition, these students will be fighting fires using a small water hose and drinking from a small canteen (dying of thirst.)

The cold water student will have to represent the upwelling nutrient rich water that attracts fish and fishermen. In the normal condition, the student(s) representing the coast of South America can have fishing poles and can pretend to be catching a bumper crop of fish. In the El Niño condition these students will have on rain gear and can have oars to pretend they are rowing through flood waters. The North American coast student will also have on rain gear and carry oars. In addition, someone can pretend to be surfing extra high waves in Southern California.



Setup:

From left to right from the perspective of the audience, place the students like this:

1. INDONESIA and AUSTRALIA- Two students will construct a name tags with Indonesia on one and Australia on the other showing the location of each country on a world map that is glued to a piece of construction paper and hung around their neck using yarn. (Have the students stand side by side facing right)
2. WARM WATER + CLOUDS Have one student facing Indonesia and Australia. This student should wear a name tag labeled "Warm Water" having "clouds" glued onto a piece of red construction paper with a mass of cotton balls or some other white fluffy material on their name tag.
3. EASTERLY TRADEWINDS - (Have one student standing beside South America facing Indonesia and Australia wearing a name tag showing arrows pointing to the left);
4. NORTH & SOUTH AMERICA WESTERN COASTS- (Have two students wearing name tags having world maps showing the location of North America and South America facing Indonesia and Australia).
5. UPWELLING COLD WATER -(Have one student wearing a name tag made on blue construction paper having many different sized fish glued onto the tag. This student is facing Indonesia and Australia but standing closer to the South and

North American Coastlines)

6. NARRATOR- One student will read the script which describes the following events as students demonstrate the events that occur during an El Niño event.

Simulation Activity:

The narrator will explain that the following demonstration shows what happens to worldwide weather patterns when we have the condition known as El Niño.

- 1) Narrator: "In the normal condition, the easterly wind is blowing very hard across the Pacific Ocean."

ACTION:

- a) The "easterly wind" student then blows, gyrates, and moves their hands in the direction of the "Warm Water/Cloud" student.
- b) The Easterly wind will gently push the "warm water" student across the room toward Indonesia and Australia coastline.

- 2) Narrator: "Just like taking a warm shower produces clouds of steam in the bathroom, the warm water in the Pacific carries with it, its rain clouds."

- 3) "As warm water is pushed away from the western coast of South America, cold water from the ocean floor can surface bringing nutrients to the surface which causes the reproduction of algae which attract millions of small sardines. This in turn attracts larger fish. These "upwellings" provide fishermen off the coast of South American by Peru and North American off the coast of California huge catches of fish."

ACTION:

- c) North America and South America students pretend to be catching many fish with their fishing poles.

- 4) Narrator: "But in the El Niño condition, the easterly wind stops blowing as hard and may completely stop."

ACTION: The "easterly wind" student will come to a stop.

- 5) Narrator: "When this happens, the warm water stays closer to the South American Coast, the cold water can't surface, so the fish don't have anything to eat so they will not congregate in their usual upwelling locations. Instead, large amounts of warm water accumulates against the coasts of South and North America producing heavy rain all along these coasts causing flooding and landslides."

ACTION: North and South American students will put up their umbrellas indicating heavy rainfall. North American student can pretend to surf high waves.

- 6) Narrator: "When the warm water condenses on the western side of the Pacific, the western Pacific countries like Indonesia and Australia experience drought."

ACTION: The Indonesia and Australia coast students pant, and gag from thirst drink from their canteen, and use their fire hoses to put out the brush fires.

- 7) Narrator: So we can see that the El Niño condition can create dramatic changes in climate all over the world. "

Evaluation:

Have students answer the following questions following the dramatic simulation.

1. Describe what happens to warm water during a normal non-El Niño year off the western coasts of North and South America.
2. Explain what happens to the deep cold current in the same location.
3. What is the result that occurs when the above activity takes place?
4. Describe what El Niño is.
5. How does it affect the warm water movement off the coasts of North and South America?
6. How does the activity described in question 3 change?