

Natural disasters

Kitchen El Niño

This fun experiment will allow students to understand the climate pattern known as “El Niño” and will give students a better understanding of how El Niño affects natural disasters in Australia.

Instructions

- ▶ Organise students into small groups
- ▶ Read aloud to students the information on El Niño provided below
- ▶ Following reading the El Niño information provide each group with the equipment and instructions for the experiment. Ensure there is one adult per group to supervise the use of very hot water
- ▶ Allow the students to run the experiment. Allow 10-15 minutes for completion
- ▶ Following completion of the activity explain what’s happening (page 2) during the experiment

Read to students

The El Niño Effect

Australia’s climate sometimes swings from dry conditions one year to floods the next. This is due to a phenomenon around the Pacific Ocean called the Southern Oscillation. The most well-known extreme of the Southern Oscillation is the drought-causing El Niño (el-neen-yo).

El Niño is the Spanish word for the boy-child, a reference to the baby Jesus. The name was given because an El Niño event is characterised by the appearance of warm ocean currents off the coast of South America at Christmas time (the time of the birth of the boy-child - Jesus).

But what does this have to do with Australia?

In normal years the cool water in the eastern Pacific near South America is blown west, and is warmed by the tropical sun along the way.

When this warm water reaches the coast of Australia it warms the air, making it rise and creating cumulo-nimbus clouds that bring summer rain.

In an El Niño year, the circulation across the Pacific weakens, so the upwelling of cool waters is reduced, the warm water stops before it gets to Australia and we have a drought.

The effects of El Niño reach right around the globe. When we have droughts, large areas of Indonesia, India and Southern Africa also experience dry conditions; Peru gets floods, and parts of North America get very warm.

What is the current situation for Far North Queensland?

Where could you find more information about these climatic effects and what they mean for Cairns?

Experiment

Classroom resources provided by Cairns Regional Council



Curriculum links

F	Science	ACSSU004: Science as a Human Endeavour; Earth and space sciences	Daily and seasonal changes in our environment, including the weather, affect everyday life
1	Science	ACSSU019: Earth and Space Science Understanding	Observable changes occur in the sky and landscape
1	Science	ACSHE021: Science as a Human Endeavour; Nature and development of science	Science involves asking questions about, and describing changes in, objects and events
1	Science	ACSYS024: Questioning and predicting	Respond to an post questions, and make predictions about familiar objects and events
2	Science	ACSSU032: Science Understanding; Earth and space science	Earth's resources, including water, are used in a variety of ways
2	Science	ACSHE034: Science as a Human Endeavour	Science involves asking questions about, and describing changes in, objects and events
2	Science	ACSHE035: Science as a Human Endeavour	Science involves asking questions about, and describing changes in, objects and events
3	Science	ACSSU049: Science Understanding; Physical sciences	Heat can be produced in many ways and can be moved from one object to another
3	Science	ACSHE050: Science as a Human Endeavour; Nature and development of science	Science involves making predictions and describing patterns and relationships
4	Science	ACSSU075: Earth and Space Science; Nature and development of science	Science involves making predictions and describing patterns and relationships
4	Science	ACSHE062: Science as a Human Endeavour; Use and influence of science	Science knowledge helps people to understand the effect of their actions
5	Science	ACSHE083: Science as a Human Endeavour; Use and influence of science	Scientific knowledge is used to solve problems and inform personal and community decisions
5	Geography	ACHASSK114: Knowledge and Understanding	The impact of bushfires or floods on environments and communities, and how people can respond
6	Science	ACSSU096: Science Understanding; Earth and space sciences	Sudden geological changes or extreme weather conditions can affect Earth's surface
6	Science	ACSHE098: Science as a Human Endeavour; Natural and development of science	Science involves testing predictions by gathering data and using evidence to develop explanations or events and phenomena
6	Science	ACSHE100: Science as a Human Endeavour; Use and influence of science	Scientific understandings, discoveries and inventions are used to solve problems that directly affect peoples' lives

Build your own EL NIÑO

Warning: This activity involves hot water and an electrical appliance. Make sure there's an adult around to supervise.

Instructions

You will need:

- ▶ A large glass Pyrex baking dish or plastic Tupperware-type container
- ▶ Red and blue food colouring
- ▶ Water
- ▶ A funnel
- ▶ A hair dryer or fan

Method:

1. Half-fill a large glass Pyrex baking dish or plastic Tupperware container with very hot water. Add red food colouring to the water (taking care not to scald yourself!).
2. Next, in a separate container, mix up some very cold water with blue food colouring. Using a funnel, carefully add this cold water to the bottom of the baking dish. Notice how the hot and cold water do not mix. This represents an El Niño situation, where the warm water on top prevents the cooler water from rising to the surface.
3. To set up the conditions normally experienced, direct a stream of air from a hair dryer or fan over the surface of the water.

(Warning: keep the electrical appliance well away from the water itself. If the hair dryer should come into contact with the water, you should turn it off at the power point. Do not reach in to fish it out).

What's happening?

As the air blows over the surface of the water, the hot water will move to the other end of the container. The cold water will rise to the surface near the fan, replacing the hot water. This represents the usual winds that drive the warm water west to Australia.

Turn off the fan, and look at the slope between the hot and cold water. Does the water return to El Niño conditions now that the wind has stopped?

Of course, the ocean's water is not exactly half hot, half cold. The warm layer is really a thin surface layer.

While this model helps you understand the processes at work, it doesn't give an accurate representation of El Niño.

For scientists to understand what's happening in real life, they have to closely monitor the oceans and the atmosphere. While their understanding is increasing, there's still a lot to be learned.

