

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 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-noon-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

7	Science	ACHGS053: Geographical Inquiry and Skills; Communicating	Present findings, arguments and ideas in a range of communication forms selected to suit a particular audience and purpose; using geographical terminology and digital technologies as appropriate
7	Science	ACSHE121: Science as a Human Endeavour	People use science understanding and skills in their occupations and these have influenced the development of practices in areas of human endeavour
7	Science	ACSHE223: Science as a Human Endeavour; Nature and development of science	Science knowledge can develop through collaboration across the disciplines of science and the contributions of people from a range of cultures
7	Geography	ACHGK042: Knowledge & Understanding	Causes, impacts and responses to an atmospheric or hydrological hazard
7-8	Health & Physical Education	ACPPS072: Personal, Social and Community Health; Being healthy, safe and active	Practise and apply strategies to seek help for themselves or others
8	Science	ACSHE136: Science as a Human Endeavour; Use & Influence of Science	People use science understanding and skills in their occupations and these have influenced the development of practices in areas of human endeavour
8	Geography	ACHGK053: Knowledge & Understanding; Landforms & landscapes	Causes, impacts and responses to a geomorphical hazard
9	Science	ACSHE160: Science as a Human Endeavour; Use & influence of science	People use scientific knowledge to evaluate whether they accept claims, explanations or predictions, and advances in science can affect people's lives, including generating new career opportunities
9	Geography	ACHGK063: Knowledge & Understanding; Biomes & food security	Challenges to food production, including land and water degradation, shortage of fresh water, competing land uses, and climate change, for Australia and other areas of the world
10	Science	ACSHE191: Science as a Human Endeavour; Nature and development of science	Scientific understanding, including models and theories, is contestable and is refined over time through a process of review by the scientific community
10	Geography	ACHGK074: Knowledge & Understanding; Environmental change & management	The application of geographical concepts and methods to the management of the environmental change being investigated
10	Geography	ACHGK075: Knowledge & Understanding; Environmental change & management	The application of environmental, economic and social criteria in evaluating management responses to the change

Build your own EL NIÑO

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

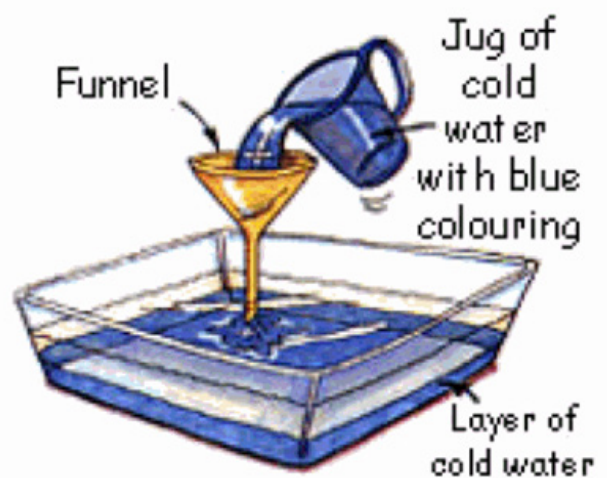
Instructions

You will need:

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