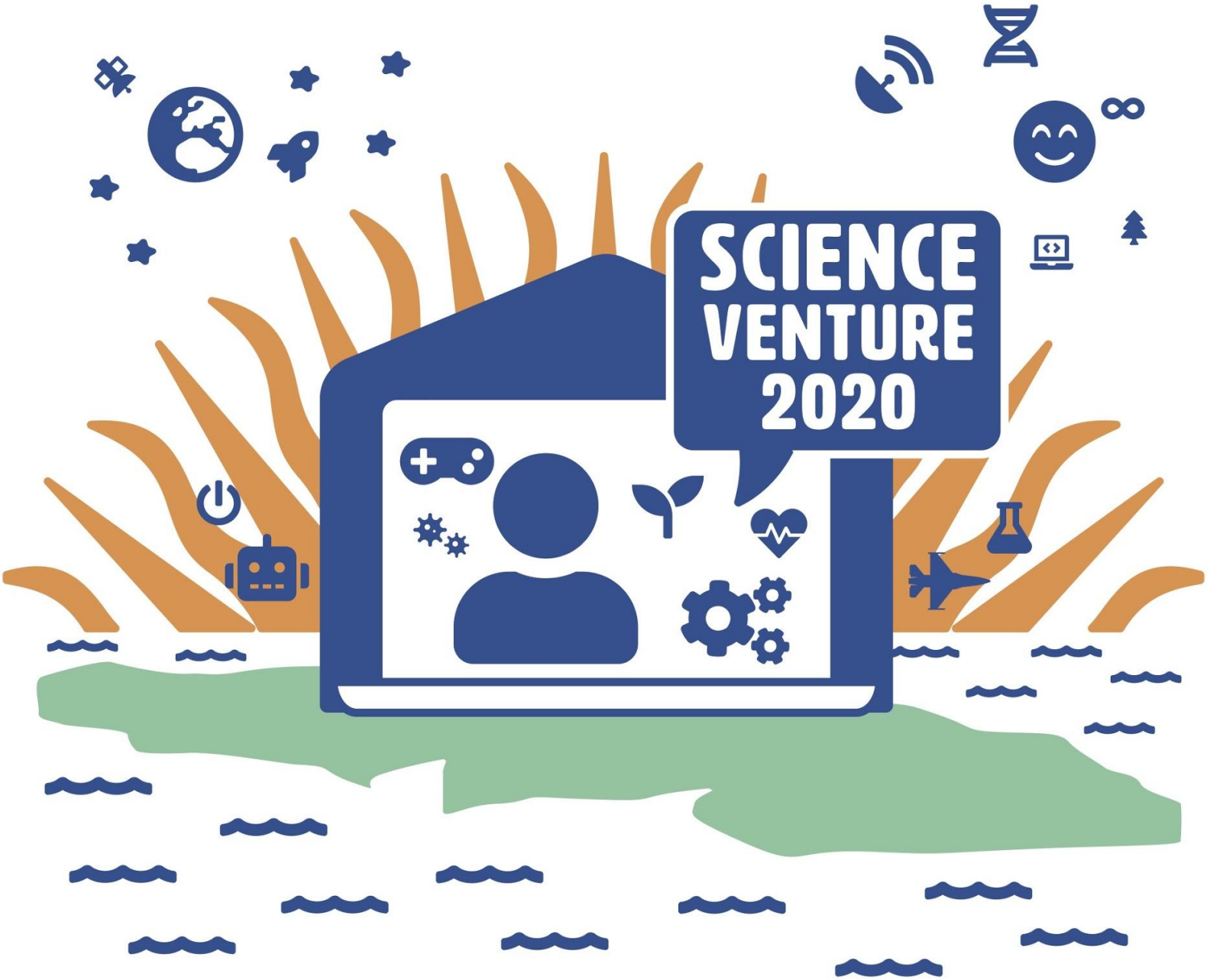


Oceanography

Ocean Motion

By simulating ocean movements and motions with waves, students will recreate the motion of the ocean and the role of wind on our coasts. Students will create rheoscopic fluid so the currents and water motions will be easily observable, and will track waves, marine debris and convection currents.

Materials

- Mica powder
- Pan or container
- Play doh or clay
- Fan/hair dryer
- Food coloring
- Marine debris
  - Beads
  - Plastic
  - Toys

Safety Considerations

- Students should be gentle when handling the mica powder

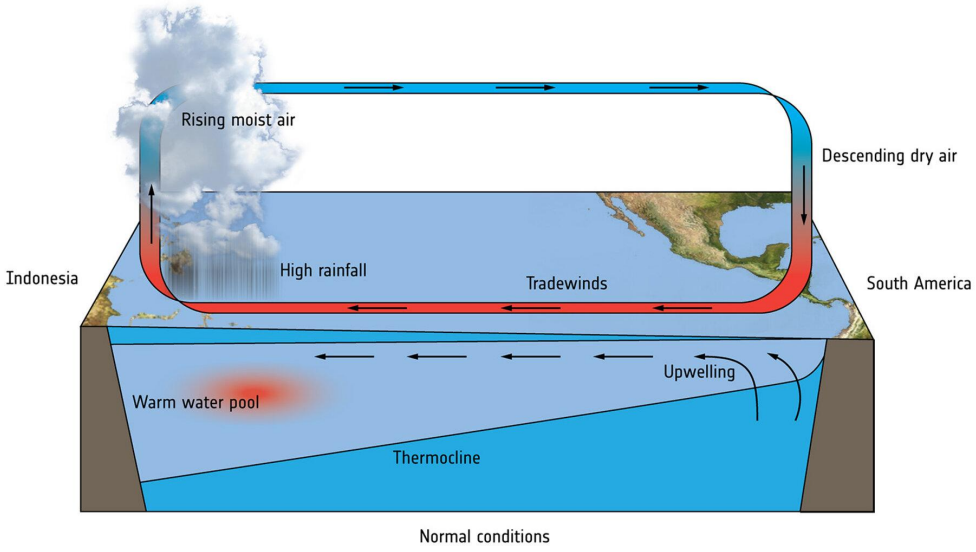
Background

El Niño

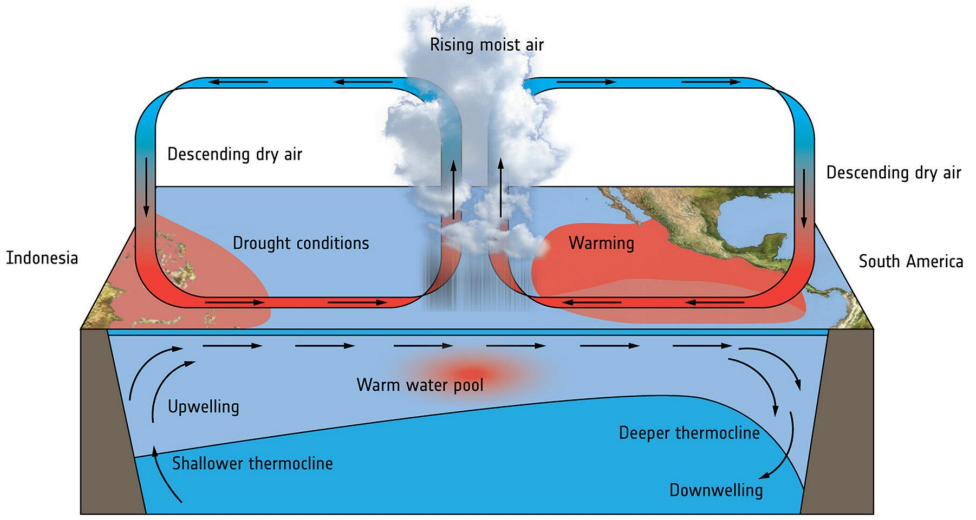
- An ocean-atmospheric climate interaction where surface sea temperatures rise across the the east-central equatorial pacific
  - El Ninos usually occur over North America leading up to the winter season
- Usually, strong trade winds blow towards the west, which pushes warm surface water towards the **western** pacific, near Asia and Australia
- However i an El Niño, these westward blowing trade winds are weaker along the equator, which causes the water to move **eastward** towards South America
  - This brings rain to South America, and droughts to Indonesia and Australia, which has many consequences for the country, as well as the people and animals that live there

Ocean Motion

Background Information



Normal conditions



El Niño conditions

Trade winds

- Trade winds blow towards the equator from the northeast in the northern hemisphere, or from the southeast in the Southern Hemisphere. These two directions of winds circle around the earth and blow from high-pressure to low-pressure belts.

Upwelling

- The movement of nutrient rich waters from deep in the colder ocean water up to the surface of the ocean through the thermocline, as a result of the trade winds moving water and creating currents as warm water moves across the ocean from East to West.
- El Niño's prevent upwelling to occur because of this unusual warm layer of warm water that is moving differently.
- Without upwelling, the coastal ecosystems change and fish populations and die or migrate

Ocean Motion

Procedure

1) Create rheoscopic fluid with mica powder
   a) Fill your container with water (1 liter or however much water it can fit)
   b) Add a teaspoon of mica powder, or however much is directed on the bottle
   c) Color the liquid with food coloring (blue for water ~ or any other color you want your ocean to be)

2) Rheoscopic fluid allows you to see the motion of the water and turbulence in the fluid. This will help you visualize the fluid dynamics better!

3) In a pan or container, create land masses and a sea floor with play doh or clay, or sand. Create a 'coastline' in your container, so that a portion is land (like a beach).

4) Using a fan or hairdryer, create different currents and observe what happens from different directions

5) The hairdryer will act as the **trade winds**. These **trade winds** blow towards the equator from the northeast in the northern hemisphere, or from the southeast in the Southern Hemisphere. These two directions of winds circle around the earth and blow from high-pressure to low-pressure belts.

6) Can you create waves in your container? How are you doing this?

7) What does the role of the coastline play? What does the role of the ocean floor that you created play in waves and water movement?
   a) Move around your sea floor design by recreating the play doh and creating new structures. What does shallow water look like vs deep water? Does it move in the same way?

8) Map the movement of sea creatures
   a) Place some marine debris in the water and watch which way they move with the currents you are creating

#SVatHome

Want to share your project or results with us?

Email or tag us @ScienceVenture

Have a question?

Reach us at svcamp@engr.uvic.ca