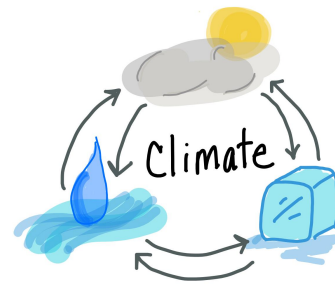


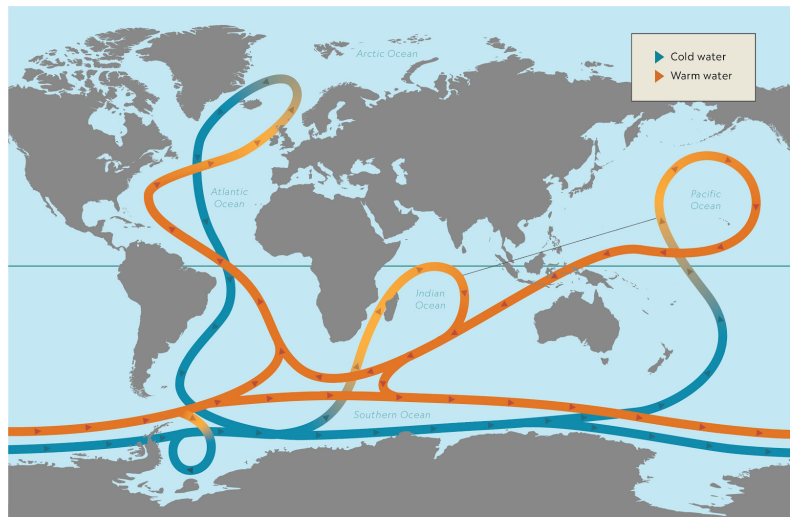
# Ocean Currents & Climate

PURPOSE: The climate is formed through the interaction of the hydrosphere, cryosphere, and atmosphere. This lab will focus on the impacts of the ocean currents within the hydrosphere.



## Pre-lab Questions

A. What is the *global conveyor belt*?



- B. *Highlight your answer choices.* A warm ocean current brings [warm / cold] temperatures on land and [wet / dry] conditions.
- C. *Highlight your answer choices.* A cold ocean current brings [warm / cold] temperatures on land and [wet / dry] conditions.

## Supplies:

You will need the following items in order to complete this lab

- Graduated Cylinder
- Red Warm Water (hot plate)
- Blue cold water (ice)
- Green Salty water (room temperature)
- Yellow Fresh water (room temp)
- Clear Square container (like the one shown on the right)
- Access to a sink



## Part 1: Warm and Cold Ocean Currents

### Directions

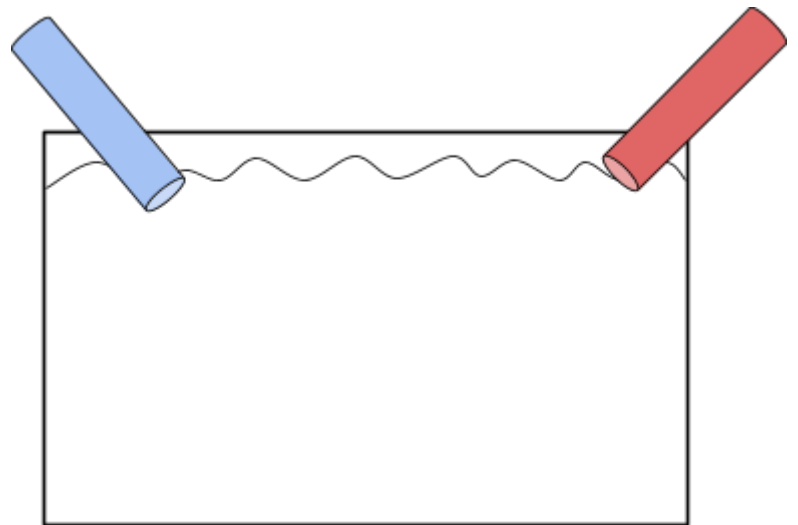
- Fill your container with room temperature water
- Take a graduated cylinder full of blue cold water and dump it in the square container on the left side

Record your observations

- Take the graduated cylinder full of red warm water and GENTLY add it to the square container on the right side

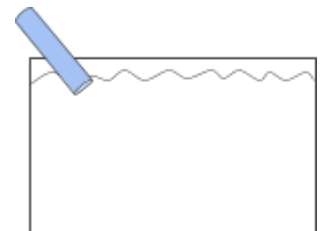
Record your observations

Draw your square container below - use colors and words to indicate temperature and density

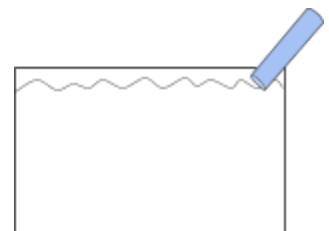


Draw arrows to show the convection currents

NOW dump one more graduated cylinder of cold water on the LEFT side - what effect does this have on the convection current?



NOW dump one more graduated cylinder of cold water on the RIGHT side - what effect does this have on the convection current?



## Part 2: Salty and Fresh Ocean Currents

### Directions

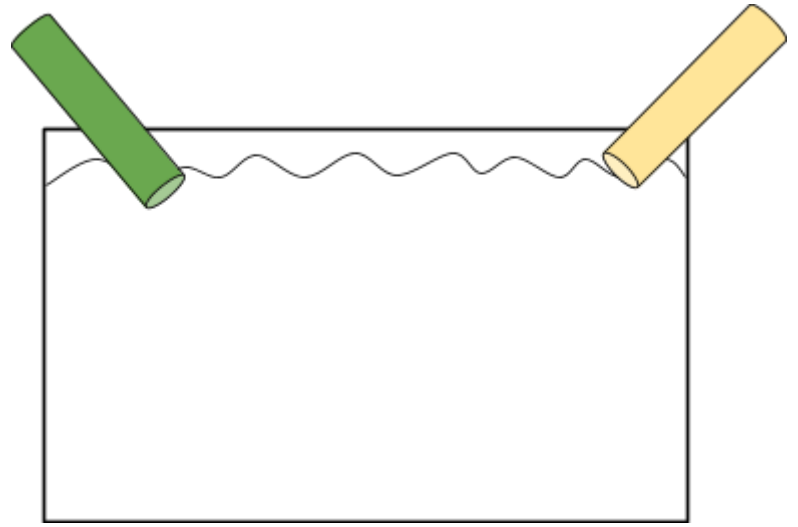
- Dump put the water and RESET you container with room temperature water
- Take a graduated cylinder full of green salty water and dump it in the square container on the left side

Record your observations

- Take the graduated cylinder full of yellow fresh water and GENTLY add it to the square container on the right side

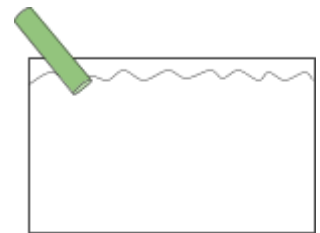
Record your observations

Draw your square container below - use colors and words to indicate temperature and density



Draw arrows to show the convection currents

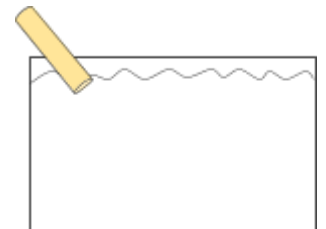
NOW dump one more graduated cylinder of salty water on the LEFT side - what effect does this have on the convection current?



How does water get more salty - think of the water cycle...

NOW dump one more graduated cylinder of fresh water on the LEFT side - what effect does this have on the convection current?

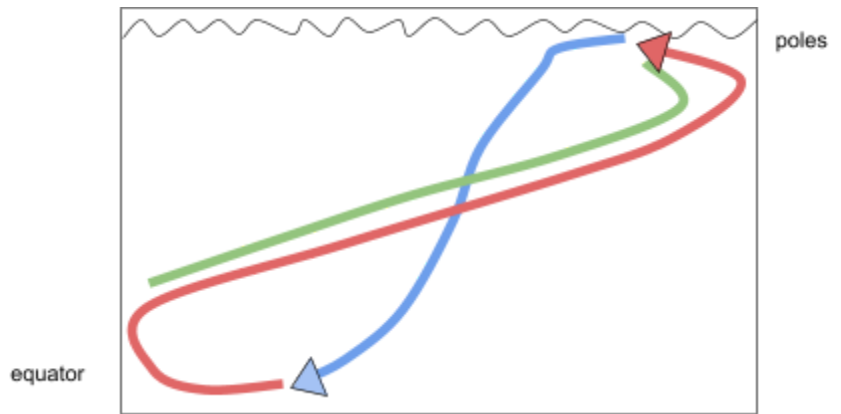
Does fresh and salty water make convection currently like warm and cold water? Why do you think not?



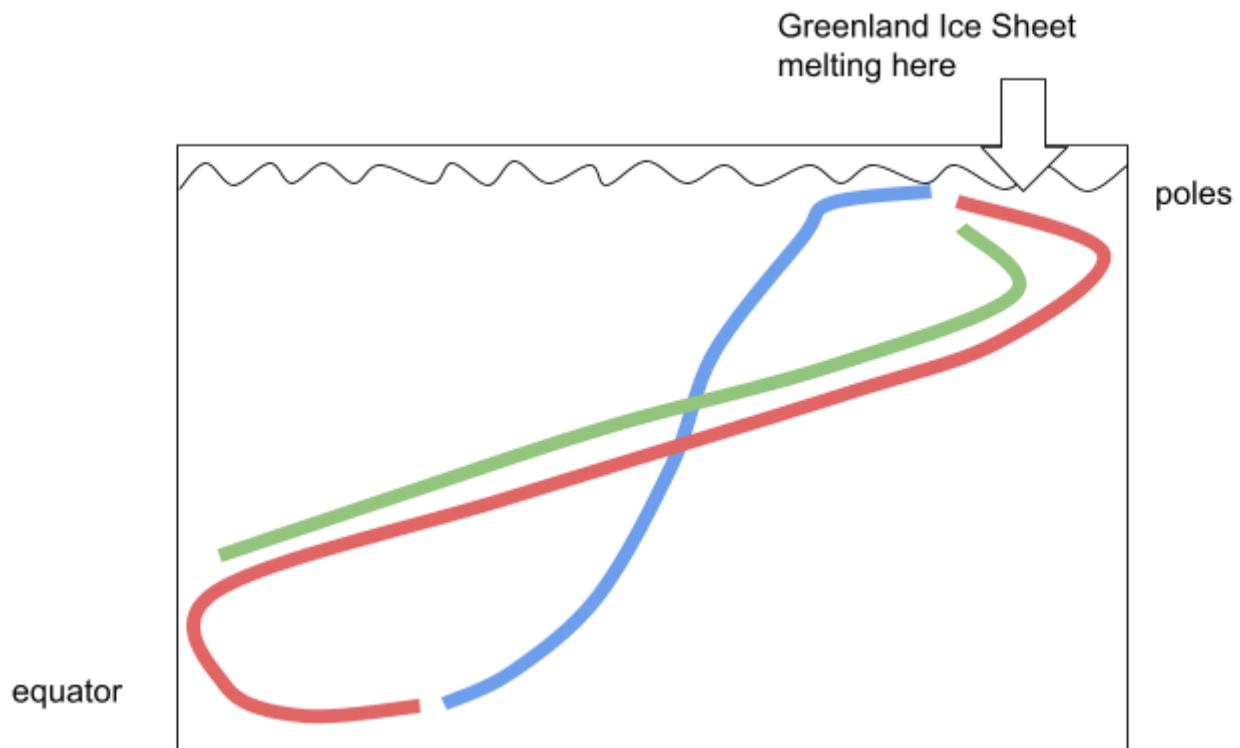
## Putting it All Together

The following model shows a representation of the Gulf Stream in the buckets. The bottom of the bucket represent the equator and the top of the bucket represents the poles

The Greenland ice sheet is melting!  
Using the model to the right, draw what would happen to the ocean currents between the equator and the poles.

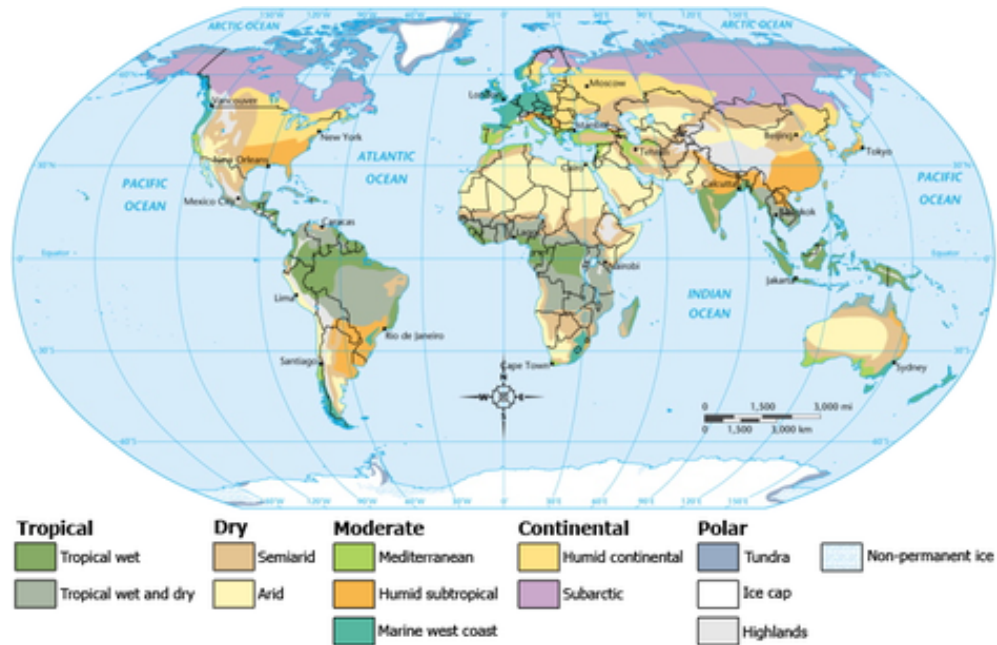


Draw your model below using colors to indicate temperature and salinity - use arrows to show the direction of the convection current

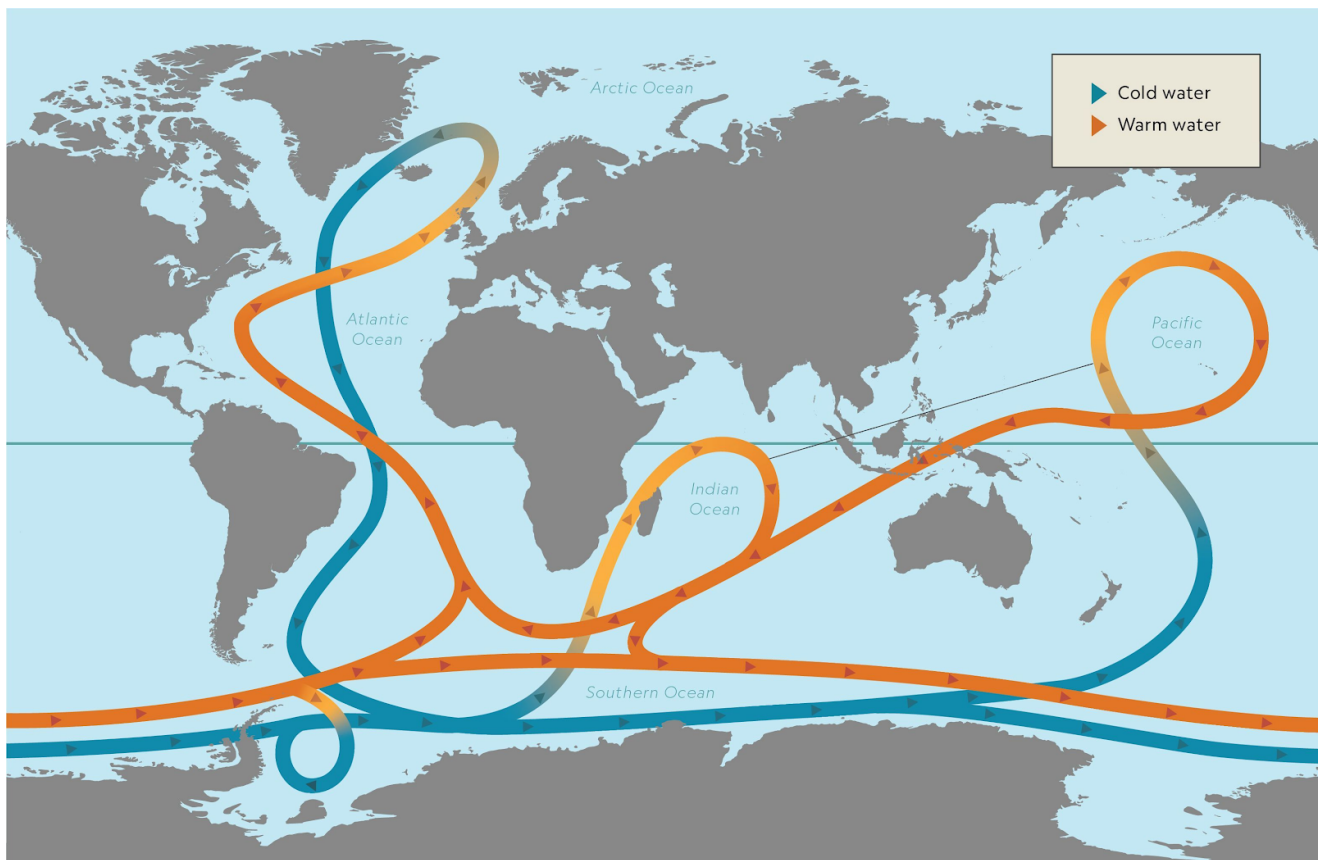


## Post-lab Questions

### Climate Zones of Earth



- A. Use the map of the Climate Zones above to label the 5 categories of climates on the map below. **Tropical Wet (T)** has been done for you as an example. Label **Dry (D)**, **Moderate (M)**, **Humid Continental (C)**, and **Polar (P)** climate zones.



B. Use the labeled map and what you've learned about ocean currents and climate to fill out this table. This table will be used at the end of the unit to help you answer essay questions on the test!

<b>Climate Zone</b>	<b>Description of nearby ocean current(s): Warm/cold</b>	<b>Description of climate</b>	<b>How does the ocean current affect the climate? Think about how water heats air and contributes to precipitation</b>
Tropical Wet			
Dry/Arid			
Moderate			
Humid Continental			
Polar			

1. As the Greenland Ice Sheet melts and the Gulf Stream breaks down, what is that going to do to the climate of the UK? Think about how the ocean currents will change
  
2. What will happen to the climate of the Caribbean as the Gulf Stream breaks down?
  
3. What do you think will happen to the overall climate of the planet if the ocean circulation stops?
  - a. Think about if the climate of the poles will be the same as the equator?