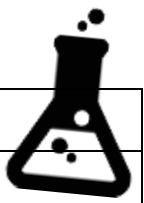


Material: beakers, hot colored water, cold colored water, tubes, experimental protocol



Diagrams showing the experiment about the origin of ocean currents

Beginning of experiment :

End of experiment :

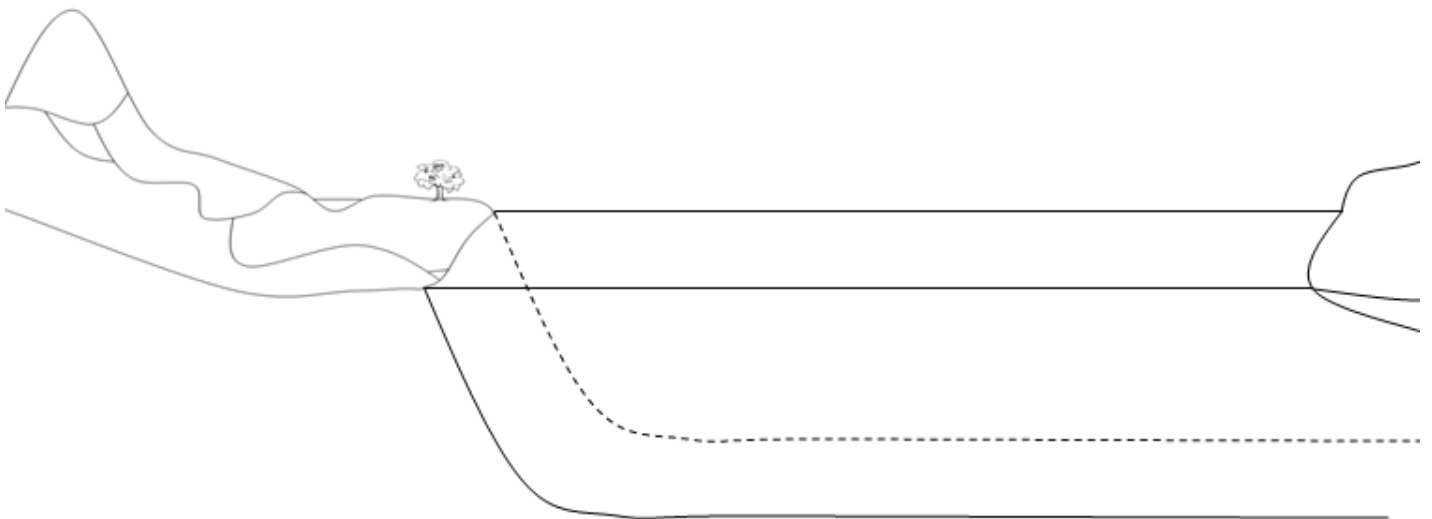
4. **Results:** I notice ...

5. **Interpretation of results:** My conclusion is that ...

Equator



pole



| Skills | Self-assessment |
|--|-----------------|
| I have manipulated carefully (precise handiwork, material is tidy and the table is clean at the end of the experiment) | ☺☹☹ |
| I have manipulated quietly and with my partner. We have helped each other. | ☺☹☹ |
| I have manipulated without my teacher's help. | ☺☹☹ |
| I have respected the protocol. | ☺☹☹ |

Experimental protocol

Step 1 : Fill one beaker with the hot water and another one with the cold water.

Step 2 : Pour, at the same time, the hot water in the right tube and the cold water in the left tube.

Step 3 : Close the tube and observe.

Step 4 : Use drawings to show your results.

| Skills | Self-assessment |
|--|-----------------|
| I have manipulated carefully (precise handiwork, material is tidy and the table is clean at the end of the experiment) | ☺☹☹ |
| I have manipulated quietly and with my partner. We have helped each other. | ☺☹☹ |
| I have manipulated without my teacher's help. | ☺☹☹ |
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Experimental protocol

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The creation of ocean currents

Benjamin Franklin, the inventor of the lightning rod, did some research to explain why the boats from England to America were sometimes slower than the boats which left America to England.

From immemorial time, the Gulf Stream has intrigued those navigators who crossed its path. American whalers, in the early 18th century, were the first to be aware of the path of this powerful current that went through their fishing waters. Then, in 1769, when Benjamin Franklin was a deputy Postmaster General for the American colonies, the British authorities commissioned him to investigate on why English ships crossing between Europe and America suffered delays of several weeks. Franklin conducted experiments and he discovered the existence of a powerful current in the middle of the Atlantic. Franklin realized it depended on the route that the ship captains took. Sometimes it would take much longer to cross the Atlantic Ocean than others. He determined that there was this swiftly moving water, a stream, and he called it the Gulf Stream.

1) Link the English words to the French words:

| | | | |
|-------------|---|---|-----------------|
| Whaler | • | • | Plusieurs |
| Path | • | • | Chemin/parcours |
| Current | • | • | Puissant |
| Swiftly | • | • | Pêche |
| Boat / ship | • | • | Baleinier |
| To cross | • | • | Courant |
| Several | • | • | Traverser |
| Powerful | • | • | Bateau |
| Fishing | • | • | Rapidement |



Map of the Atlantic ocean

- 2) In the 18th century, which 'problem' did ships have in the Atlantic ocean ?
They were disturbed / delayed / slowed (by a current).
- 3) What do you understand about the 'Gulf Stream'?
= a powerful current 'discovered' by Benjamin Franklin
- 4) On the map, draw an arrow showing the direction of the Gulf Stream.

We want to understand the origin of ocean currents.

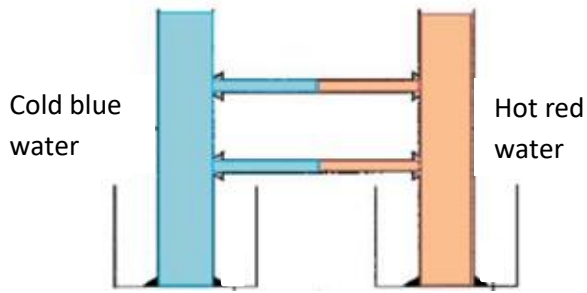
1. **Problem:** What is the origin of ocean currents ?
2. **Hypothesis:** I suppose ...
3. **Experimental protocol:**

Material: beakers, hot colored water, cold colored water, tubes, experimental protocol

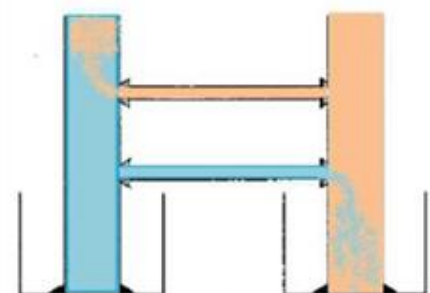


Drawings showing the experiment about the origin of ocean currents

Beginning of experiment :



End of experiment :



4. **Results:** I notice that the cold water goes down and to the other side by crossing the lower tube. I also observe that the hot water goes up and to the other side by crossing the upper tube.

5. **Interpretation of results:**

With this experiment, we can say that the difference of temperature generates a movement of masses of water. Given that ocean currents correspond to movements of masses of water, we can conclude that it is the difference of temperature which generates the movements of masses of water.

