Global Climate Patterns

Atmosphere -

The layer of gasses that surrounds the earth.

Climate -

The long term weather patterns in a particular place.

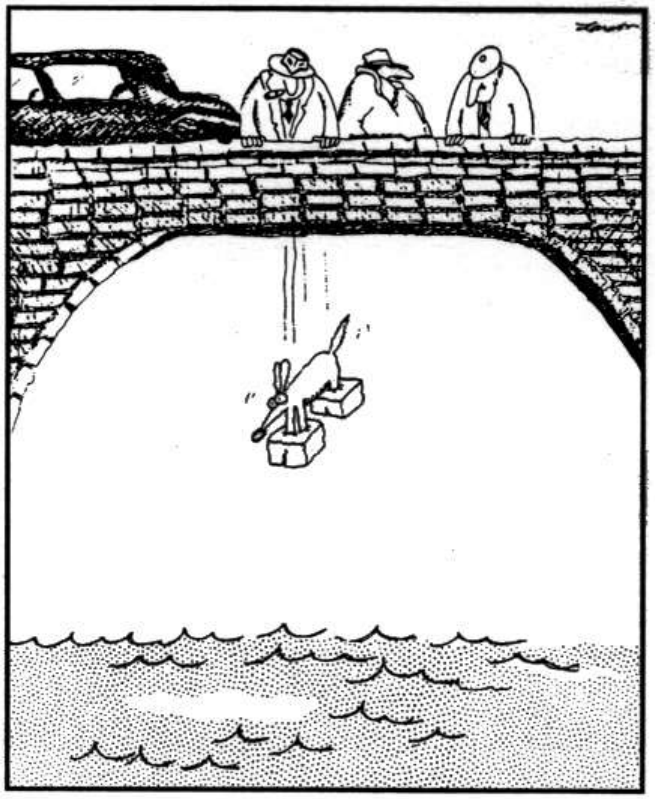
Density -

The amount of mass in a certain amount of volume.

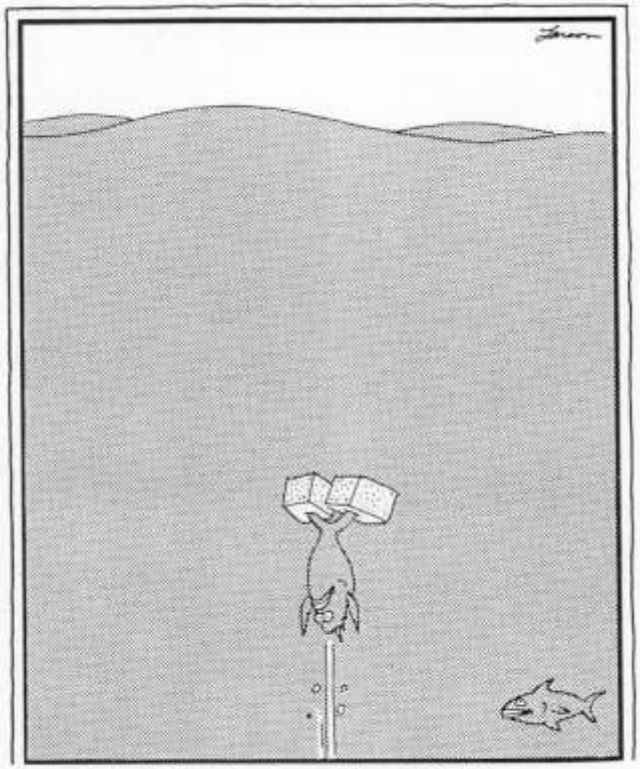
High density things sink and low density things float.

High = sink

Low = float



"He bit the Godfather."



Embedded in Styrofoam "shoes," Carl is sent to "sleep with the humans."

Balsa wood 0.12 g/cm^3

Ethyl alcohol 0.79 g/cm^3

Cooking oil 0.82 g/cm^3

Polyethylene plastic 0.92 g/cm^3

Colored water 1.0 g/cm^3

Neoprene rubber 1.23 g/cm^3

Corn syrup 1.38 g/cm^3

Steel 7.18 g/cm^3

Balsa wood has the lowest density of all the substances, so it floats at the top. The other materials arrange themselves in order of density.

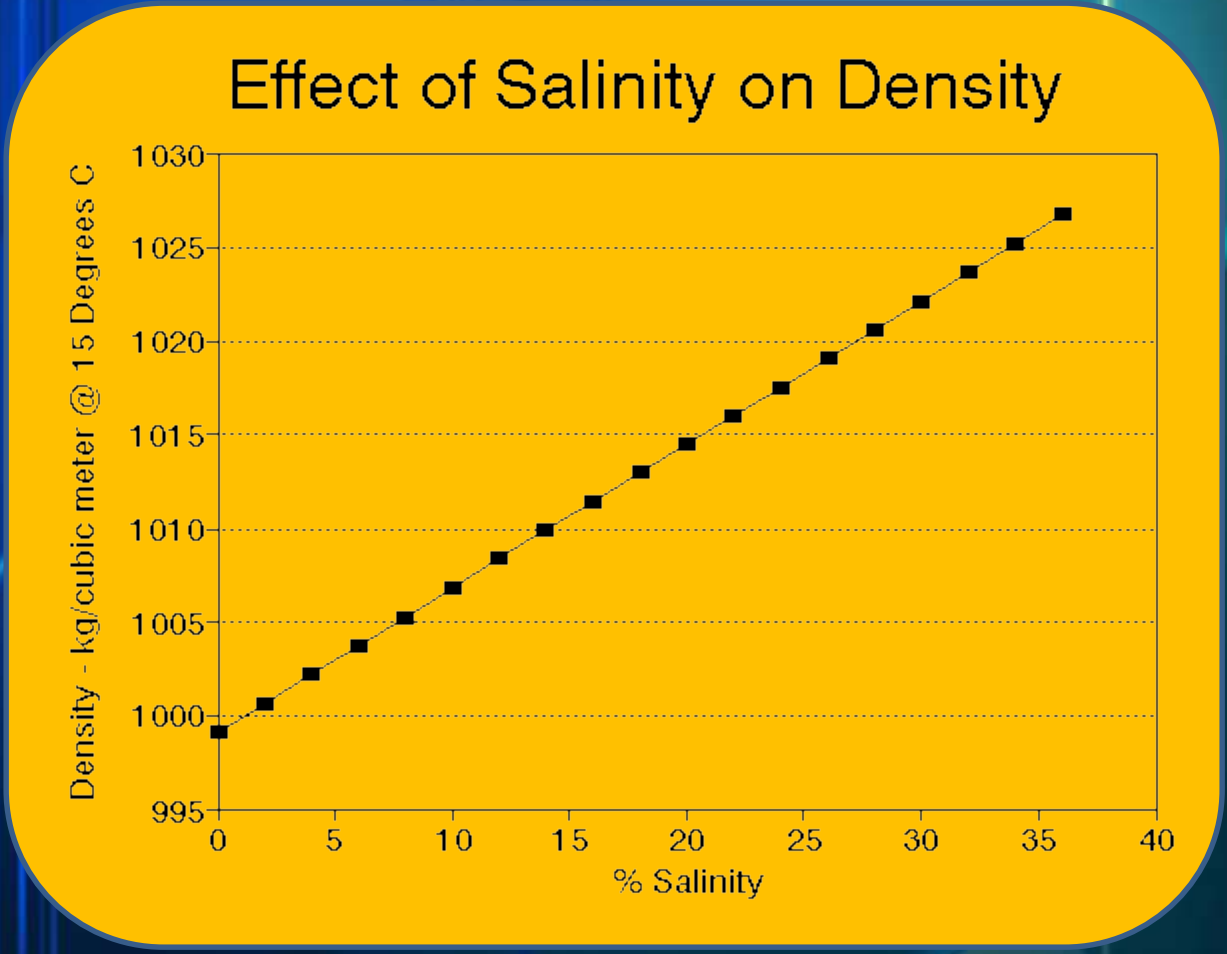
Liquids form layers. Each solid floats at the top of a denser liquid layer.

Steel and corn syrup have the highest densities. They rest on the bottom.

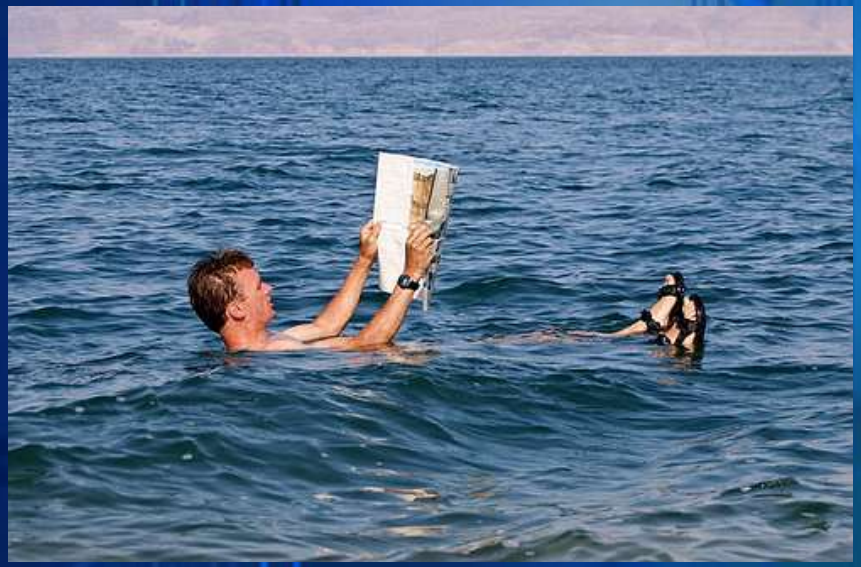
Salinity -

The amount of salt in water.

Water gets more dense the saltier it gets.



The Dead Sea



Two things happen when materials get heated:

1. They get larger or expand when they get heated. They shrink or contract when they get cold.

Sidewalks must have expansion spaces in them or….

Using liquid nitrogen on a balloon.

Two things happen when materials get heated:

2. They get less dense when they get heated. They get more dense when they get cold.

Water is the same until it freezes. Then:

Ice expands

Ice floats

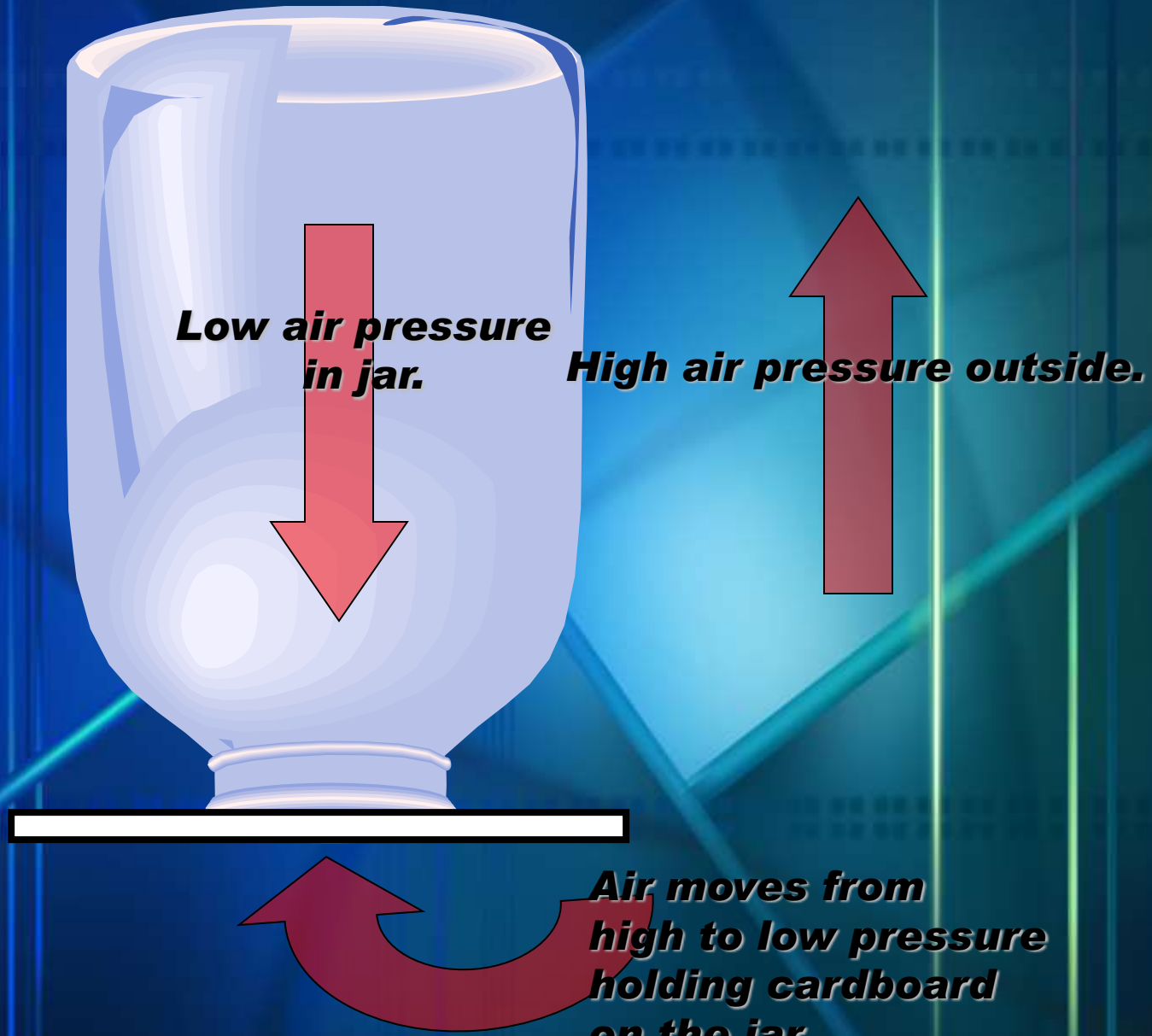
Air pressure -

The force of air pushing down on things.

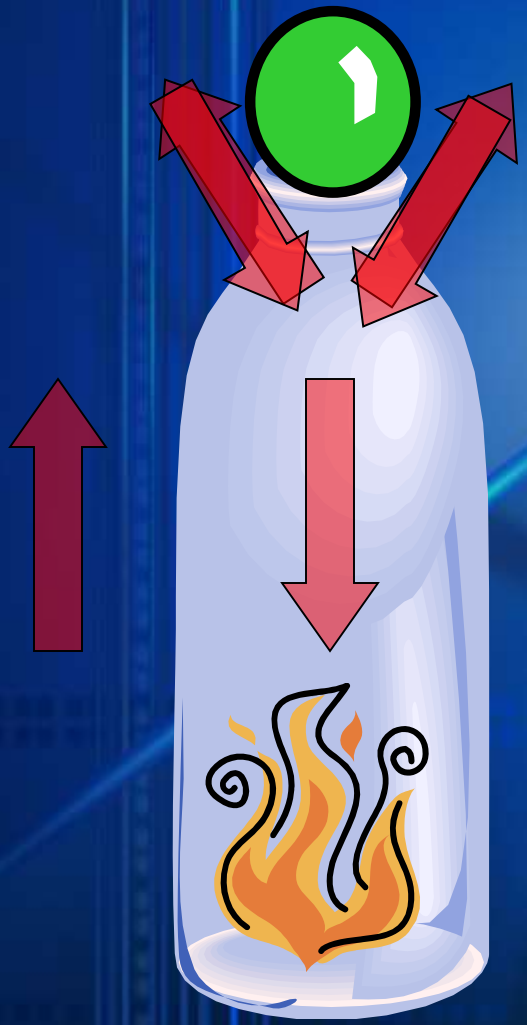
Air always moves from high pressure to low pressure!

Hot air floats making low pressure. Cold air sinks making high pressure.

Why will a piece of cardboard stick to a jar filled all the way up with water?


Low air pressure
in jar.
High air pressure outside.
Air moves from
high to low pressure
holding cardboard
on the jar.

Why will a water balloon get pushed into a jar with burning paper in it?



The fire in the jar heats the air up. This causes the air to leave the jar, pushing past the balloon.

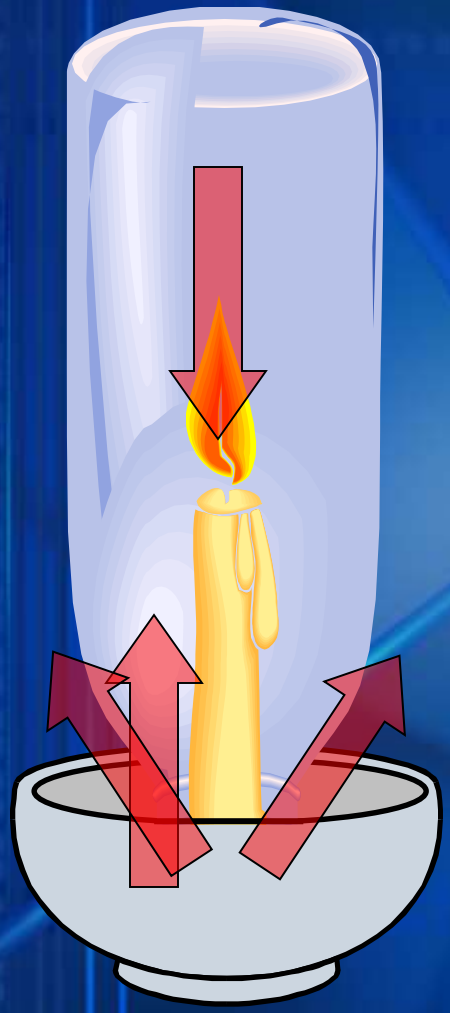
When the fire goes out, it creates low pressure inside of the jar.

There is now high pressure in the air outside of the jar.

The air outside tries to move inside of the jar, but the balloon is in the way.

This causes the balloon to get pushed into the jar.

Why will water get sucked into a jar that has a lit candle in it upside-down in a bowl of water?



As candle burns, it heats up the air and pushes it out of the jar.

When flame goes out it creates low pressure inside of the jar.

There is now high pressure in the bowl.

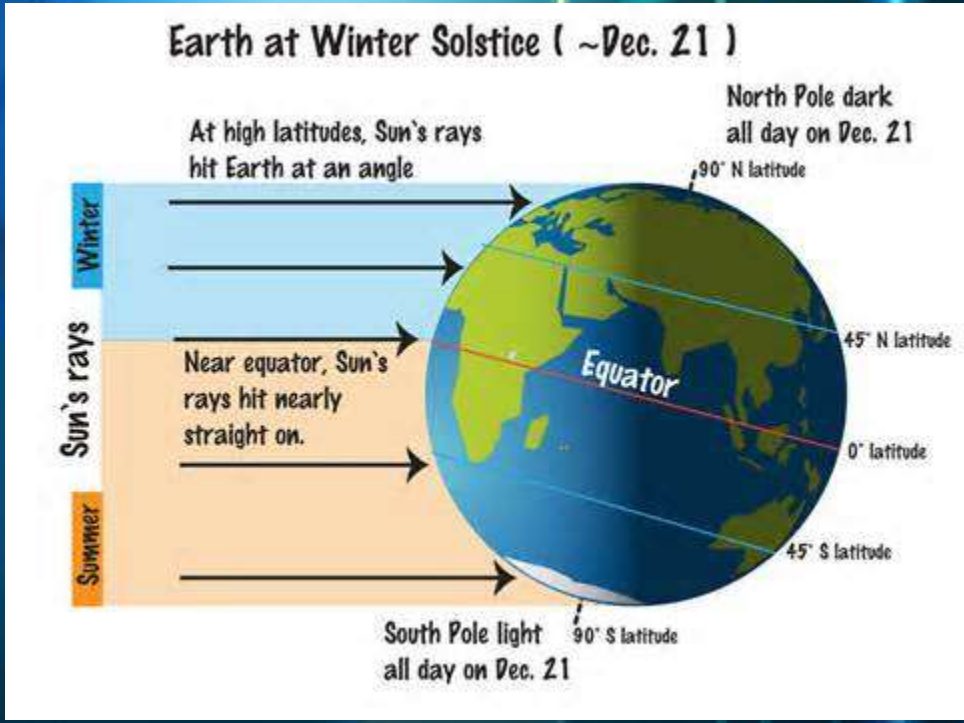
Therefore, water moves from the high pressure in the bowl to the low pressure in the jar.

Wind is caused by…

Air pressure differences made because the earth does not heat up evenly.

Why doesn't the entire earth get the same amount of sunlight?

The earth is a sphere. Most sunlight hits the equator. Less hits the poles.



Which way does the Parma wind blow?

Is the air above Lake Erie warmer than the air above Parma.

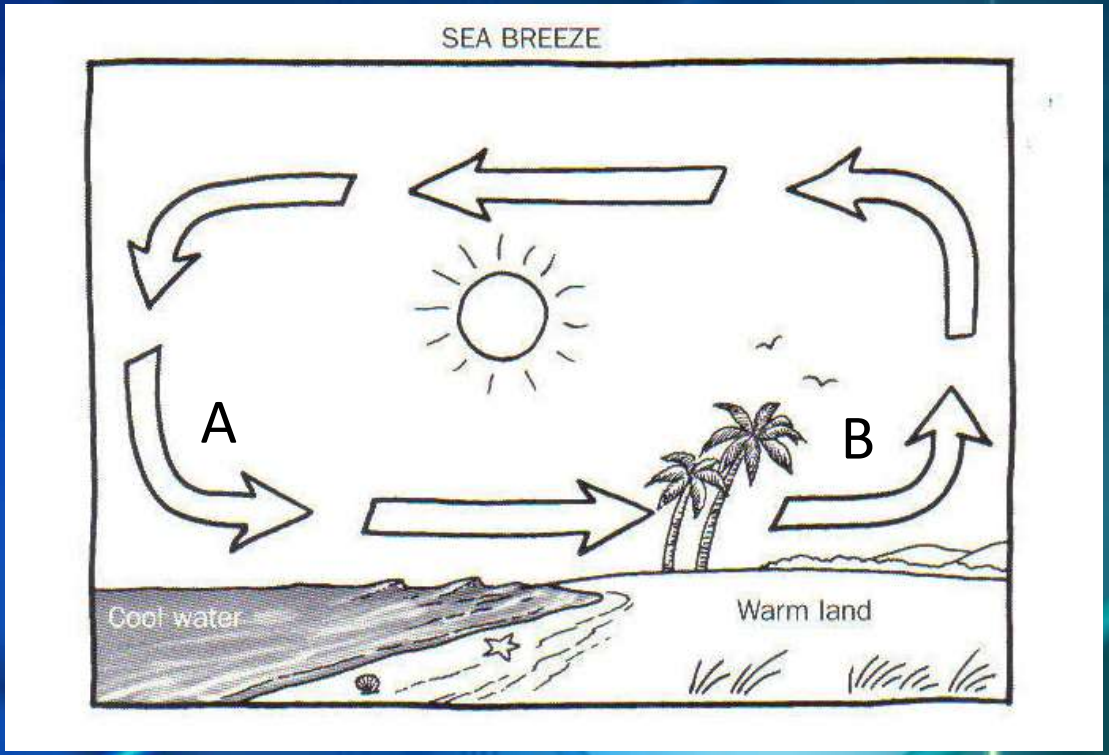
What pressure does that make over Parma?

Over Lake Erie?

Convection -

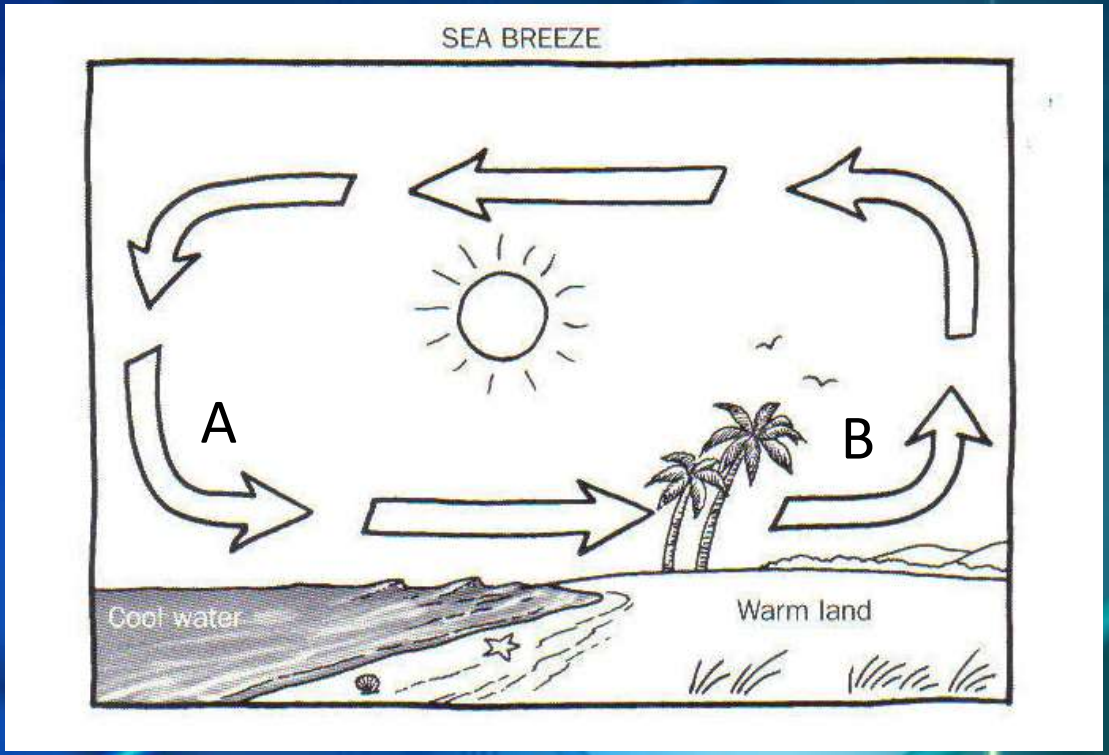
The transfer of heat in the air or water. This causes both air and ocean currents to move.

Convection makes air move.
Let's see how it creates wind on a beach during the day and night.



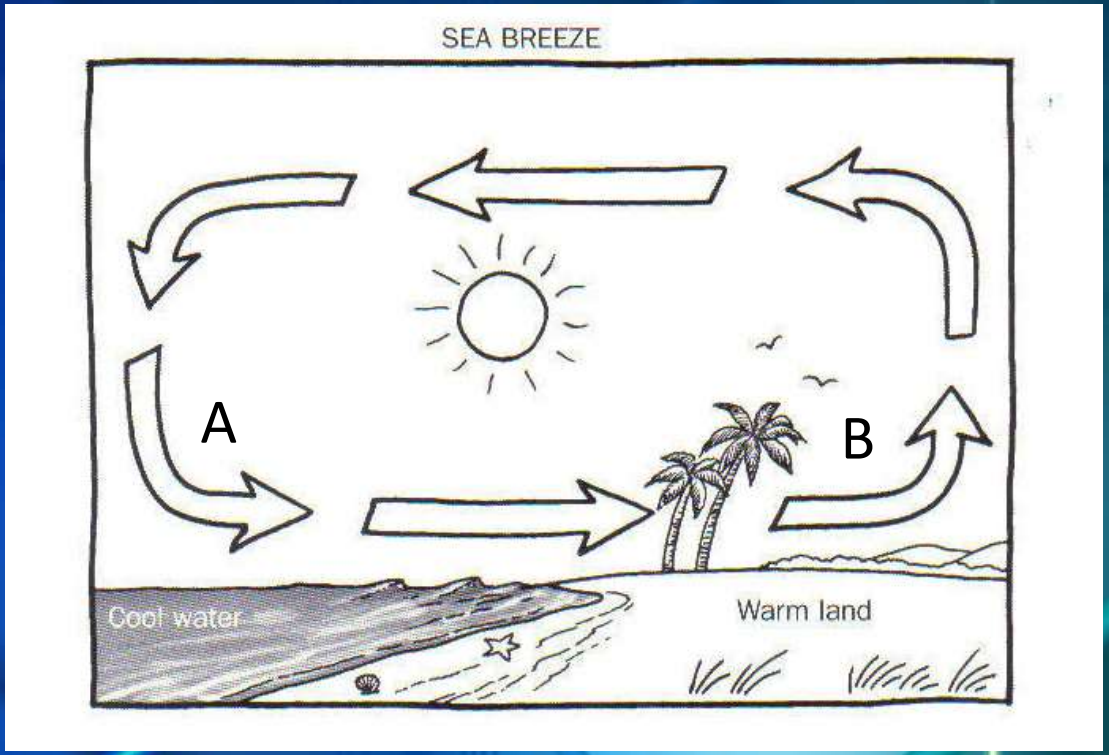
A. During the day the temperature of the air over the water is cooler. This causes the air to sink, making what pressure?

High pressure.



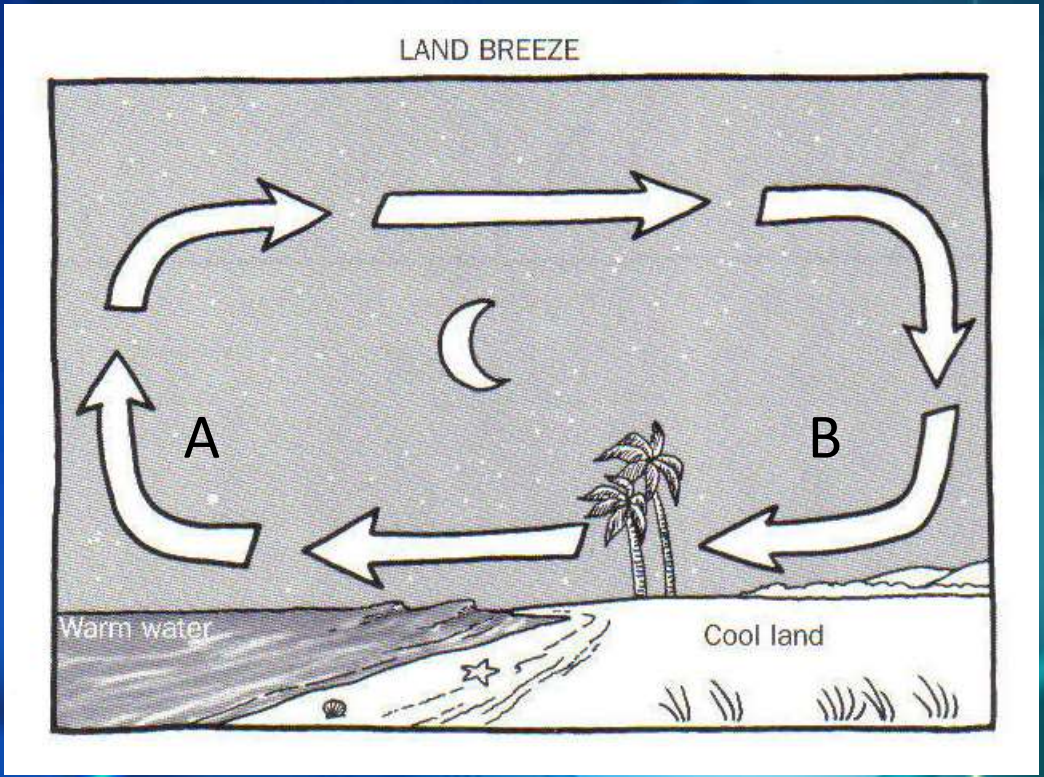
B. During the day the temperature of the air over the land is warmer. This causes the air to float, making what pressure?

Low pressure.



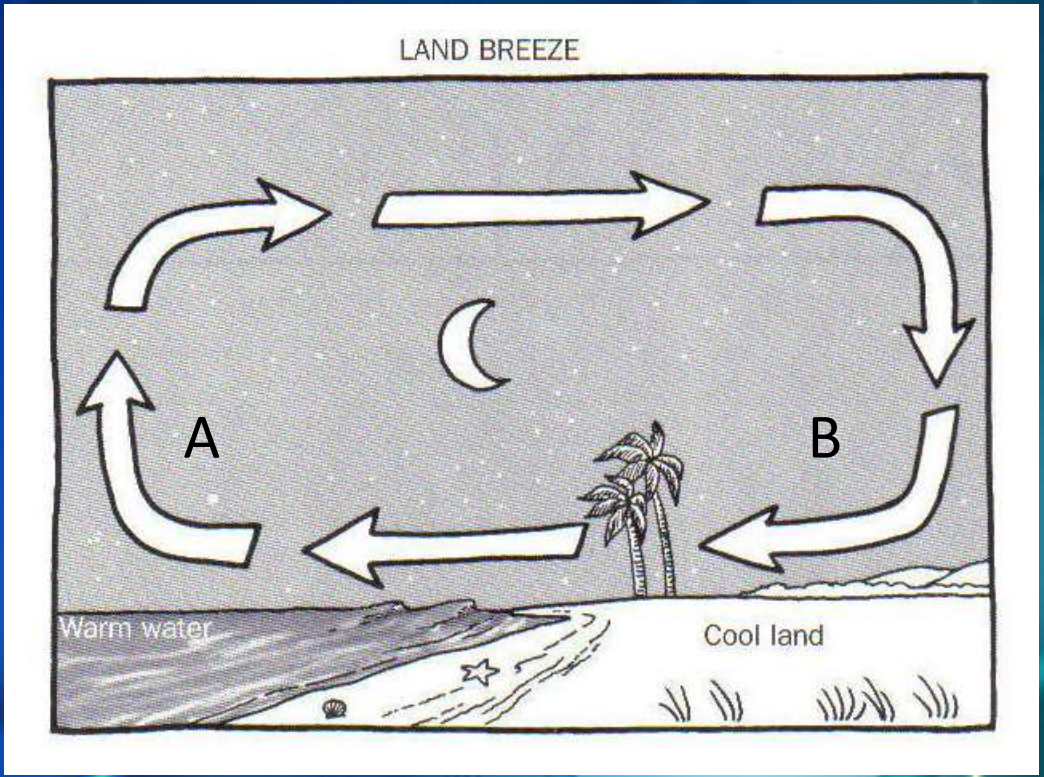
So, during the day, which direction does the wind blow at the surface?

From the water towards the land.



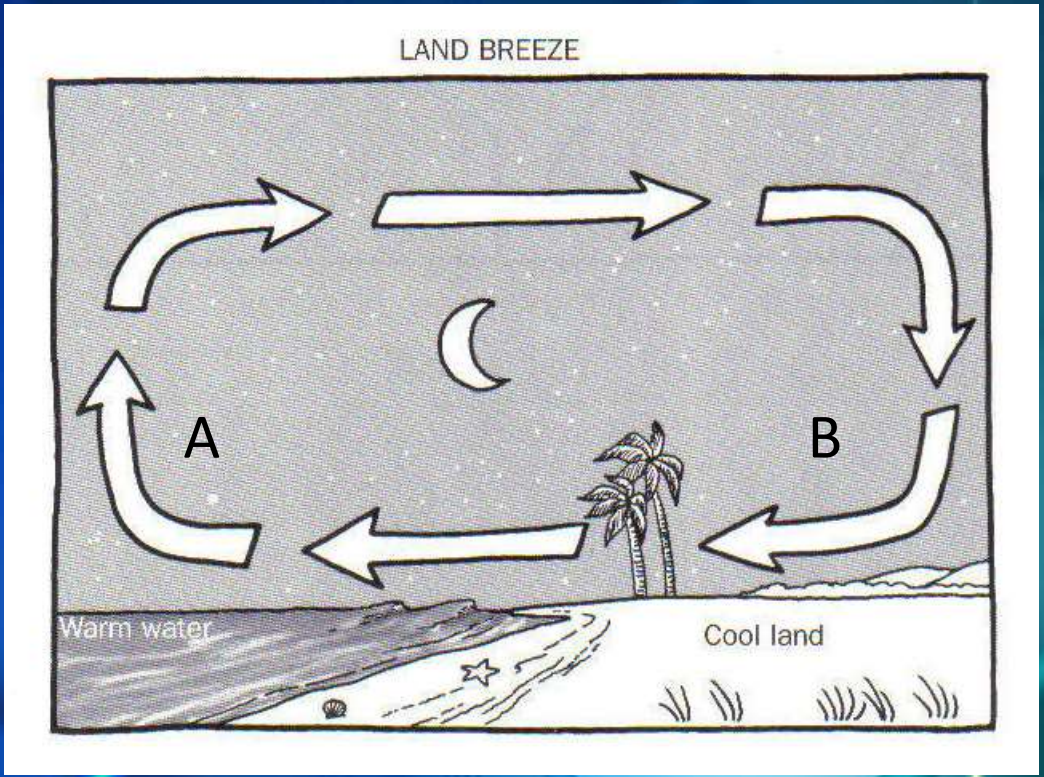
A. At night the temperature of the air over the water is warmer. This causes the air to float, making what pressure?

Low pressure.



B. At night the temperature of the air over the land is cooler. This causes the air to sink, making what pressure?

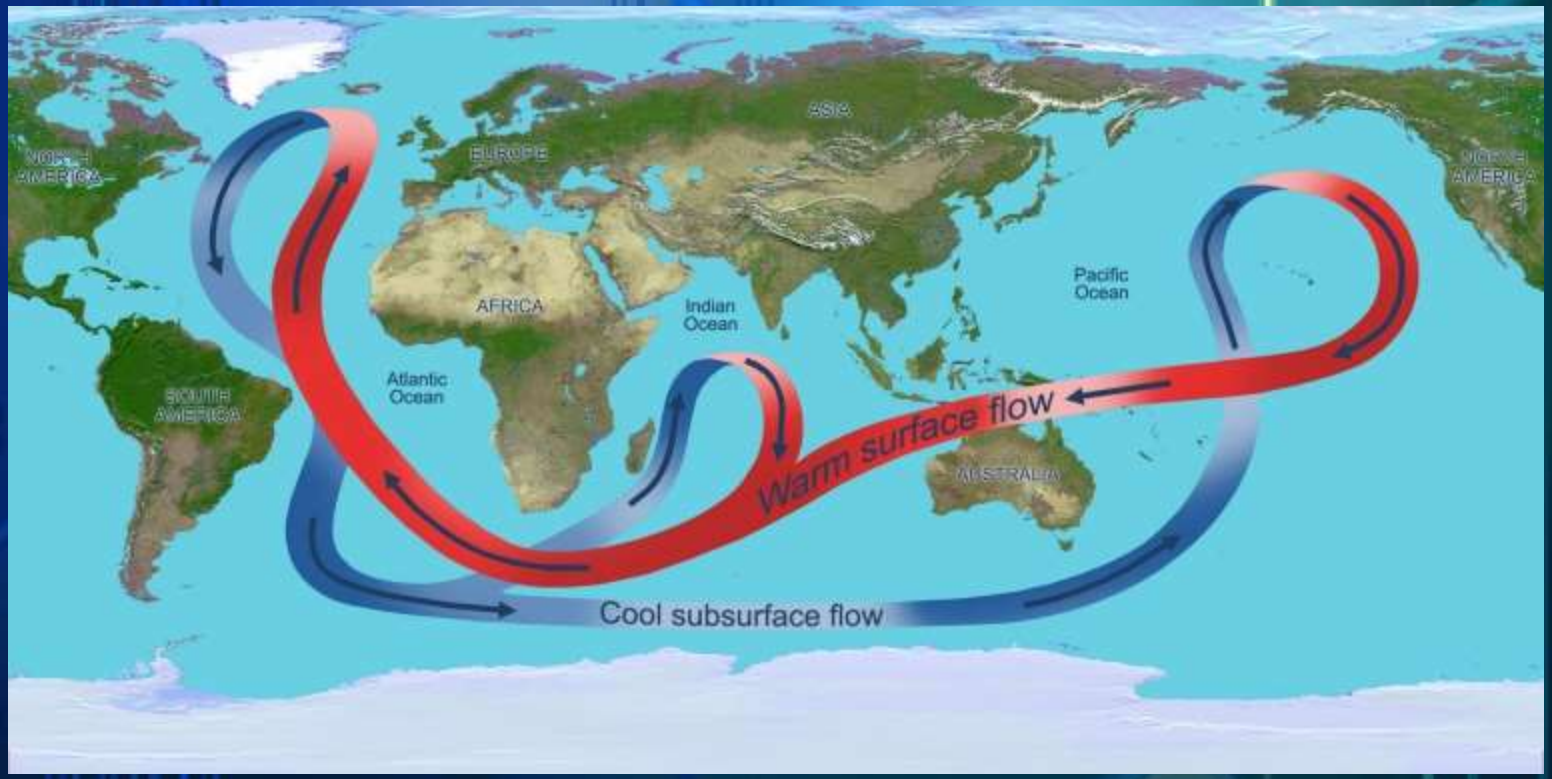
High pressure.



So, at night, which direction does the wind blow at the surface?

From the land towards the water.

Convection causes water to move as well. Cold water sinks and warm water floats.



Atmospheric Currents

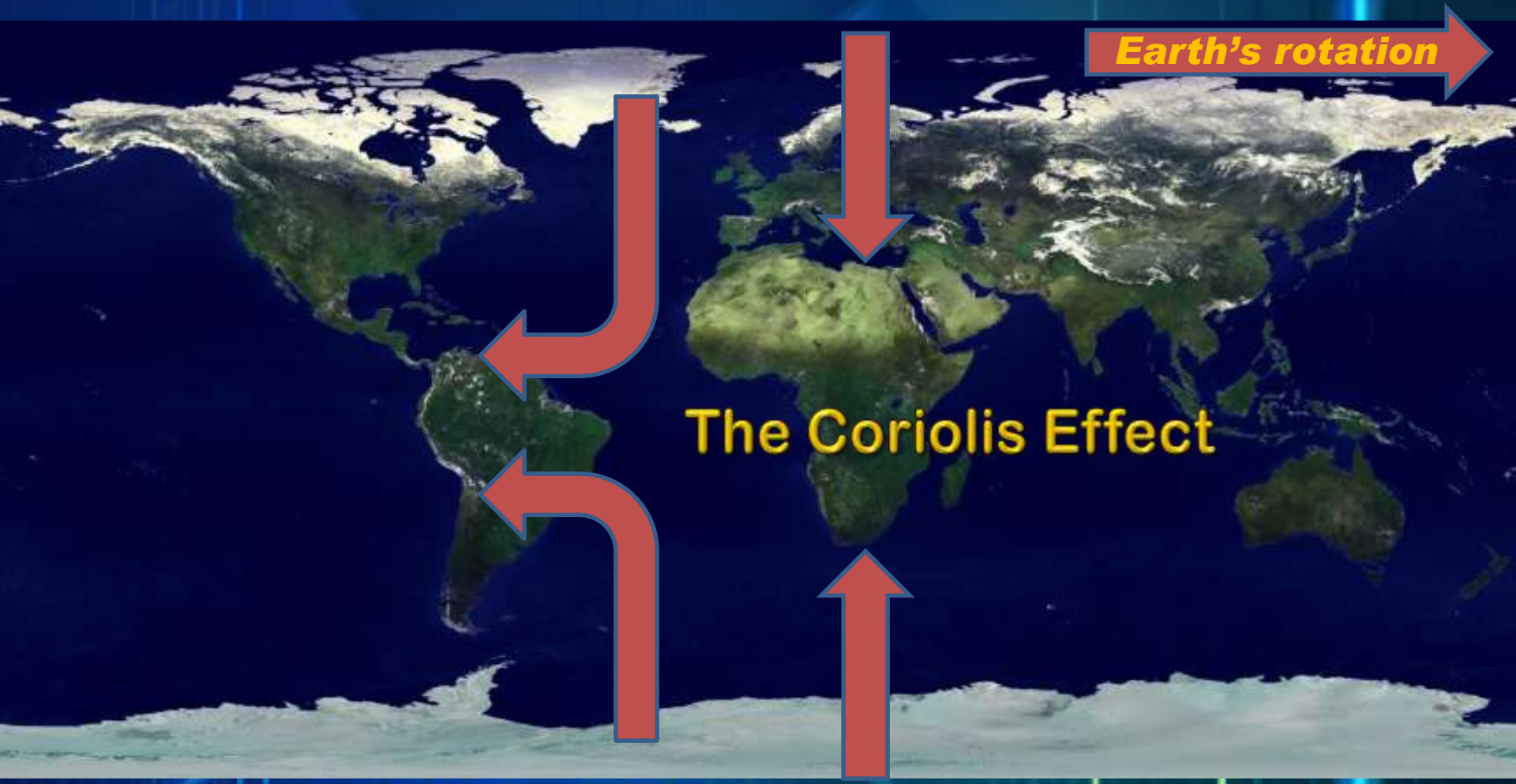
Atmospheric currents -

The continuous movement of air in a certain direction.

If the earth were not spinning, wind would always blow from the cold poles (high pressure) to the warmer equator (low pressure). However, the earth is spinning, and this affects the wind.

Coriolis Effect -

When the spinning of the Earth bends wind.



This causes the wind to bend like this. (Clockwise in the Northern Hemisphere, and counterclockwise in the Southern Hemisphere.)

Jet streams -

Fast moving winds that blow high up in the atmosphere. They move cold and warm air around, greatly affecting weather.


RAIN
SNOW
COLD
SNOW SHOWERS
SHOWERS
DRY &
MILD
JET
THIS
WEEKEND

Ocean Currents

Ocean currents -

The continuous movement of water in a certain direction.

There are two main types of ocean currents:

1. Surface oceanic currents
2. Deep water oceanic currents

Surface oceanic currents -

Currents that form near the surface of the ocean.

Surface oceanic currents mainly move because of:

Wind.

Deep water oceanic currents -

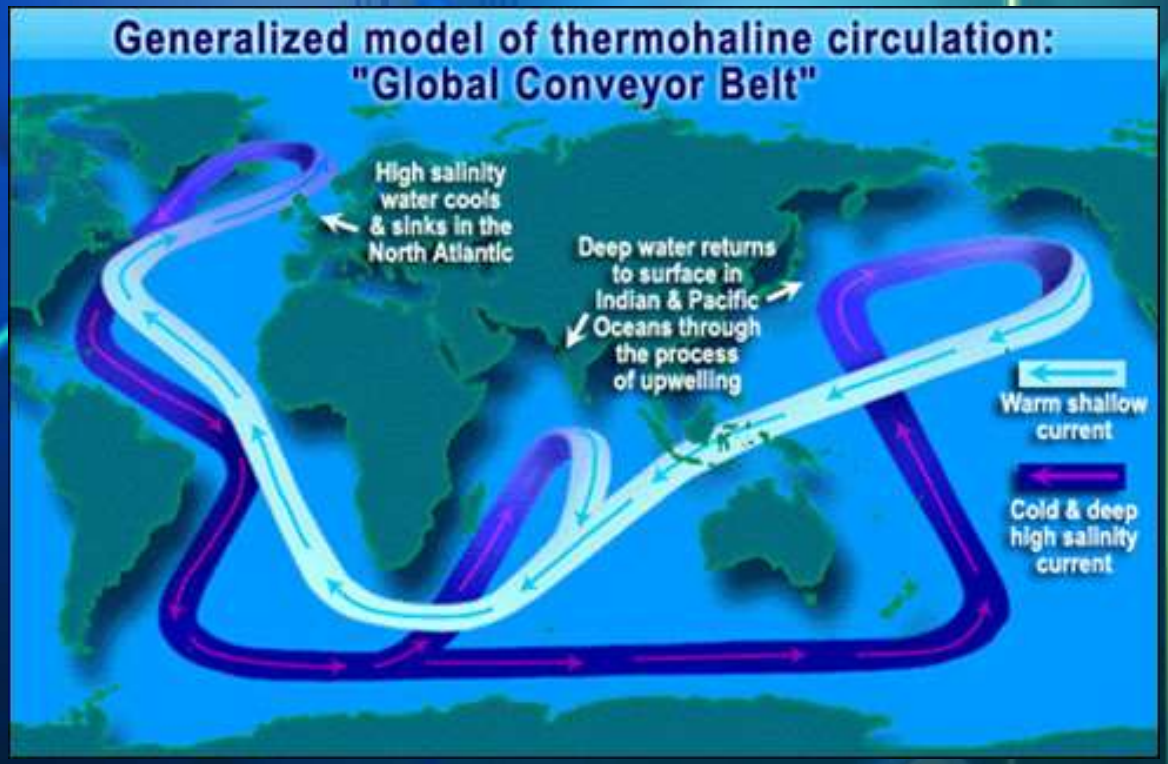
Currents that form deep in the ocean.

Deep water oceanic currents mainly move because of:

Salinity and convection.

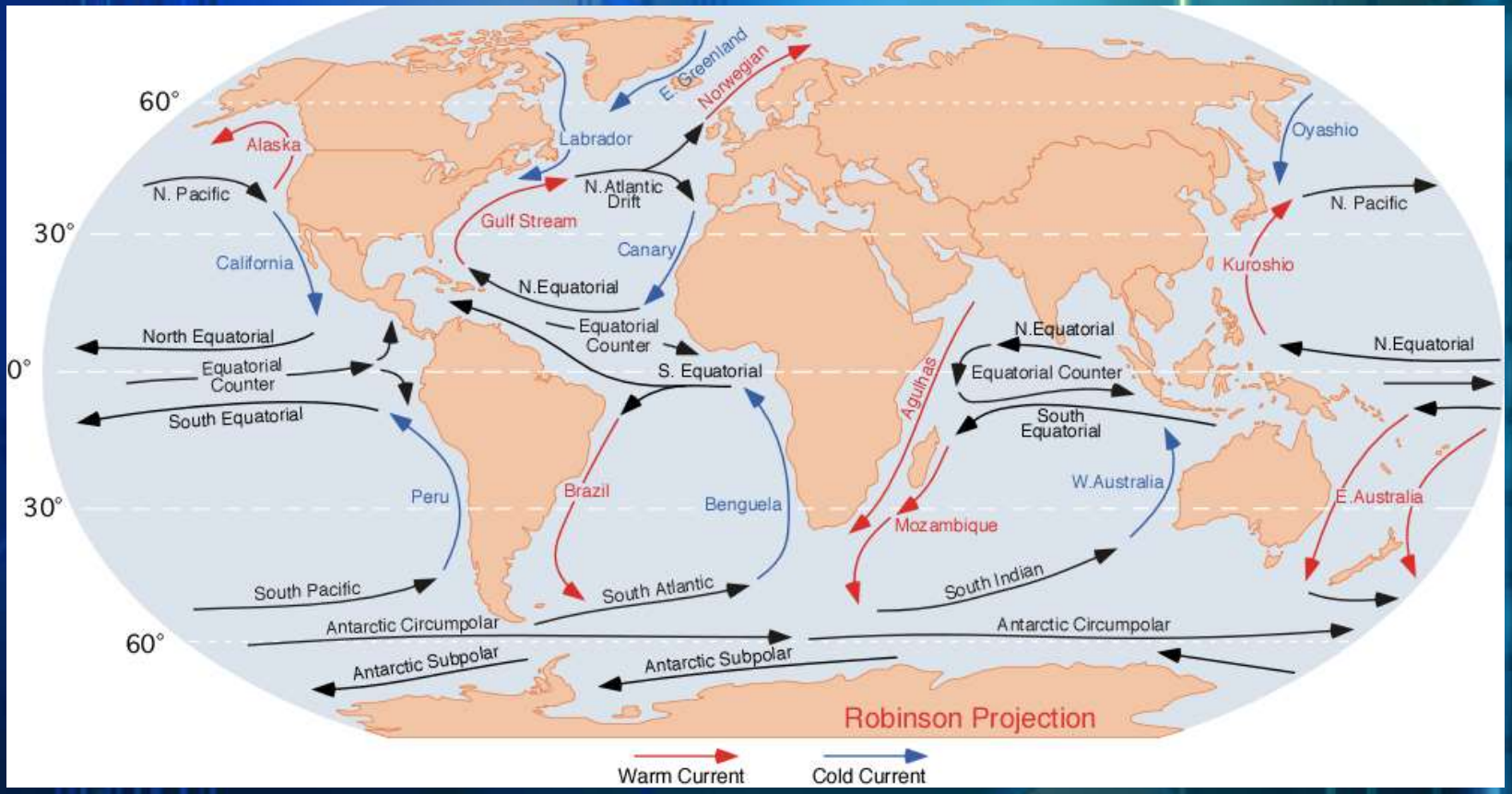
How salinity moves currents:

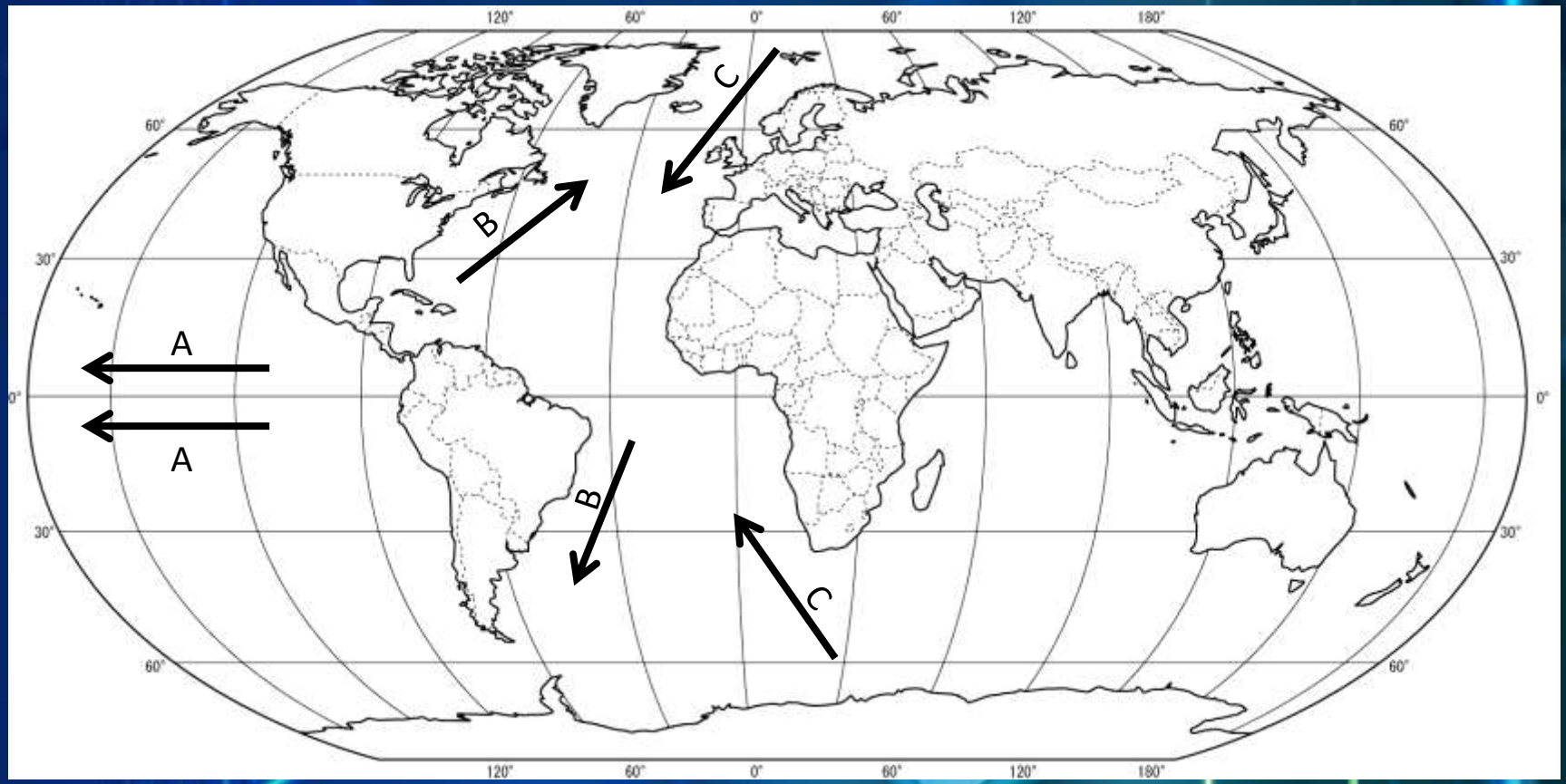
Saltier water is more dense, so it sinks. Less salty water floats.



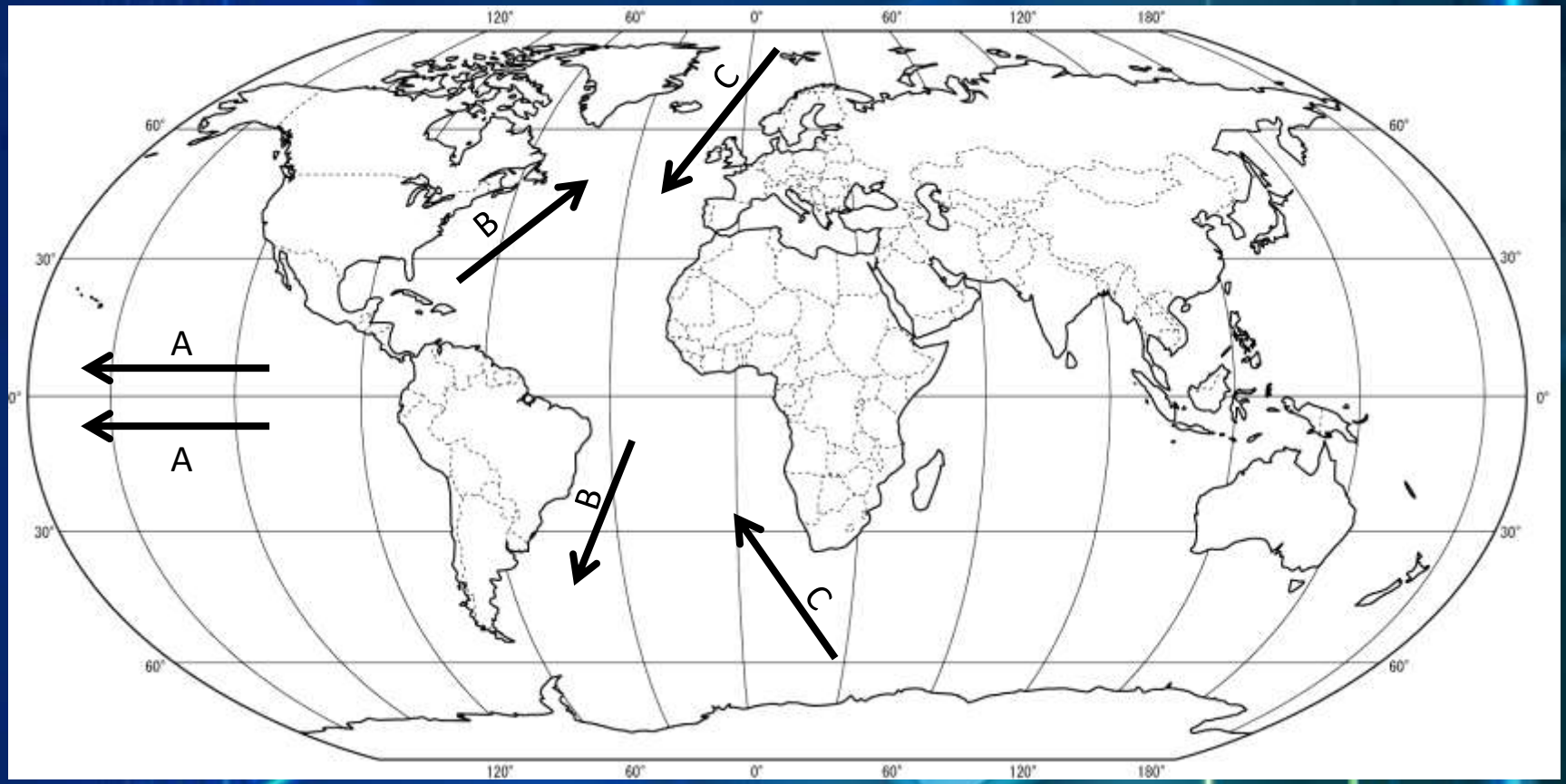
How convection moves currents:

Cold water is more dense, so it sinks. Warmer water floats.

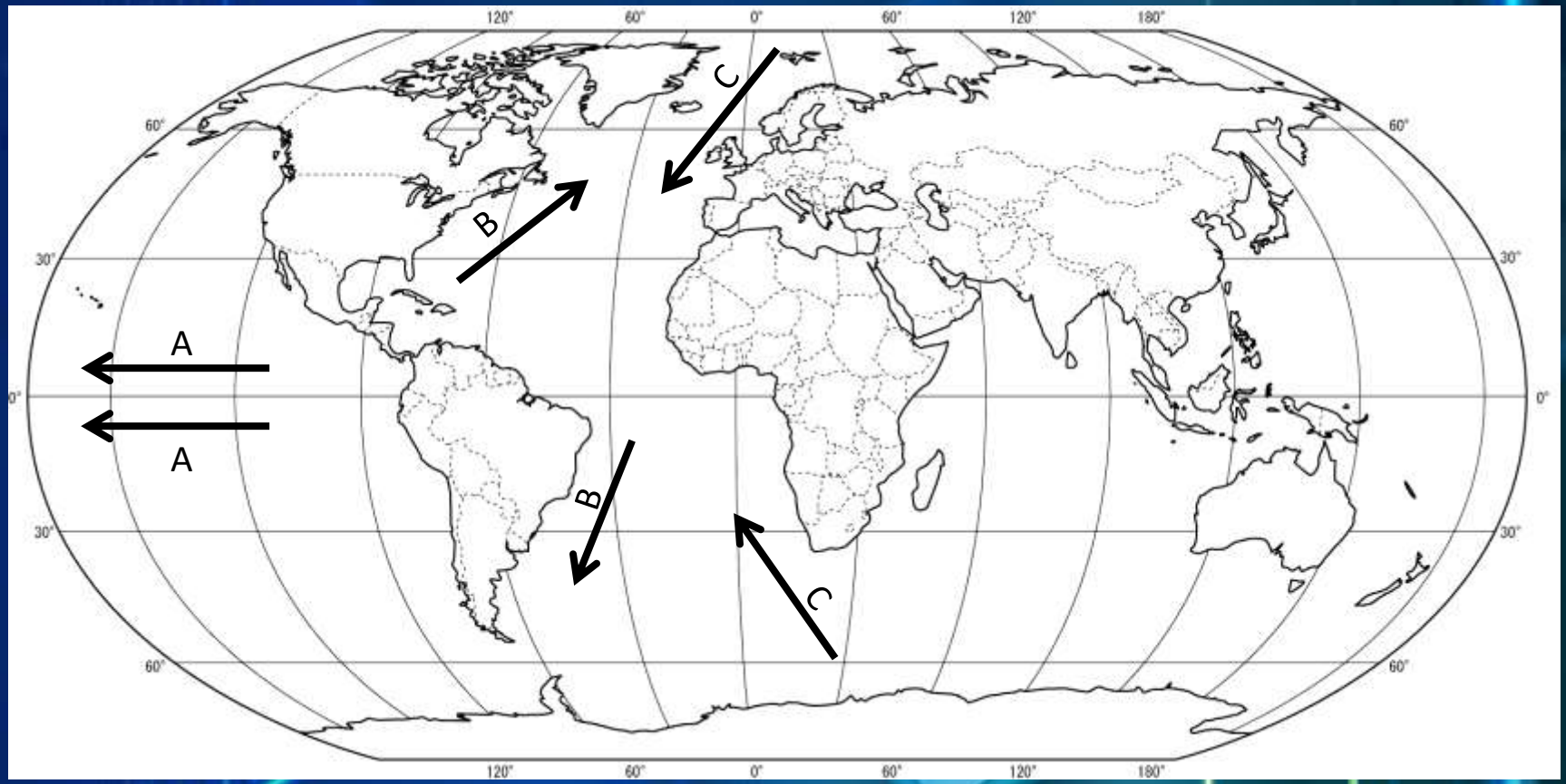




A. Ocean currents that travel along the equator are warm.



B. Ocean currents that form near the equator are warm.



C. Ocean currents that form near the poles are cold.

The Gulf Stream -

A warm oceanic current that runs along the eastern coast of the United States. Because it's warm, it brings warm weather to Europe.