

What is the difference between weather and climate?

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Weather: the set of environmental conditions encountered from day to day.

Climate: the set of environmental conditions averaged over a longer period of time.

We will discuss three factors that lead to different climate and weather.

1. Solar Energy

2. Air circulation and the Earth's surface

3. Water circulation.

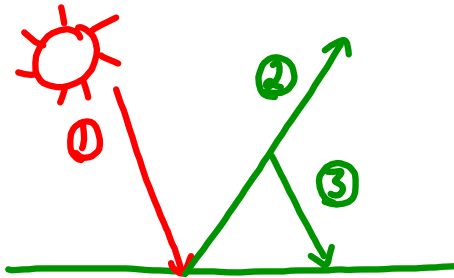
1. Solar Energy

-The Greenhouse Effect

2. Air circulation and the Earth's surface

3. Water circulation.

Greenhouse Effect: a natural process that allows the Earth to retain some of the heat it receives from the Sun.



① Sun's rays get absorbed by the ground

② Ground emits infrared rays (thermal energy) into the atmosphere

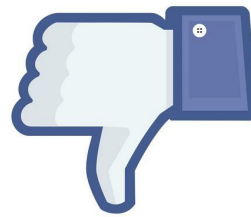
③ Some get trapped by greenhouse gases and are sent back to Earth.

Greenhouse Gases:

- exist around our planet
"greenhouse roof"

- water vapor (H_2O)
- carbon dioxide (CO_2)
- methane (CH_4)
- nitrous oxide (N_2O)

Is the Greenhouse Effect good or bad?





EXCESSIVE greenhouse effect may lead to global warming and climate change.



Climate and Weather Affected



When do cars "idle?"

If every driver in Canada avoided idling for 10 minutes a day:

=taking 2 600 000 vehicles off the road

each driver would save 83 Liters of fuel

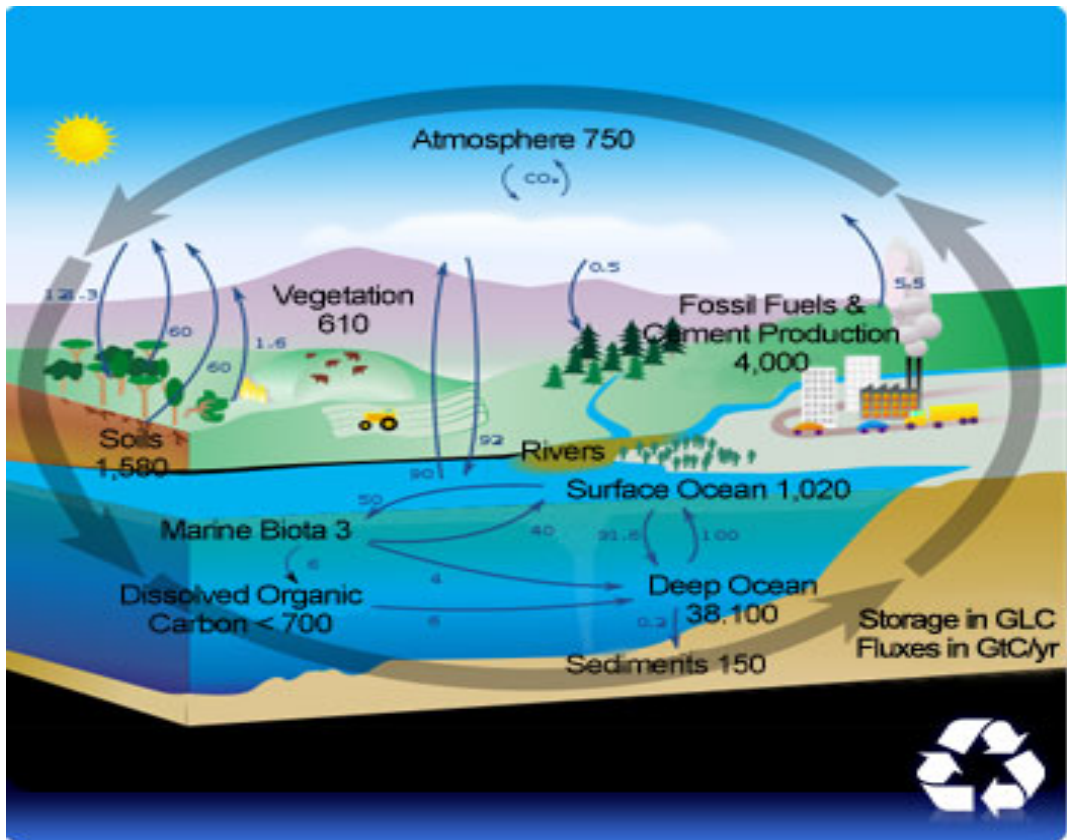
reduce GHG emissions by 3 700 000t

(2 000 000 NHL-sized hockey rinks)

Cars are one factor that contribute to the CO₂ in the atmosphere. What are some other examples?

The Carbon Cycle

The Carbon Cycle



Into the Atmosphere:

- volcanic eruption
- respiration
- forest fires (burning of forests to plant farm fields)
- decomposition of waste
- fossil fuels

Out of the Atmosphere:

- photosynthesis
- composition of shells and skeletons of marine organisms

Nutrient Cycling:

-Matter is never used up and it never goes away. It just keeps cycling around and around.

"Matter may be transformed from one type to another, but it cannot be created or destroyed." -Law of Conservation of Matter

1. Solar Energy

-The Greenhouse Effect

2. Air circulation and the Earth's surface

-The Atmosphere

3. Water circulation.

The Atmosphere:



Directions:

1. Fill the cup to the top with water.
2. Cover the cup with a playing card, making sure the card covers the mouth of the cup completely.
3. Quickly flip the cup over (so it's upside down), holding on to the card.
4. Slowly let go of the card (over the sink, just in case)

What happened and why?

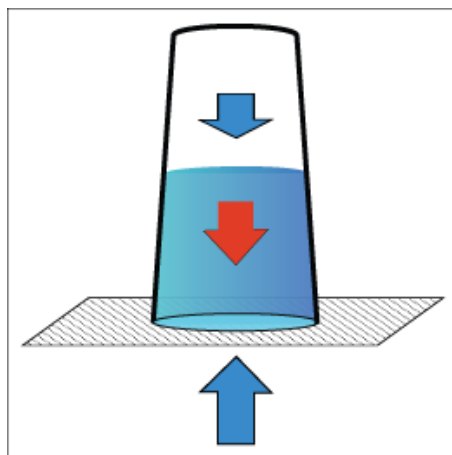
Air molecules in the atmosphere exert pressure on everything, they are exerting pressure on you right now!

At sea level, air molecules exert over 14 pounds of pressure! Your body is used to it so you do not feel this.

When you first flip the cup over, the air pressure inside the cup is **EQUAL** to the air pressure outside the cup.

When the cup is flipped over, gravity pulls the water down and there is an increased volume of air inside the cup (above the water)

This means the pressure inside the cup is now **LESS THAN** the pressure outside. The air pressure outside of the cup holds the card in place.



Why do your ears "pop" when riding in an elevator of a tall building or in an airplane that is moving up or down rapidly?



Steve Fossett

First successful solo attempt around the world in a hot air balloon.

2002

Under 15 days.

5 Attempts

1. Solar Energy

-The Greenhouse Effect

2. Air circulation and the Earth's surface

-The Atmosphere

3. Water circulation.

-The Hydrosphere

The Hydrosphere



Water Cycle Review

Draw the water cycle including the three main terms.



Atmosphere AND Hydrosphere: The Coriolis Effect

-causes air or water to curve as they travel across or above the earth's surface

Do storms always swirl in the same direction?



The Coriolis Effect

-causes fluids to curve as they travel across or above the earth's surface

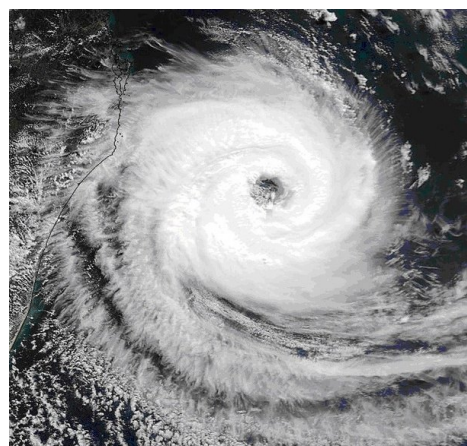
Do storms always swirl in the same direction?

No!

The coriolis effect causes storms to swirl counter clockwise in the northern hemisphere



and clockwise in the southern hemisphere.



Is hurricane Irma swirling counterclockwise or clockwise?

Interactions between heat, pressure, and the Coriolis Effect can cause extreme weather or natural disasters.



Climate and Weather Affected