

Earth's Atmosphere

1-1 |

Objectives:

Identify the gases in Earth's atmosphere

Describe the structures of Earth's atmosphere.

Explain what causes air pressure.

Stratosphere
Planes fly here
The ozone layer
It's got ozone
Blocking some
It rises up like
The temperat

the atmosphere
is made up of
gases that
are held in
place by the
gravity of the
Earth

The atmosphere is why there's life
Because the raging Sun's a fire in
the sky

Thanks to the ozone, rays are
absorbed of the Sun



I. Atmosphere

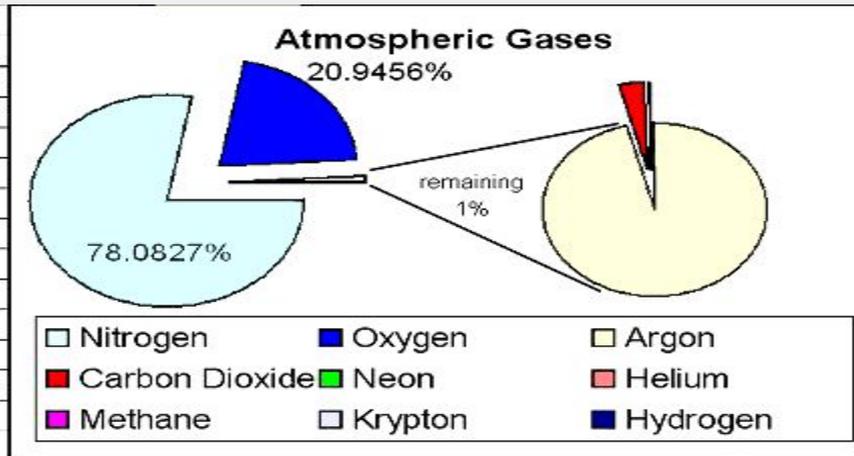
Maintains a balance between the amount of heat absorbed from the Sun and the amount of heat that escapes back into space.



II. Make up of the Atmosphere

Earth's Atmosphere extends from Earth's surface to outer space. It is made up of a mixture of gases with some solids and liquids.

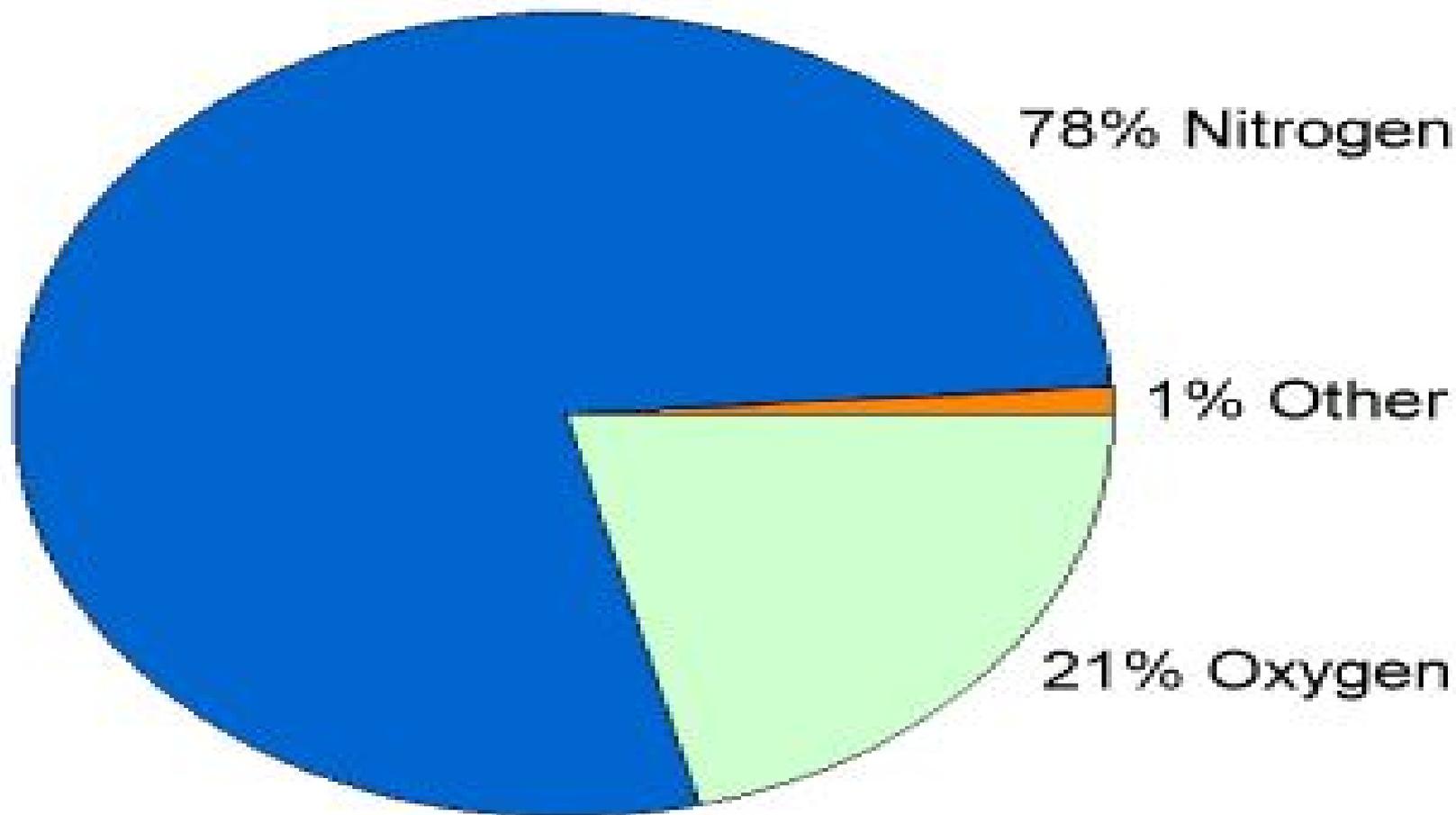
Gas	Reported by NASA	Normalized to 100%
Nitrogen	0.78084000	78.082687%
Oxygen	0.20946000	20.945648%
Argon	0.00934000	0.933984%
Carbon Dioxide	0.00035000	0.034999%
Neon	0.00001818	0.001818%
Helium	0.00000524	0.000524%
Methane	0.00000170	0.000170%
Krypton	0.00000114	0.000114%
Hydrogen	0.00000055	0.000055%
		100.000000%



Source:

<http://nssdc.gsfc.nasa.gov/planetary/factsheet/earthfact.html>

Relative composition of air



Troposphere

Stratosphere

Mesosphere

Thermosphere,

Thermosphere

divided to

ionosphere and

exosphere

Now Stratosphere is the next location
The ozone layer helps civilization, hey
The temperatures climb as one will rise
And jet aircraft, well they will fly, hey
Now the next one is the Mesosphere
I'm afraid that this is the coldest layer
Most meteoroids from space will burn
And they will leave us without any concern



But tell me, does the mesosphere have shooting stars?
Did you ever get the chance
To see them in the light of day
Coldest layer by the Milky Way

And tell me, does the Thermosphere blow your mind?
Ionosphere, Exosphere combined
The hottest layer
And it dissipates to space out there.

Layers of the atmosphere is close to the land Troposphere is the bottom

Atmosphere

First layer is stratosphere around it and the ozone it is spotted

Stratosphere

Mesosphere coldest place

Thermosphere y'all the hottest

(Last Up)



Other Gases

Water Vapor in the atmosphere varies from 0-4%. The higher the water vapor, the lower the other gases are.



B. Solids in the Atmosphere

Dust, salt, ice and pollen are four common solids in the atmosphere.

Dust- picked up by the wind

Ice- Hail and snow

Salt- sea spray

Pollen- plants



III. Layers of the Atmosphere

5 layers

Lower atmosphere

Troposphere

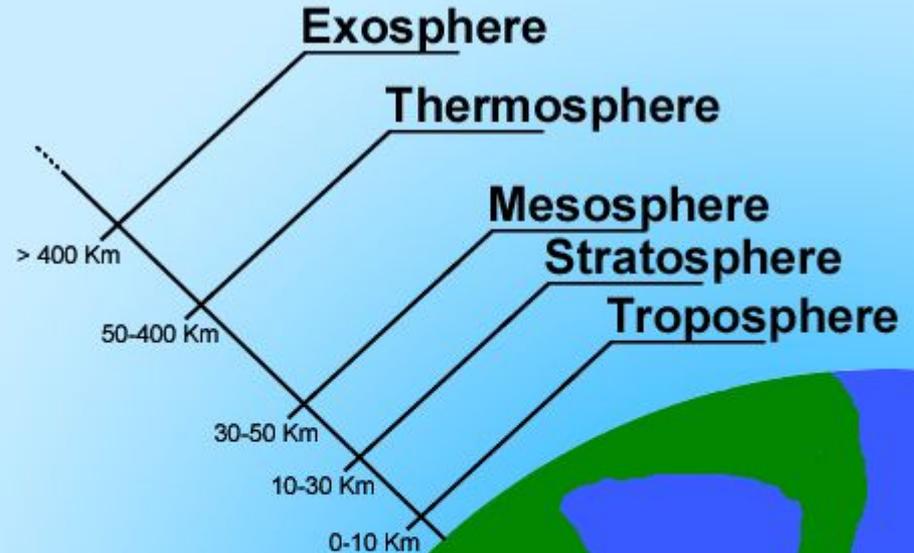
Stratosphere

Upper atmosphere

Mesosphere

Thermosphere

exosphere



Layers of the Atmosphere

Outer Space from here out...

Exosphere - 1,000 km (6,200 miles)

Satellites Orbit the Earth

Thermosphere - 200 km (125 miles)

Space Shuttle Orbits the Earth

Mesosphere - 80 km (50 miles)

Meteors flying toward Earth are often stopped here.

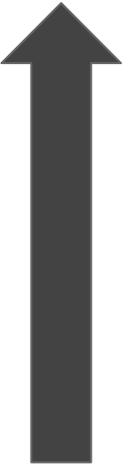
Stratosphere - 50 km (30 miles)

Calmer air where the airlines fly planes. Protective Ozone Layer forms here.

Troposphere -
Up to 20 km (12 miles)

Weather happens here - hurricanes, rain, tornados, thunder and lightening, etc. Very turbulent air.

Elephants
On
Tattled
Monkeys
Stupid
The



a. Lower layers of the Atmosphere

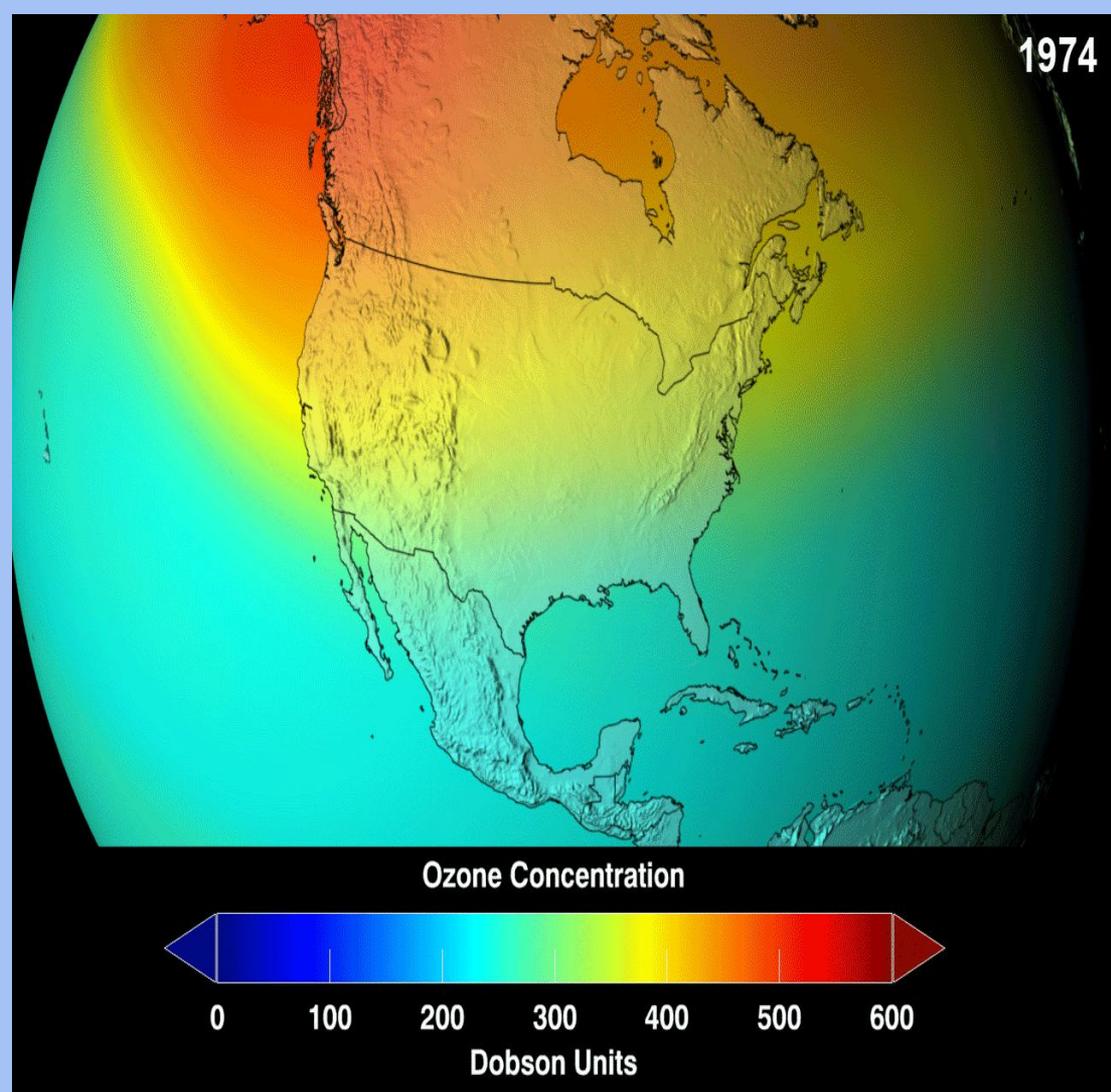
Troposphere

- Where you live
- 99% water vapor
- 75% atmospheric gases
- Weather occurs here



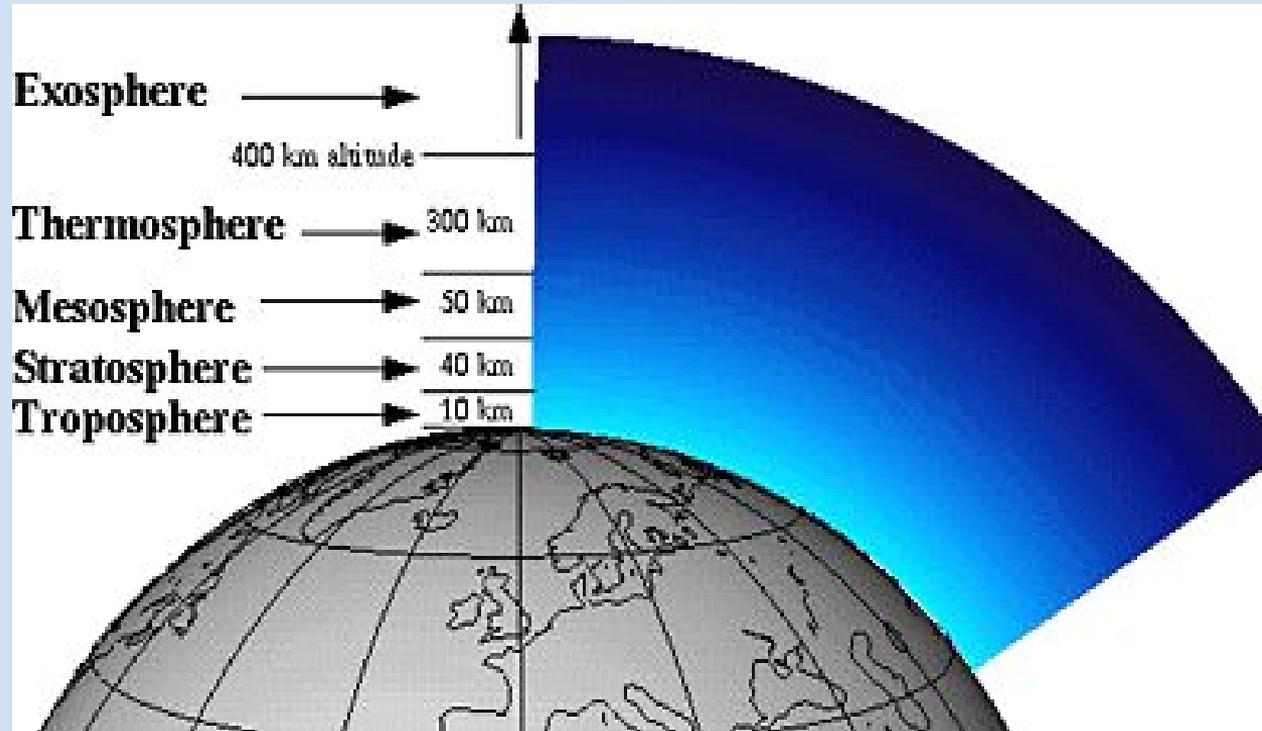
Stratosphere

- Directly above troposphere
- 10-50 KM
- Contains higher levels of ozone



B. Upper layers of the Atmosphere

- Mesosphere
- Thermosphere
- Exosphere



Mesosphere

- Extends from the top of the stratosphere to about 85 km above the Earth
- Shooting stars



Thermosphere

Thickest layer

Found between 85 and 500 km above Earth's surface

WITHIN THE MESOSPHERE AND THERMOSPHERE

Ionosphere

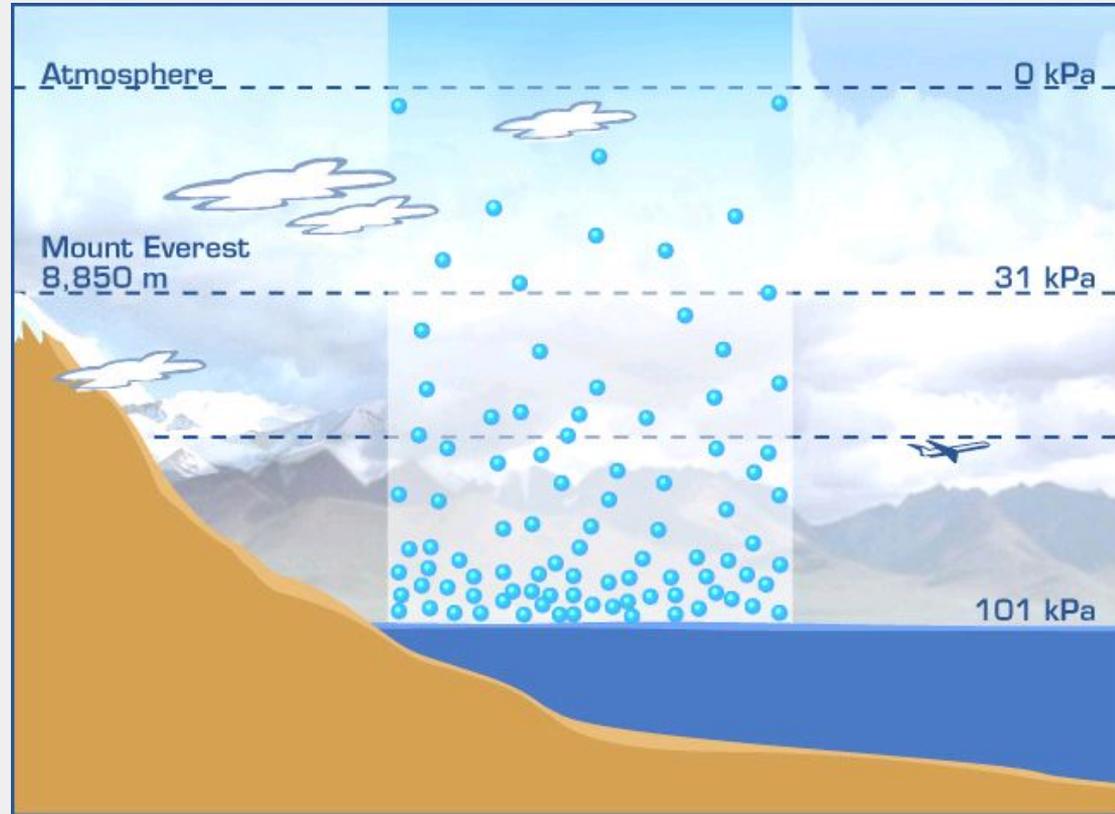
- Layer of electrically charged particles
- Allows radio waves to travel across the country

Exosphere

- Few molecules
- Space shuttle needs bursts from rockets to move

IV. Pressure from the Atmosphere

Earth's gravity pulls the gases from the atmosphere toward Earth creating pressure.



The higher you go...the less particles there are, which means less pressure.

Air also thins, making it harder to breathe



BILL NYE

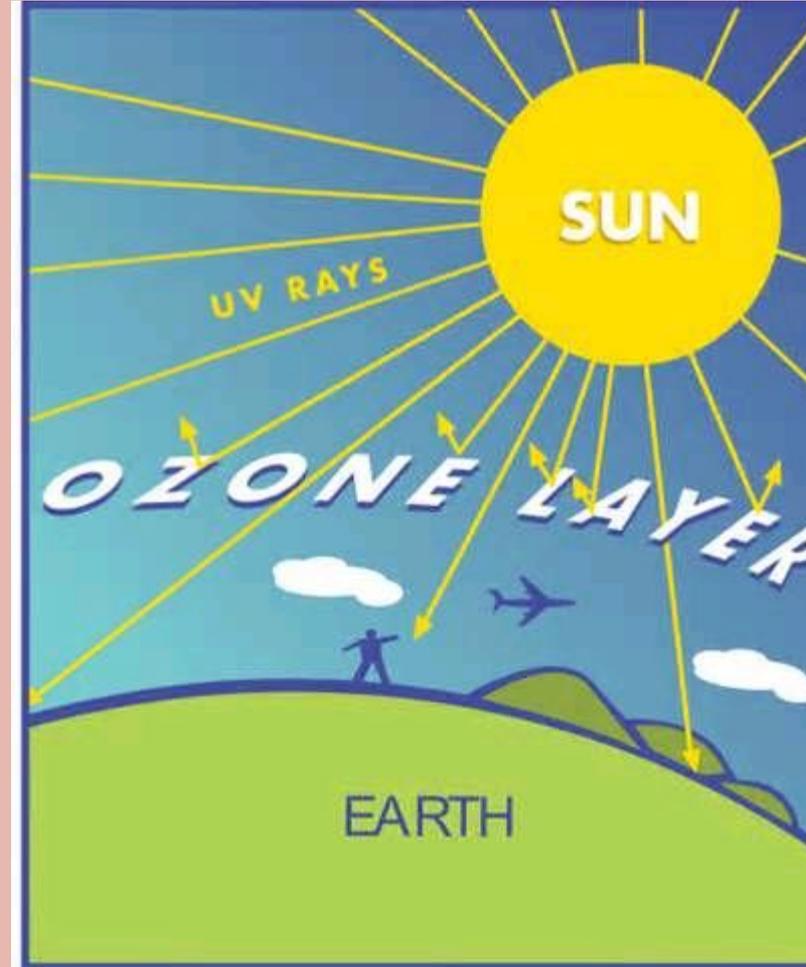


the Science Guy



Ozone Layer

The ozone layer is an atmospheric layer with a high concentration of ozone gas. It is located in the stratosphere and it helps shield us from the harmful energy of the sun.



Ozone

Ozone is a natural gas that forms in the stratosphere. It is not normally found in the lower atmosphere and if it is in considered a pollutant.

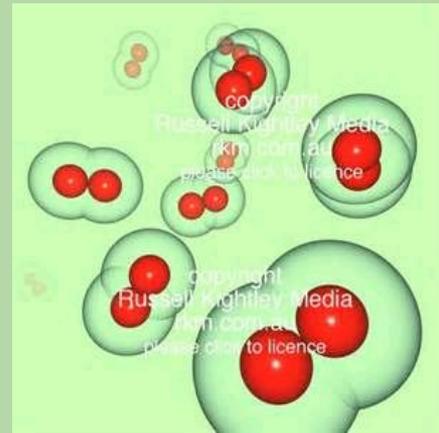
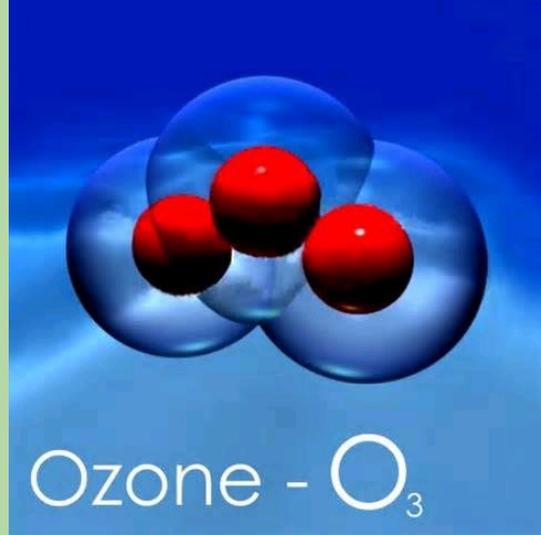
Hole in the Ozone Layer?



Ozone

Ozone is three oxygen molecules bonded together.
(O₃)

The oxygen that we breathe is two oxygen molecules.
(O₂)



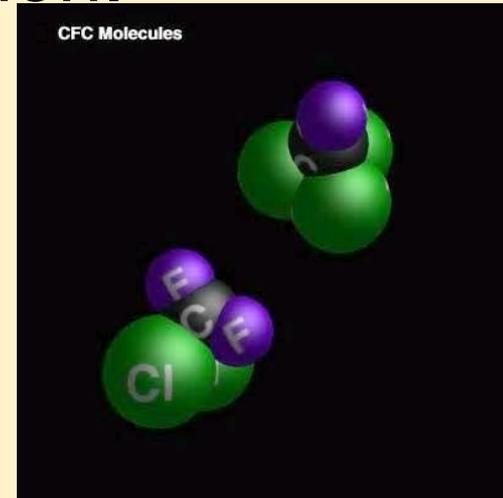
Ultraviolet Radiation

Ultraviolet radiation is one of the types of energy that comes from the sun. Too many UV rays can damage the skin, cause cancer and other health problems for plants and animals.



A. Chlorofluorocarbons

Chemicals called CFC's break down the ozone into regular oxygen molecules. These molecules can not absorb the radiation.





Energy Transfer in the Atmosphere

1-2 |

Describe what happens to the energy Earth receives from the sun.

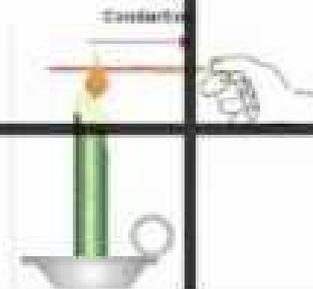
Compare and contrast radiation, conduction, and convection.

Explain the water cycle and its effect on weather patterns and climate.

Break it down, Ow, Come on, Ow, Let's go, Ow
I touched the hot pan when I was cooking
~~Ow, Ow, Ow, Come on~~

I'll be screaming out when I feel the sting

Conduction's the transfer of heat of things joined
It happens when substances directly touch
Conductors will make the heat travel faster
Good ones are copper, iron, steel, silver

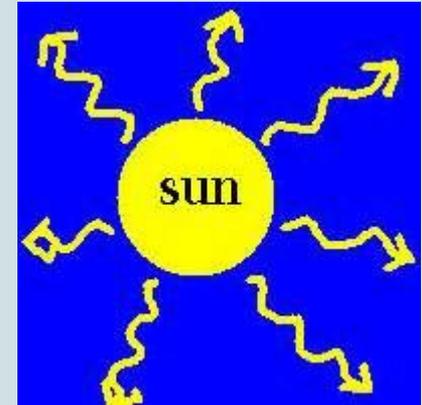


Radiation

Energy from the sun reaches our planet in the form of radiant energy or **radiation**.

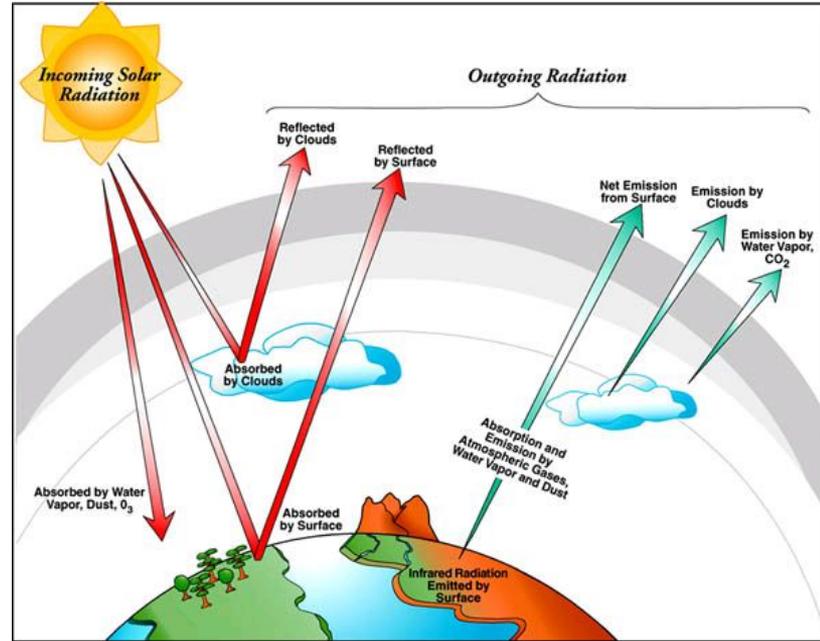
We experience radiation in the form of heat and light.

Radiation is the transfer of energy by electromagnetic waves.



The Sun's Energy

The sun gives off different types of radiation. Some of the waves get reflected back into space. Most of the energy get absorbed by the atmosphere, land and water.



Conduction

The direct transfer of heat from one substance to another is called conduction.

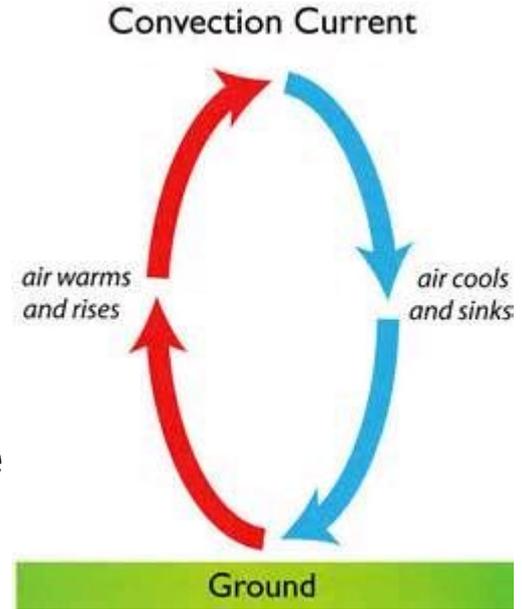
When the sun's radiation is absorbed by an object like asphalt and we walk on it we feel the heat because of conduction.



Convection

The transfer of heat through liquid or gas is called convection.

When air is warmed, the particles rise, move apart and create less pressure. New particles take their place and become heated too. As the particles rise they cool and lower toward the surface creating a cycle or a convection current.



Oh Radiation, Convection, and then there's Conduction

Today we'll talk about waves of heating

I wanna get it into your head

Radiation, Convection, or it might be Conduction

Cause Heat Transfers from hot things to cold things

Oh what happens to the heat in air?

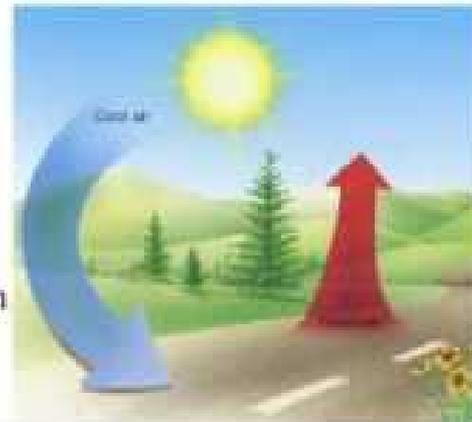
Rising hot air is less dense

Goes up, up, up, up, up, up, up, up

When Heat Transfers through Fluids

It's what we call Convection Currents

Yeah, yeah, yeah, yeah, yeah, yeah, yeah



No matter how the heat
Different temperatures meet
No matter where heat's from
Hot to cold how it's done

Radiation heat
It goes through the skies
Convection fluids rise
It's where the heat's applied
Don't get too close
You touch the fire
Conduction heat goes by
Three ways heat is supplied

Heat Transfer

Conduction, Convection and Radiation



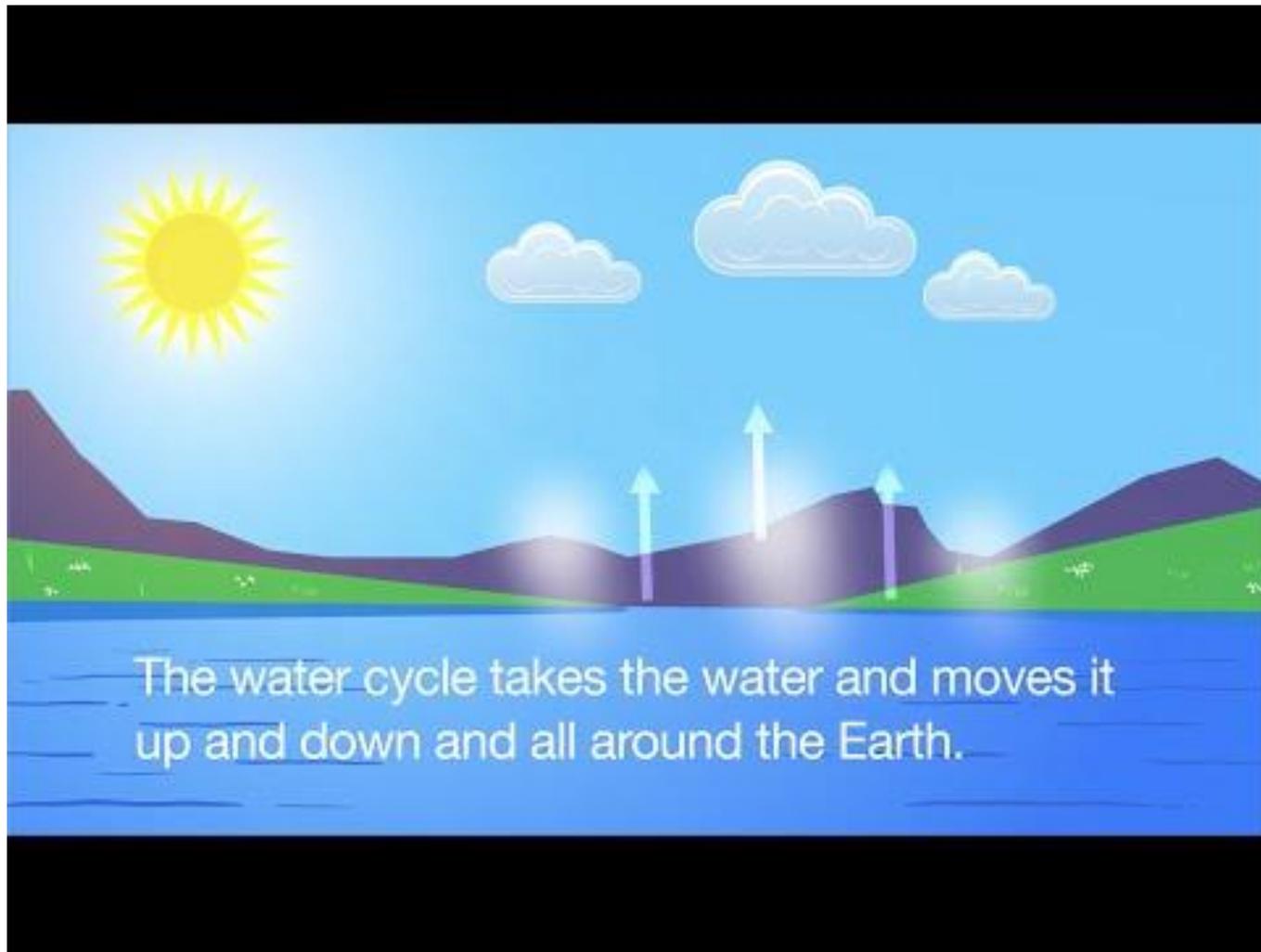
Earth's Water

All of the water in Earth's surface is called the hydrosphere.

97% salt water

3% fresh water - $\frac{2}{3}$ is frozen in the ice caps.

The percentage of water in the atmosphere is low, but important to life here on Earth.



The water cycle takes the water and moves it up and down and all around the Earth.



THE WATER CYCLE



The Water Cycle (The Hydrologic Cycle)



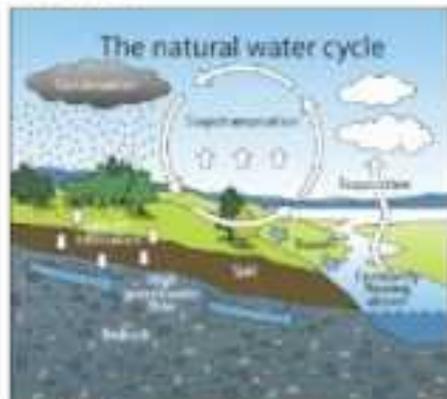
Water Cycle

The sun's energy cause water to change from a liquid to a gas by a process called **evaporation**.

When the water vapor cools, it changes back into liquid through a process called **condensation**. Clouds form and then the water returns to earth in a process called **precipitation**. The water then **runs -off** the land and back into collection areas such as a lake or ocean starting the process all over again.

That's right water droplets are in flight
Water droplets are in flight
It's H₂O, from the sky back to the Earth below
Water's in flight

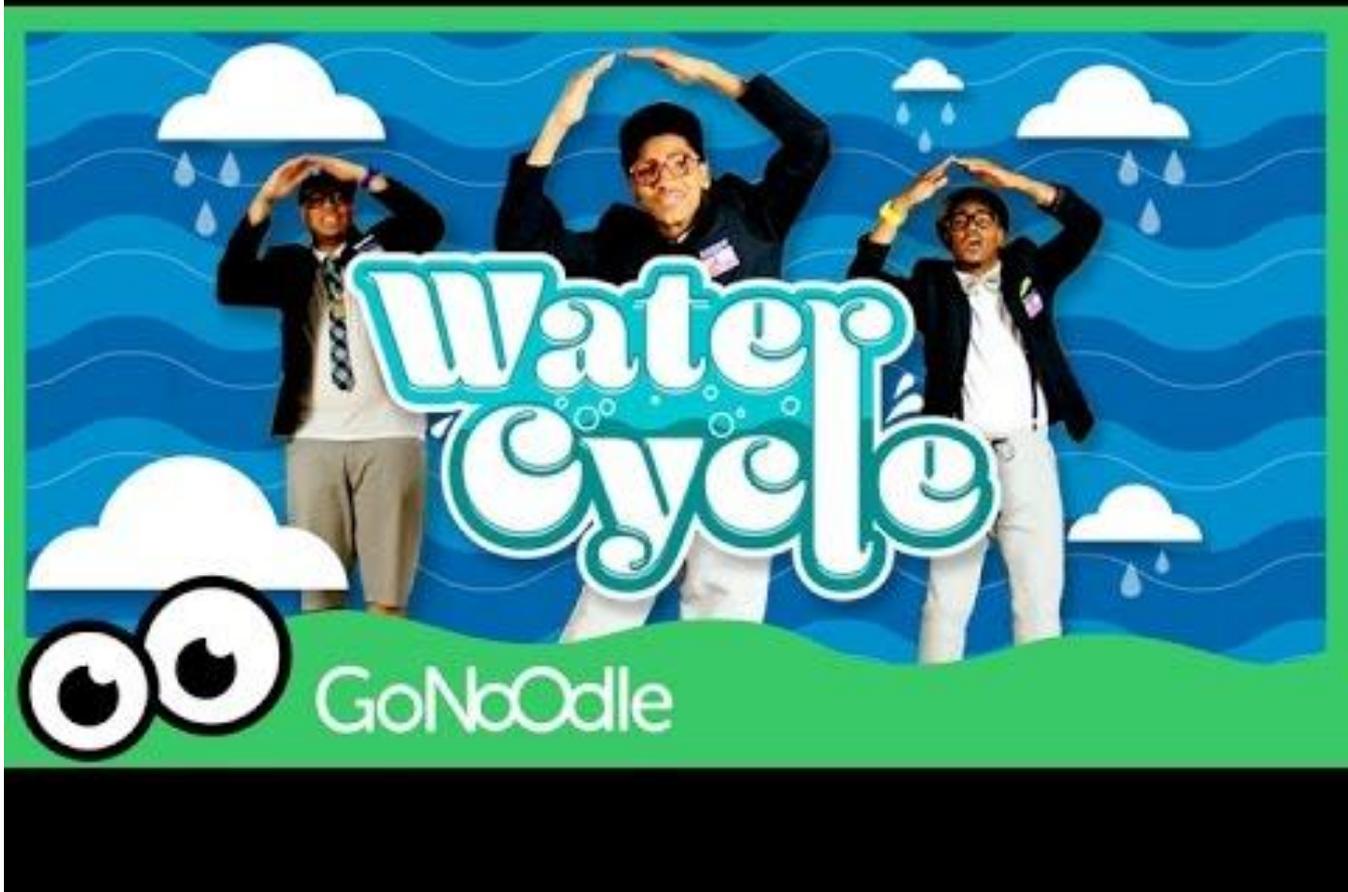
Evaporation
Then Condensation
Precipitation
And Surface Runoff
Cycle of Water, Cycle of Water,
Cycle of Water,



Grab somebody you know and tell them Hey!
Water droplets are in flight
Water droplets are in flight
Water droplets are in flight
Water droplets are in flight

It evaporated and condensed into a cloud

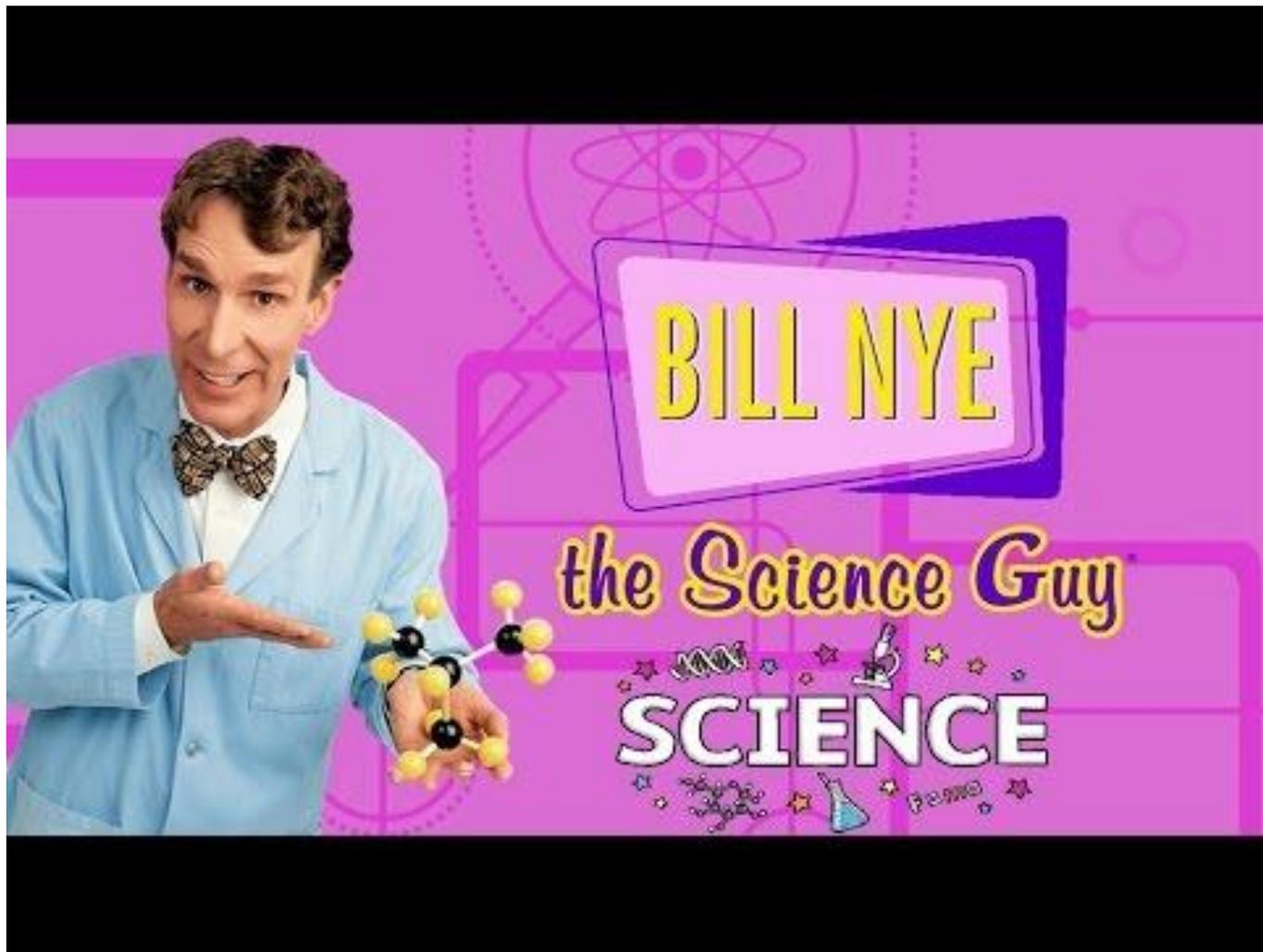




Water Cycle



GoNoOdle



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SCIENCE



Air Movement

1-3 |

Explain why different latitudes and Earth receives different amounts of solar energy.

Describe the Coriolis effect

Explain how land and water surfaces affect the overlying air.

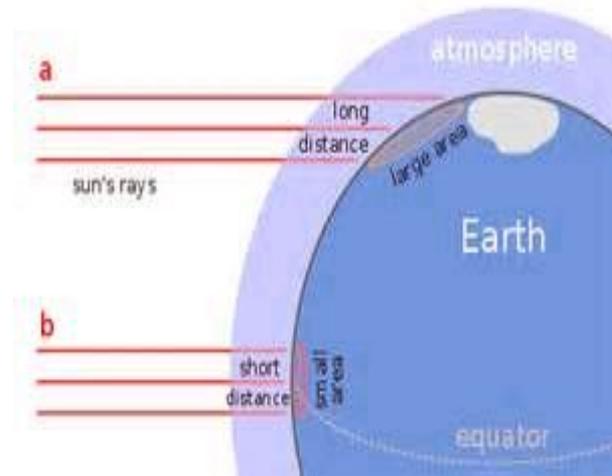


SCIENCE FACTION SHOW

Wind Formation

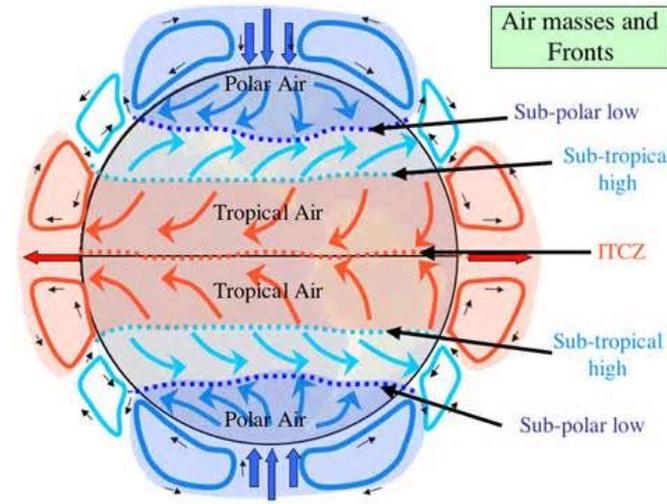
Temperature differences on Earth's surface are caused by Earth's tilt in its orbit around the sun, and by the Earth's curved surface.

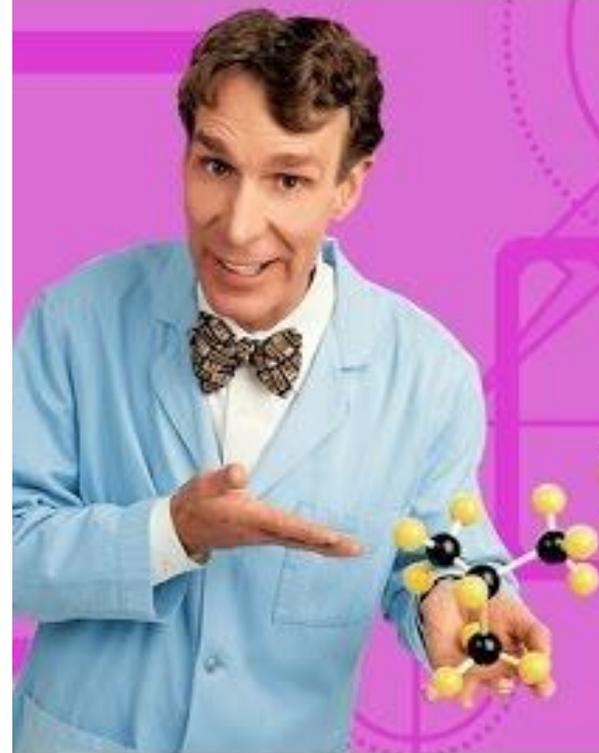
Areas of Earth receive different amounts of solar radiation because some areas receive direct rays and in other areas the rays are spread out.



Wind

Wind is caused by the uneven heating of Earth and its atmosphere. It is the movement of air from high pressure areas into low pressure areas. This causes circulation.





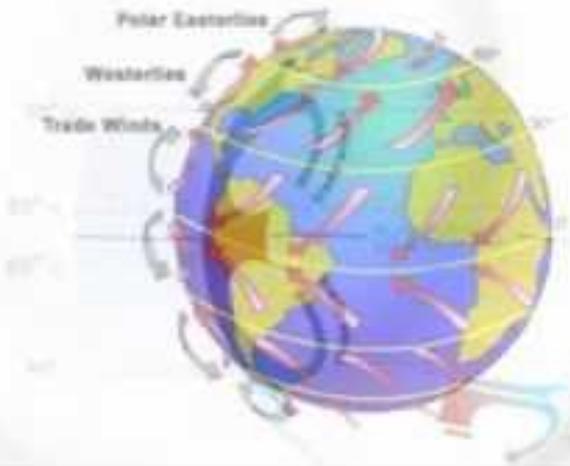
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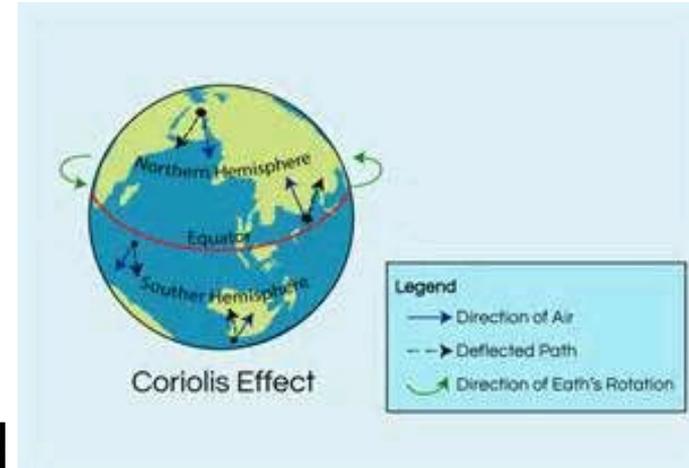


This winds about to blow, blow
This winds about to



Coriolis Effect

If the earth did not rotate, winds would blow in a straight line from the poles to the equator. However, because the earth turns it makes the wind curve. This curve is called the Coriolis Effect.





Doldrums

Air currents also leave an area of Earth unaffected by wind. This area is called the doldrums.





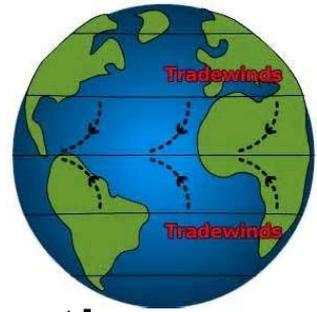


EPISODE 34.1

CURRENT EVENTS

KIDS

Trades Winds

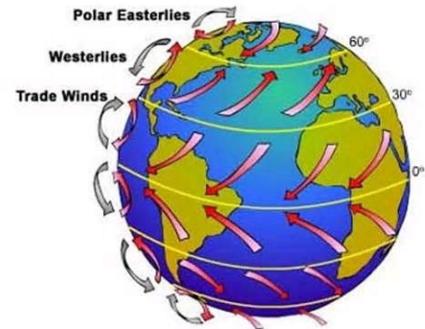


For hundreds of years sailors depended on the winds to move ships carrying cargo to different points on the globe.

A constant convection current is located between the equator and 30 degrees latitude north and south of the equator.

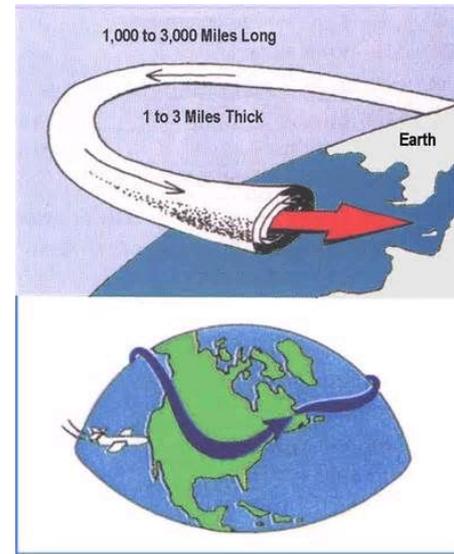
Polar Easterlies

Cold air near the poles sink and flow back toward the lower latitudes. This occurs between 60 degrees and 90 degrees latitude. They flow from east to west.



Jet Stream

Winds also blow at higher altitudes. Narrow belts of strong winds called jet streams blow at speeds of 200-400 mph. Just as the sailors used the trade winds to push them along, pilots use jet streams to save fuel and time.



EPISODE 16.2

UP, UP & AWAY

KIDS

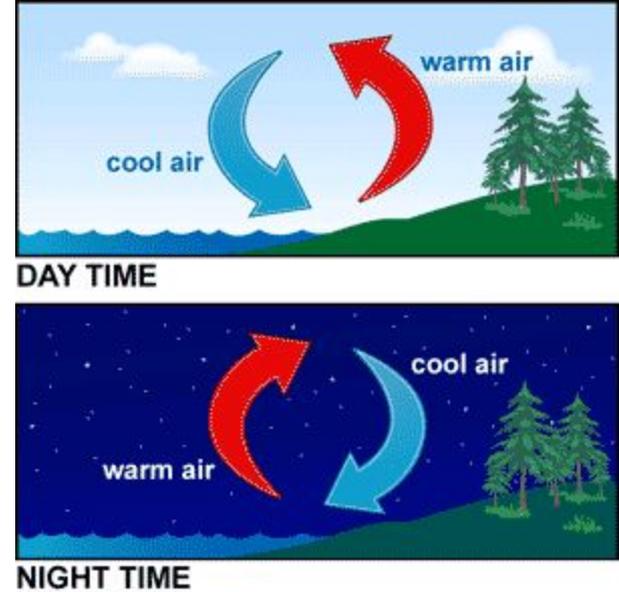
Daily and Seasonal Winds

Smaller wind systems determine the local weather.

Sea Breezes and Land Breezes are named from where they blow from.

Sea Breezes

During the day, both the land and water absorb radiation from the sun. The land warms up faster than the water, The warm air over the land rises and the cool air from the water moves in causing a sea breeze.

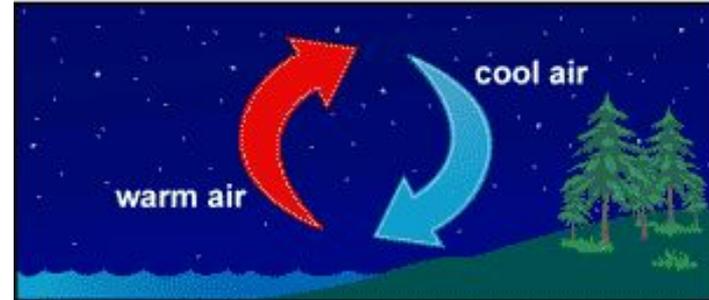


Land Breeze

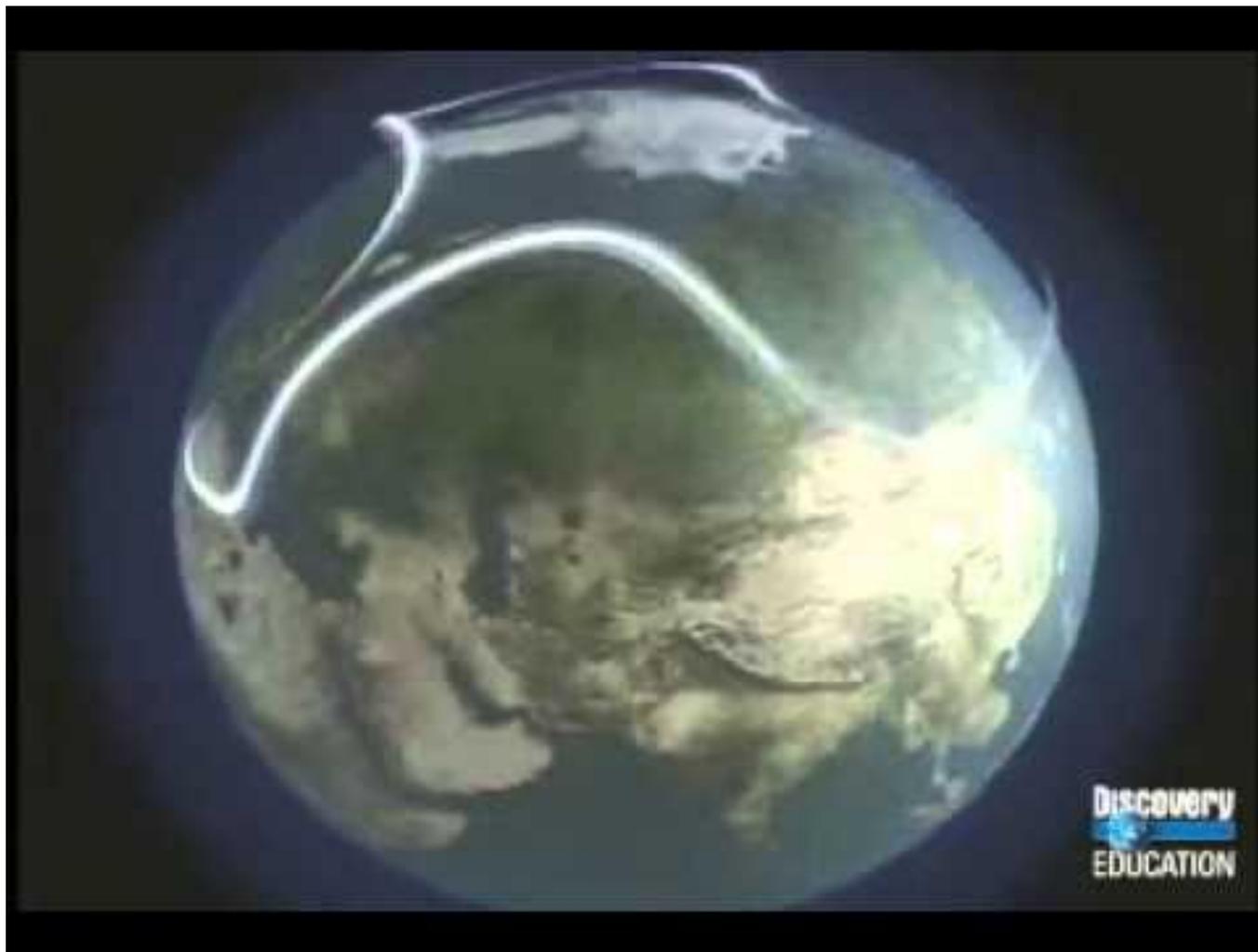
At night the land cools faster than the water. The air over the water rises, and the cool air from the land blows over the water causing a land breeze.



DAY TIME



NIGHT TIME



Discovery
EDUCATION