

Ecology

Ecology is the scientific study of interactions among organisms and between organisms and their environment or surroundings.

An **ecologist** is a person who studies the interactions between organisms and the environment.

on test

7 Levels of Organization Studied by Ecologists

The levels of organization studied by ecologists are organisms, species, populations, communities, ecosystems, biomes and finally the biosphere.

7 Levels of organization

- 1) organism - a single living thing
- 2) species - group of organisms so similar to one another that they can breed and produce fertile offspring
- 3) population - group of individuals that belong to the same species and live in the same area (Not a count of every single organism all together)
ex) Human Populations is separate from Cow Population
- 4) community - a collection of different populations that live together in a defined area
- 5) ecosystem - a collection of all the organisms that live in a particular place together with their nonliving, or physical environment
- 6) Biome - Is a collection of animals and plants in an area
- 7) Biosphere is all parts of and around the planet Earth where life can be found

add to notes

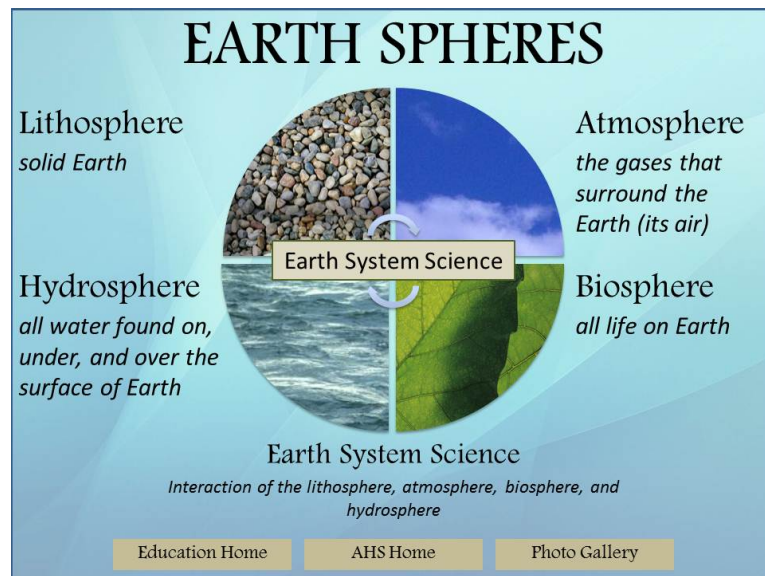
NOTES - Ecological Organization.pdf



4 Spheres of Earth

The spheres are the four subsystems that make up the planet Earth. They are called spheres because they are round, just like the Earth.

- 1) Geosphere - all the rock on Earth
- 2) Hydrosphere - all the water on Earth
- 3) Atmosphere - all the gases surrounding Earth
- 4) Biosphere - all the living things on Earth



Geosphere

Geo means “earth.” The Earth’s geosphere (sometimes called the lithosphere) is the portion of the earth that includes rocks and minerals. It starts at the ground and extends all the way down to Earth’s core.

We rely on the geosphere to provide natural resources and a place to grow food. Volcanos, mountain ranges, and deserts are all part of the geosphere. Put simply, without the geosphere, there would be no Earth!



The Rock Cycle

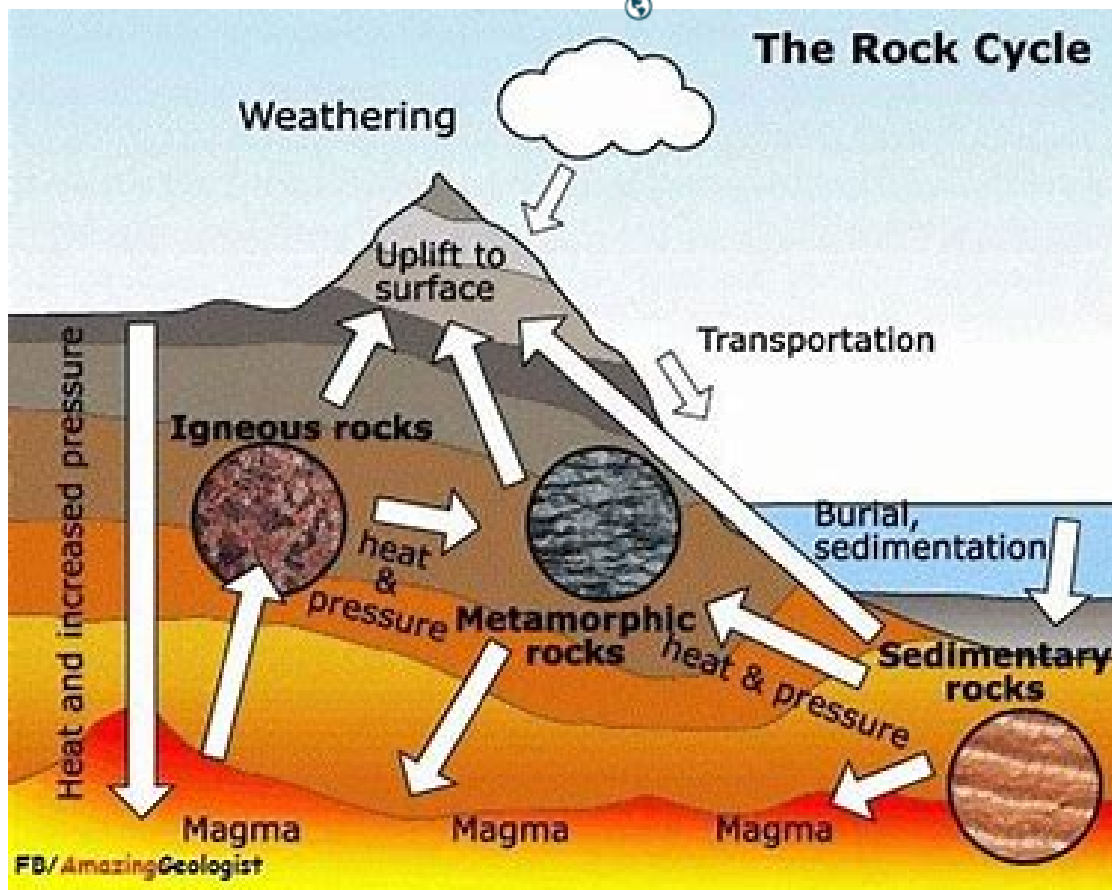
311-2

Weathering: Sediment comes from larger rocks that have broken down or worn away by a natural process called weathering.

This can happen mechanically, chemically or biologically.

[Bill Nye - The Science Guy - S03 - E04 - Rocks & Soil](https://www.dailymotion.com/video/x3jyuty)

<https://www.dailymotion.com/video/x3jyuty>



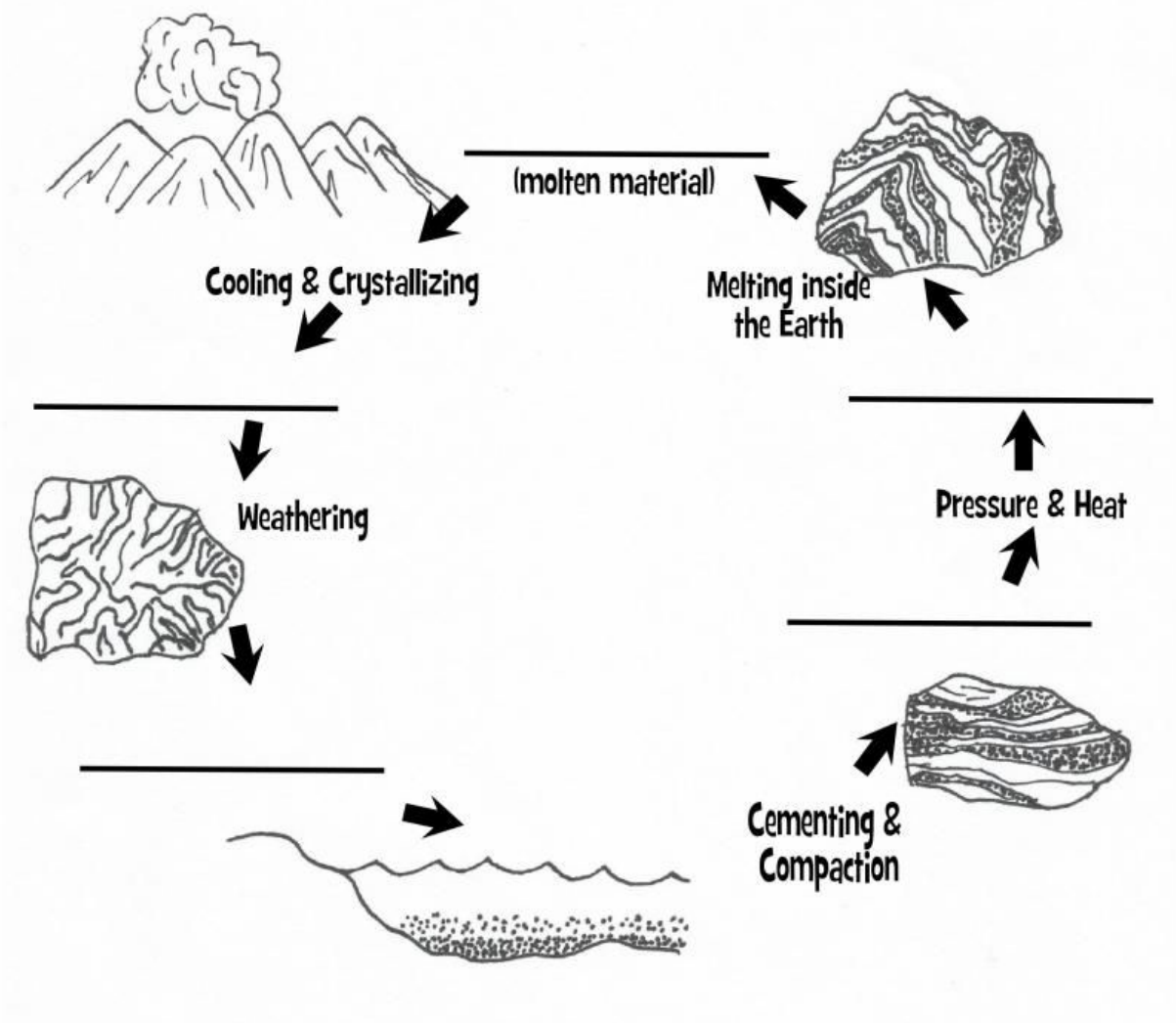
[Rock cycle video | Learn about Types of Rocks | Rock cycle for kids - YouTube](#)

[Rock Cycle - YouTube](#)

The Rock Cycle

Fill in the blanks to complete the rock cycle using these words:

metamorphic rock	igneous rock	sedimentary rock
magma		sediment



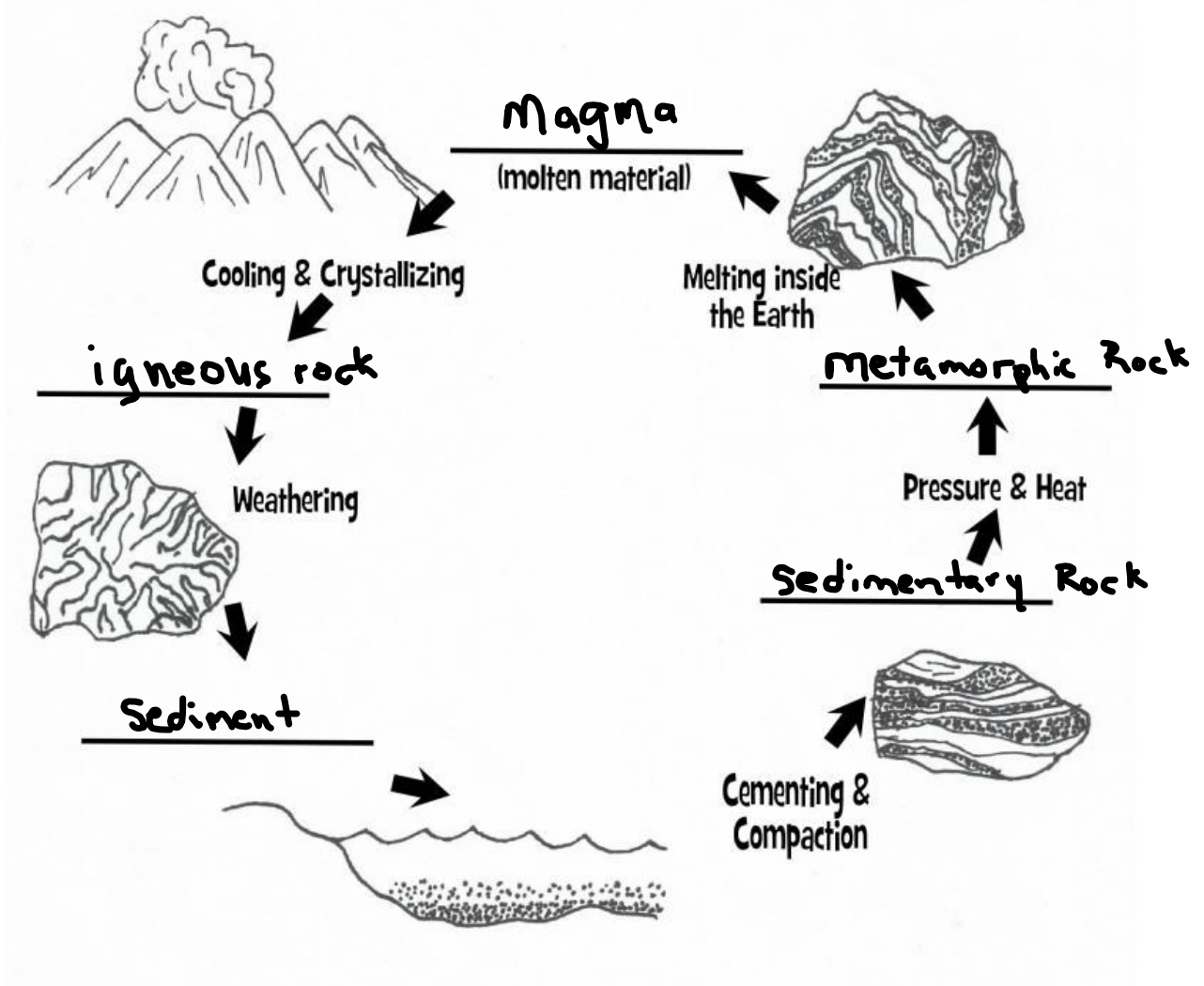
Layers of Learning

solution

The Rock Cycle

Fill in the blanks to complete the rock cycle using these words:

metamorphic rock igneous rock sedimentary rock
magma sediment

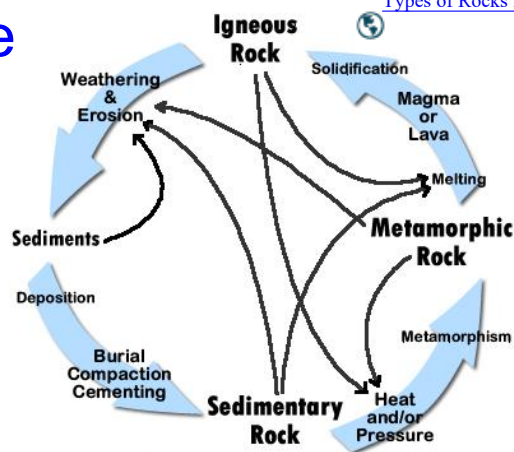


Layers of Learning

The geosphere also includes the abiotic (non-living) parts of soils and the skeletons of animals that may become fossilized over geologic time.

Rock Cycle

[Types of Rocks Igneous-Sedimentary-Metamorphic Rocks - YouTube](#)



What are volcanoes and how are they formed? - YouTube



What are volcanoes and how are they formed?



ABC is an Australian public broadcast service. Wikipedia

Trapped in the volcano: How the cruise of a lifetime turned into a deadly nightmare | Four Corners



Hawaii Volcanoes National Park - See the Biggest Volcano in The World

Linking Geosphere with other spheres with climate



As climate changes, the geosphere interacts with various other parts of the Earth system.

Biosphere: The carbon cycle, usually linked with the Earth's biosphere, includes deep storage of carbon in the form of fossil fuels like coal, oil, and gas as well as carbonate rocks like limestone.



Here living things break apart rock.

Cryosphere: Glaciers and ice sheets, parts of the cryosphere, have a large impact on the rocks and sediments below them. They erode rocks on the geosphere and push rocks up and over the land as they melt and move.

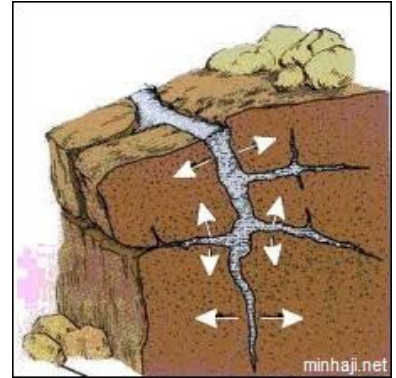
Hydrosphere and Atmosphere: The erosion of rocks, a major part of the rock cycle and change in the geosphere over time. Erosion, transportation, and deposition of sediments wouldn't occur without the hydrosphere's rivers, lakes, and ocean or the atmosphere's winds and precipitation.

Different combinations of sedimentary rocks form in environments with different climate conditions. This allows geologists to reconstruct what an environment was like millions of years ago based on the sedimentary rocks that were deposited.

Mechanical Weathering

This is the physical break up or disintegration of rocks.

Ex: Rocks rolling down a slope or fast moving stream rub and bump against each other.



Climate change can also cause mechanical weathering. During the freeze thaw period we get Frost wedging. (warm in day but temps drop below freezing at night) water seeps into the rocks freezes and expands. This causes cracks and eventually the rocks break apart.

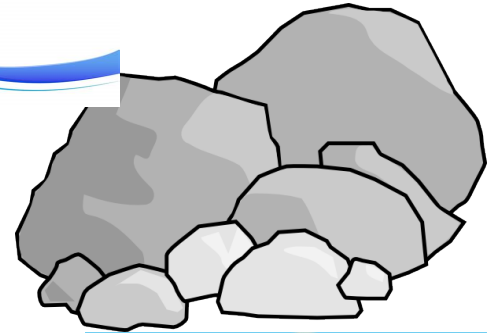
Frost Wedging: Water seeps into rocks and freezes then expands cause rocks to break.

<https://www.youtube.com/watch?v=BxmAJMjJ5Nk> 7 min.





Erosion is another form of mechanical weathering. Erosion is the process of moving soil and rocks from one place to another (wind/water)

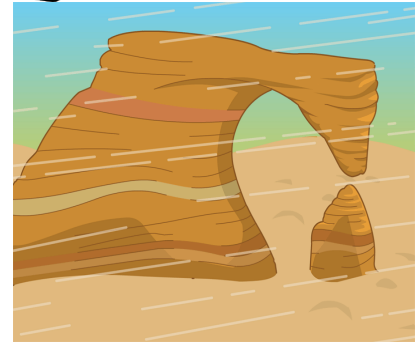


[Bill Nye the Science Guy - S05E14 Erosion - YouTube](#)
Bill nye erosion 20 min

[PEI COASTAL EROSION - YouTube](#)

<https://www.youtube.com/watch?v=dm-1FUOL1x4>

<https://www.youtube.com/watch?v=R-Iak3Wvh9c>



Assignment in the computer lab)





The Power of Water for Kids: How Erosion by Water Shapes Landforms for Children - FreeSchool
3,335 views · Aug 27, 2018 1.6K 477 SHARE SAVE ...

Hydrosphere

Hydro means “water.” The hydrosphere includes the oceans, rivers, lakes, groundwater, and water frozen in glaciers.

97.5% of water on Earth is found in the oceans (Salt water- cannot drink)

2.5% being fresh water.

FRESH WATER

Most is from glaciers & polar ice caps

2nd trapped underground

3rd liquid form on the surface as lakes and rivers

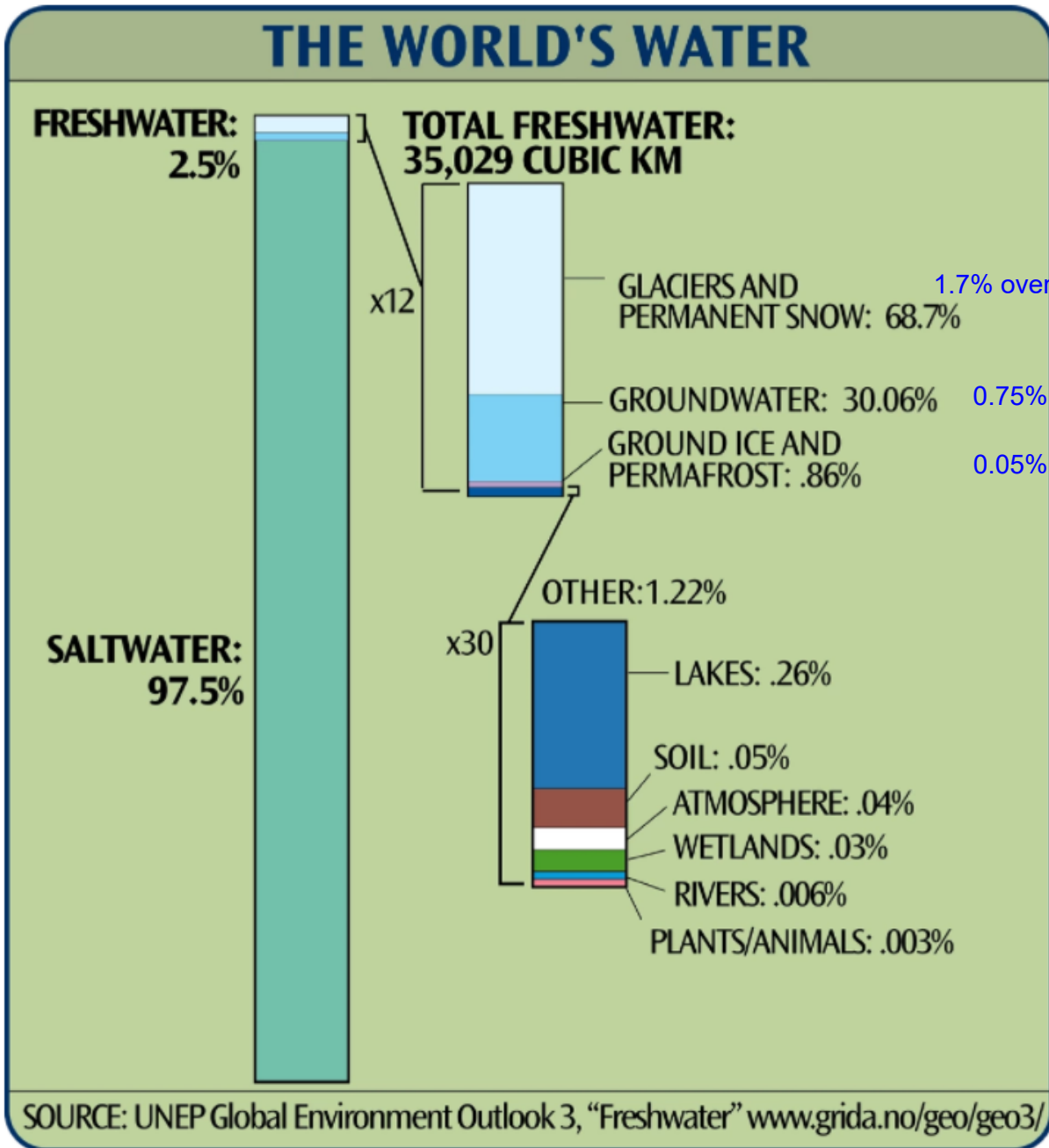
4th found in the atmosphere

[Why Melting Polar Ice Caps Are Showing Up In Canada | Angry Planet | Earth Stories - YouTube](#)



Water is one of the most important substances needed for life and makes up about 90% of living things. Without water, life would not be possible.





Remember Rain

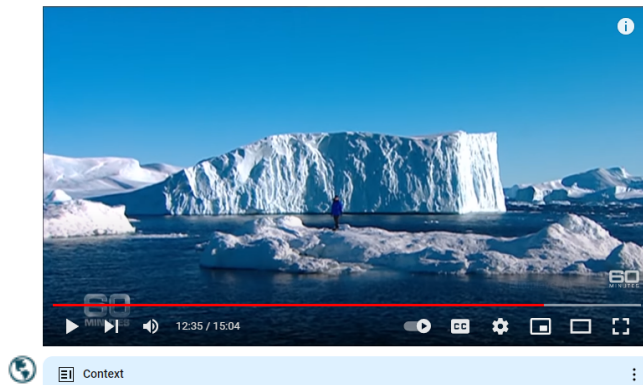
One important source of fresh water that is often overlooked is rainwater.

Rainwater is the product of **water from the Earth that has been evaporated into the Earth's atmosphere and is turned into rain (Fresh)**. During that process, the water becomes fresh water and is cultivated in many places throughout the world to be used as a suitable supply of drinking water and water to feed crops. Harvesting rainwater is a technology that has been used by ancient civilizations and is one that is still widely used in many rural areas to make the most out of an endless supply of fresh water that is often taken for granted

[Greenland's rapid ice melt could mean more flooding, climate experts say | Nightline - YouTube](#)



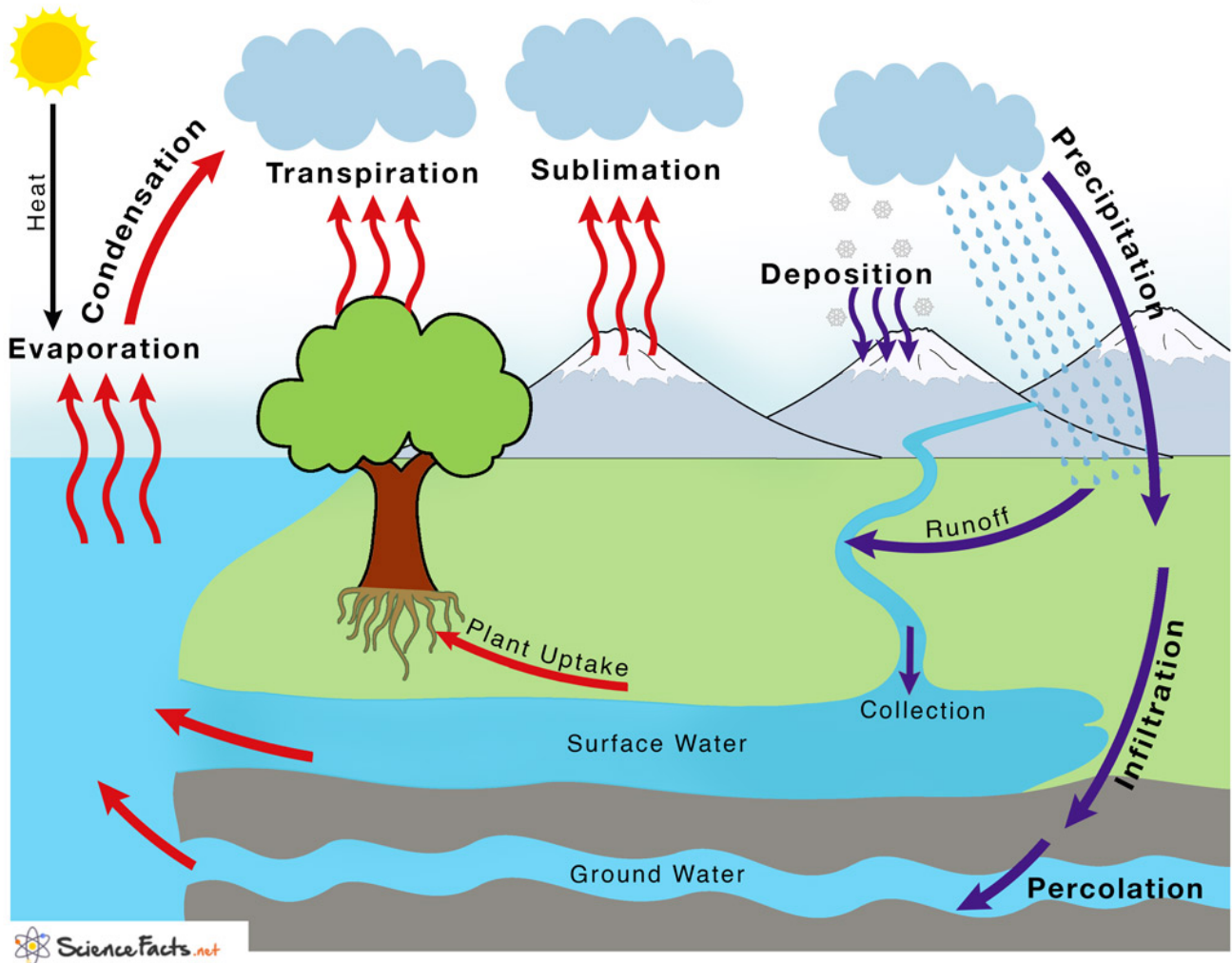
[Terrifying proof of global warming | 60 Minutes Australia - YouTube](#)



Countries with the Most Fresh Water



Water Cycle



Evaporation- the process of turning from liquid into vapor using heat

Condensation is the process where water vapor becomes liquid. (Cooling)

Transpiration is the evaporation of water from plants.

Sublimation- is the conversion of a substance from the solid to the gaseous state without its becoming liquid

Deposition- is a change from gaseous state into a solid state without passing through a liquid phase (cooling quick)

Infiltration is the downward movement of water into the soil

Percolation is the downward movement of water through soil layers due to gravity and gaps in soil

Runoff is the excess water that flows over the land surface instead of being absorbed into groundwater or evaporating.

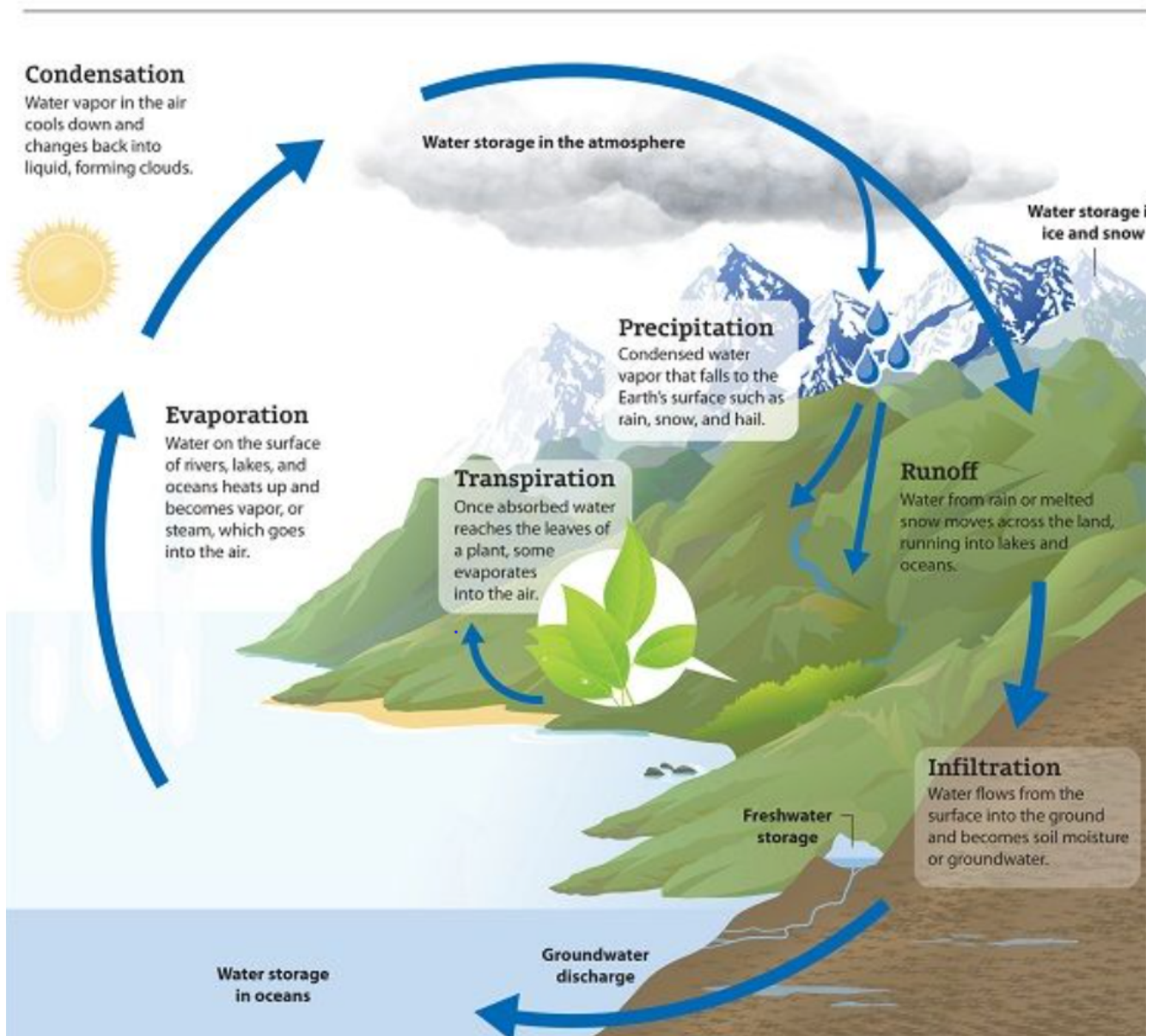
Groundwater is water that occurs below the surface of Earth

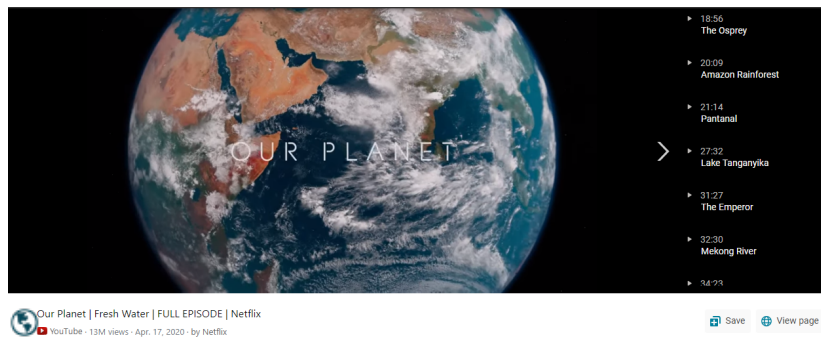
Surface water is any body of water above ground, including streams, rivers, lakes, wetlands, reservoirs, and creeks

Plant uptake- are the roots that gather the water and nutrients from the soil

The Water Cycle

The sun plays a big role in the water cycle. The Sun provides thermal energy and heats bodies of water which then evaporates into the atmosphere becoming water vapor.





53 min

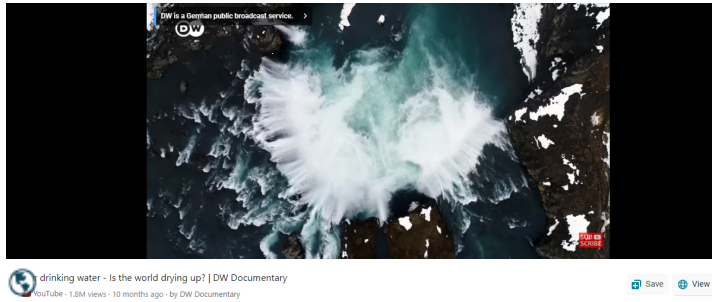
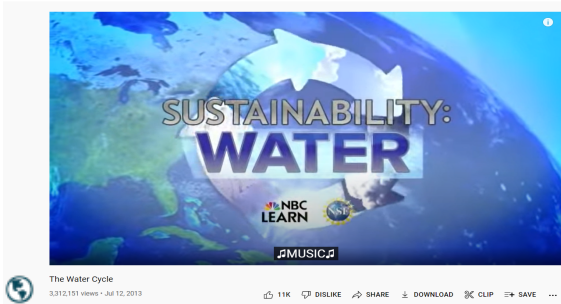
[Why some First Nations reserves don't have clean drinking water - YouTube](#)



The Magic School Bus - Wet All Over - Ep. 18

[The Magic School Bus - Wet All Over - Ep. 18 - YouTube](#)





42 min

What Role Does Gravity Play In The Water Cycle?

Gravity causes precipitation to fall from clouds and water to flow downward on the land through watersheds. Energy from the sun and the force of gravity drive the continual cycling of water among these reservoirs. As the water is heated, it changes state from a liquid to a gas.

The Oceans



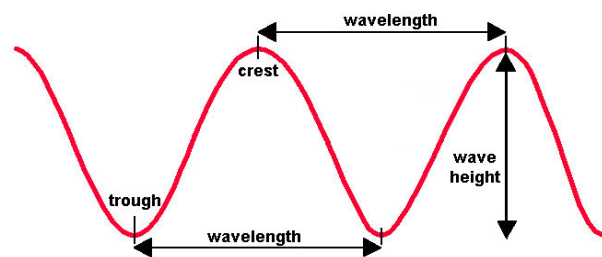
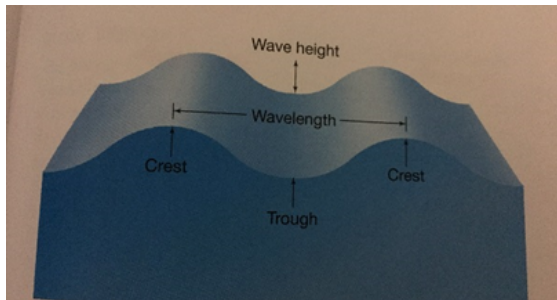
The ocean is never still. You can see it moving in the waves that crash ashore. On the open water, sailors witness broad, slow-flowing "rivers" at the ocean's surface. These movements carry enormous amount of water over hundreds of kilometers from one part of the ocean to another. Huge masses of cold water creep along the ocean floor than rise from the depths to the surface.

What causes waves?



You can find this in a hot bowl of soup! If you blow on the soup to cool it, your breath makes small ripples on the surface of the liquid. Ocean waves are just large ripples, set in motion by steady winds.

Waves begin on the open sea. Their height depends on how fast, how long and how far the wind blows over the water. An increase in one of these variables can cause an increase in wave height. Normal winds produce waves of 2-5m in height. Hurricane winds can create waves 30m high. Even on a calm day, there is usually a steady movement of smooth waves near the shore. These smooth waves are called swells.




[Biggest Waves Ever Recorded On Camera - YouTube](https://www.youtube.com/watch?v=5_HefhiwioE)

https://www.youtube.com/watch?v=5_HefhiwioE



Wind & Moisture Can cause storms

 [Hurricane, Tornado, Cyclone – What's the Difference? - YouTube](#)

Write 5 interesting facts from the video

Salt Water

Rivers around the world flow down from hills and across the land before finally pouring their water into the ocean basins. Traces of muddy water from the largest rivers, such as the Amazon River in South America, can be detected as far as 1000 km out from the coastline. Ocean water, however, is not the same as river water. If you have ever swam in the sea and accidentally got some water in your mouth, you know the main difference. Ocean water is salty.



On average 1000 g of seawater contain 35 g of dissolved salts. This is usually expressed as 35 parts per thousand (ppt). By far the most common material in this solution is sodium chloride. This is the same chemical substance as the table salt you use to season food. The next most plentiful salts are composed of sulfates, magnesium, calcium, and potassium. **The measure of the amount of salts dissolved in a liquid is known as salinity.**

Salinity- The measure of the amount of salts dissolved in a liquid.

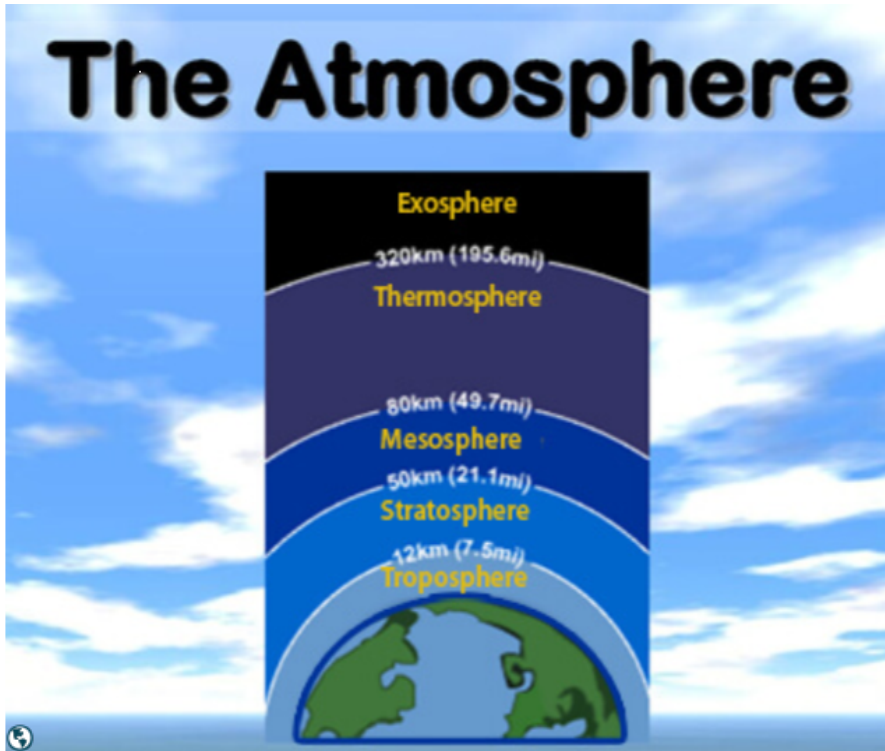
Atmosphere

Atmos means “air.” The atmosphere includes all the gases surrounding the Earth. We often call the atmosphere “air.” All planets have an atmosphere, but Earth is the only planet with the correct combination of gases to support life.

The atmosphere consists of five layers and is responsible for Earth’s weather. Even though it seems like air is made of nothing, it consists of particles too small to be seen. All these particles have weight that push down on Earth. The weight of air above us is called air pressure.



Atmosphere on Earth



The earth is surrounded by the atmosphere, which protects us from radiation from the sun, falling meteors and toxic gases. It consists of 5 layers:

- 1) Troposphere- starts at the Earth's surface and extends 12 kilometers high. It is the most dense. Almost all weather is in this region and our oxygen that is needed to breathe is found here.
- 2) Stratosphere - starts just above the troposphere and extends to 50 kilometers high. The ozone layer, which absorbs and scatters the solar ultraviolet radiation, is in this layer. Ozone layer is getting thinner due to pollution. Airplanes fly in this layer to avoid turbulence.
- 3) Mesosphere -starts just above the stratosphere and extends to 80 kilometers high. Meteors burn up in this layer. Coldest layer.
- 4) Thermosphere- starts just above the mesosphere and extends to 320 kilometers high. Northern lights and satellites occur in this layer. Warmest layer
- 5) Exosphere- upper limit of our atmosphere. It extends from the top of the thermosphere up to 10,000 km. Hydrogen and helium found there and the air is very thin.



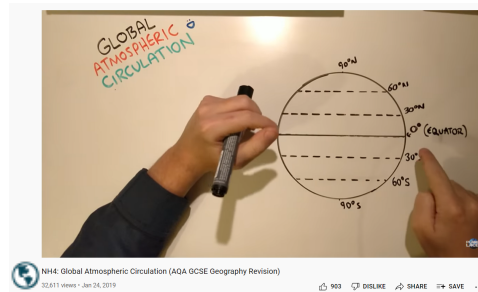
[Red sky at night, sailors delight. Is it true? - YouTube](#)

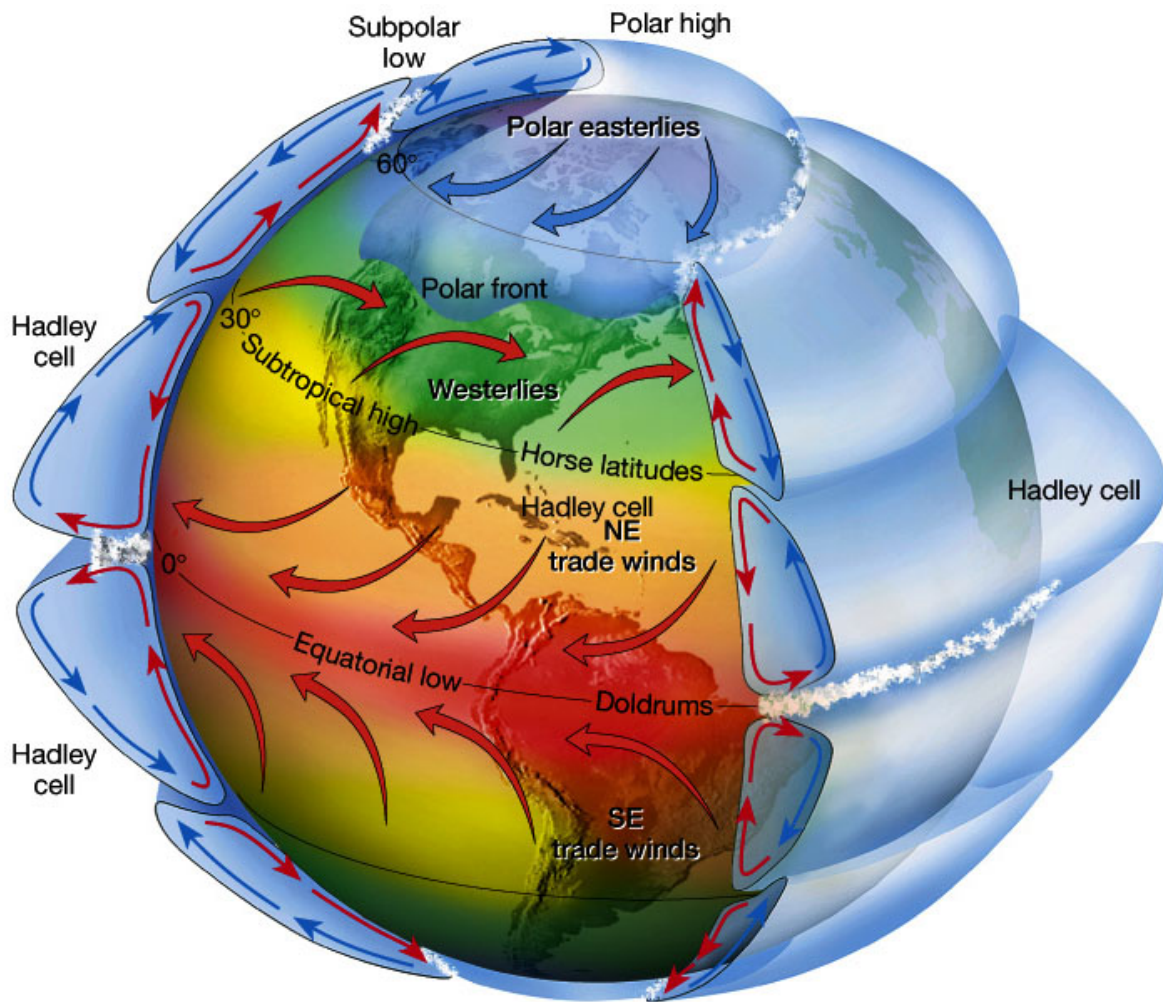
1 min

Atmospheric Flow

- is how air moves around on our planet.

The flow of the atmosphere generally moves in a west to east direction. This however can often become interrupted, creating a more north to south or south to north flow.





[Bill Nye The Science Guy Season 2 Episode 19 Atmosphere - YouTube](#)



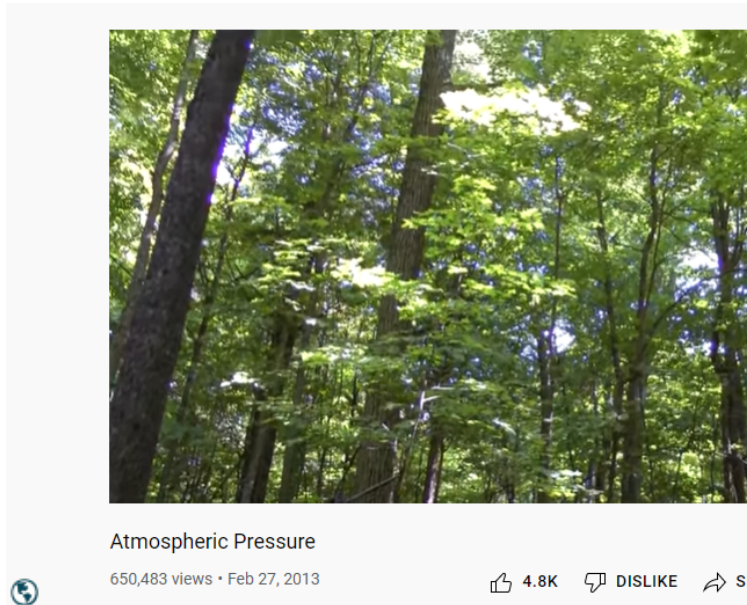
Bill Nye The Science Guy Season 2 Episode 19 Atmosphere



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Atmospheric pressure



5 min

The atmosphere that surrounds Earth has weight and pushes down on anything below it. The weight of air above a given area on Earth's surface is called atmospheric pressure. It is an important factor influencing Earth's weather and climate.

Atmospheric pressure changes at different altitudes. Pressure is greatest at sea level and decreases with height.

Air is heaviest at sea level because the air molecules are compressed by the weight of the air above them.

Air becomes lighter farther away from Earth's surface as the air molecules become separated by more space

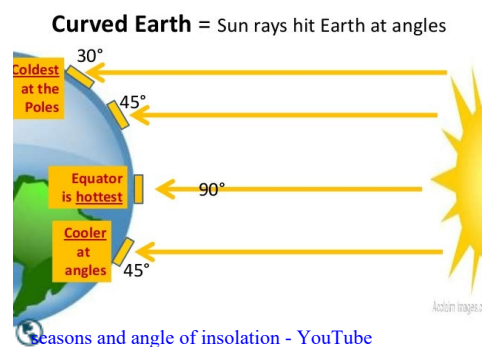
Barometer



A barometer is a scientific instrument used to measure atmospheric pressure, also called barometric pressure. The atmosphere is the layers of air wrapped around the Earth. That air has a weight and presses against everything it touches as gravity pulls it to Earth. Barometers measure this pressure.



Uneven heating by the Sun causes differences in Earth's atmospheric pressure. These pressure differences affect the motion of the atmosphere, as air moves from areas of high pressure to areas of low pressure. The result is wind, which has a great effect on weather and climate.

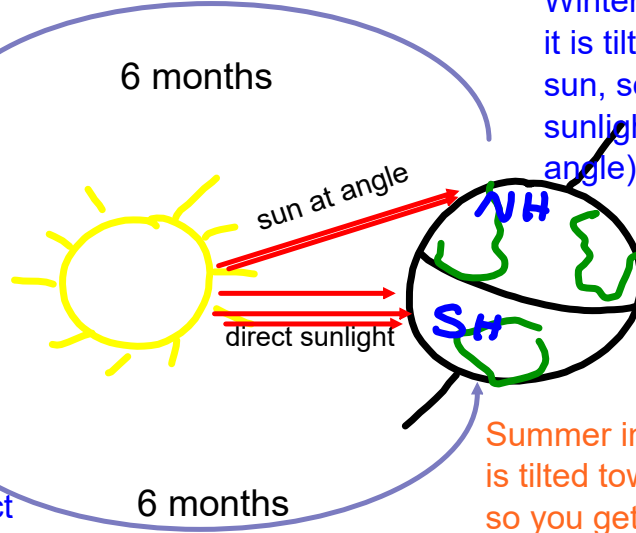


Meteorologists monitor changes in pressure as one indication of upcoming weather changes. Falling pressure generally indicates that stormy weather is on the way. Rising pressure usually indicates the approach or continuation of fair weather.

Summer in NH because it is tilted towards the sun, so you get direct sunlight



Winter in SH because it is tilted away from sun, so you get indirect sunlight (light at an angle)



Winter in NH because it is tilted away from sun, so you get indirect sunlight (light at an angle)

Summer in SH because it is tilted towards the sun, so you get direct sunlight

Meteorologists

Meteorologists are atmospheric scientists. They continually analyze vast amounts of data, including surface and upper air observations of temperature, wind, pressure, and humidity, as well as weather satellite data, radar data, lightning strikes, and data from weather models.

Based on this information, they might issue a warning or produce a public, aviation, or marine forecast.

But not all meteorologists forecast the weather: other specialties include research into atmospheric chemistry, biological impacts, and computer modelling.

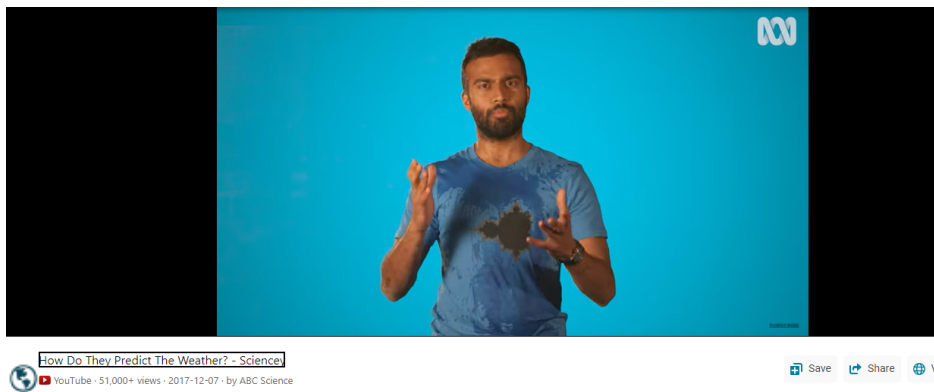
[How Do We Know When It Will Rain? | Weather Science | SciShow Kids - YouTube](#)



[Weather Forecast | Magic or Science? | Learn With BYJU'S - YouTube](#)



Weather Forecast | Magic or Science? | Learn With BYJU'S



The difference between weather and climate is time.

Weather is what is happening right now, and climate is what you typically expect the weather in a specific location to be like for this time of year.

Weather is the condition of Earth's atmosphere at a particular time and place.



[What's the difference between weather and climate? - YouTube](#)



Weather Instruments

A **THERMOMETER** measures the air temperature. Most thermometers are closed glass tubes containing liquids such as alcohol or mercury. When air around the tube heats the liquid, the liquid expands and moves up the tube. A scale then shows what the actual temperature is.



A **BAROMETER** measures air pressure. It tells you whether or not the pressure is rising or falling. A rising barometer means sunny and dry conditions, while a falling barometer means stormy and wet conditions. An Italian scientist named Torricelli built the first barometer in 1643.



A **SLING PSYCHROMETER** measures relative humidity using the cooling effect of evaporation. Two thermometers are used in a sling psychrometer. Wet the cloth of one of the thermometers and swing the psychrometer around a few times. Water evaporates from the cloth, causing the temperatures on that thermometer to be lower than the other.



A **RAIN GAUGE** measures the amount of rain that has fallen over a specific time period.



A **WIND VANE** is an instrument that determines the direction from which the wind is blowing.



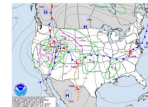
An **ANEMOMETER** measures wind speed. The cups catch the wind, turning a dial attached to the instrument. The dial shows the wind speed.



A **WIND SOCK** is a conical textile tube, which resembles a giant sock, designed to indicate wind direction and relative wind speed.



WEATHER MAPS indicate atmospheric conditions above a large portion of the Earth's surface. Meteorologists use weather maps to forecast the weather.



A **HYGROMETER** measures the water vapor content of air or the humidity.



A **WEATHER BALLOON** measures weather conditions higher up in the atmosphere.



A **COMPASS** is a navigational instrument for finding directions.



WEATHER SATELLITES are used to photograph and track large-scale air movements. Then meteorologists compile and analyze the data with the help of computers.



YOUR EYES are one of the best ways to help detect the weather. Always keep an eye at the sky and you'll usually be on top of weather conditions.



Attachments

NOTES - Ecological Organization.pdf

TEXT - Water and Nitrogen Cycles.pdf

Science 7 Rock Assignment 1.docx