Unit Two: Hydrosphere

Chapter One: Intro To Hydrosphere

Water Is Everywhere

Water is one of the most common substances on Earth, it is the only substance on Earth that occurs naturally as a solid, liquid, and gas.

The Availability Of Water

Water covers approximately 71% of the Earth’s surface. Most of this water (97%) is not drinkable because it is saltwater. The majority of freshwater (3%) exists in ice caps, glaciers, and oceans. 77% of the freshwater is frozen. Of the 23% that is not frozen, approximately a half of a percent is available to supply living organisms with what they need to survive. The availability of water varies with local geography and allows humans to utilize water as a resource.

Why Is The Ocean Salty?

The ocean is salty because of dissolved chemicals eroded from the Earth's crust and washed into the sea. Solid and gaseous ejections from volcanoes, suspended particles swept to the ocean from the land by onshore winds, and materials dissolved from sediments deposited on the ocean floor have also contributed. Salinity in ocean waters is increased by evaporation or by freezing of sea ice and it is decreased as a result of rainfall, runoff, or the melting of ice.

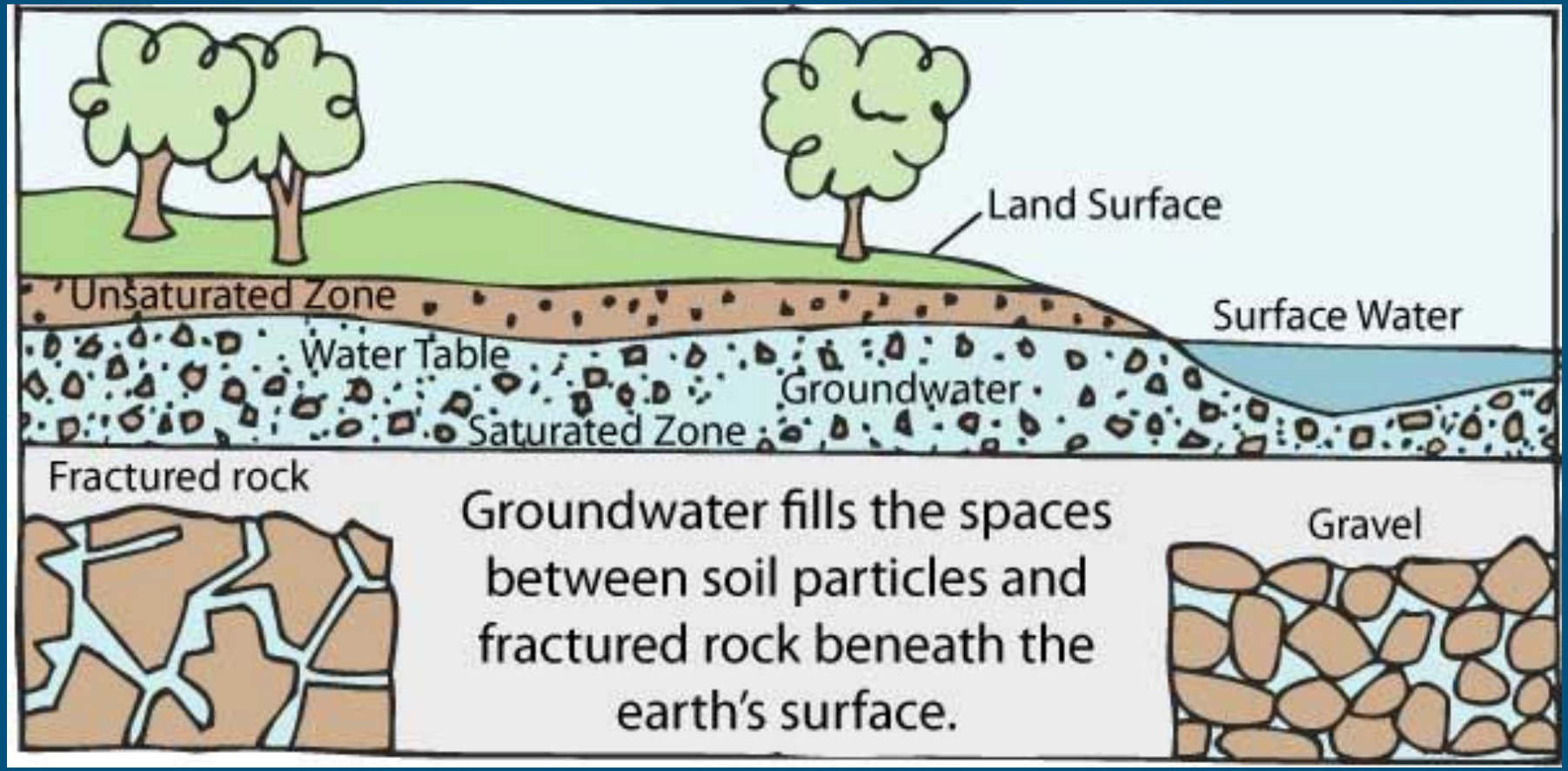
Where Is Our Freshwater?

Accessible freshwater is found in lakes, ponds, and rivers. It also is found underground in groundwater.

What Is Groundwater?

Groundwater is water that exists underground in saturated zones beneath the land surface. The upper surface of the saturated zone is called the water table.

Contrary to popular belief, groundwater does not form underground rivers. It fills the pores and fractures in underground materials such as sand, gravel, and other rock, much the same way that water fills a sponge. If groundwater flows naturally out of rock materials or if it can be removed by pumping (in useful amounts), the rock materials are called aquifers.



Groundwater Illustration

Aquifers

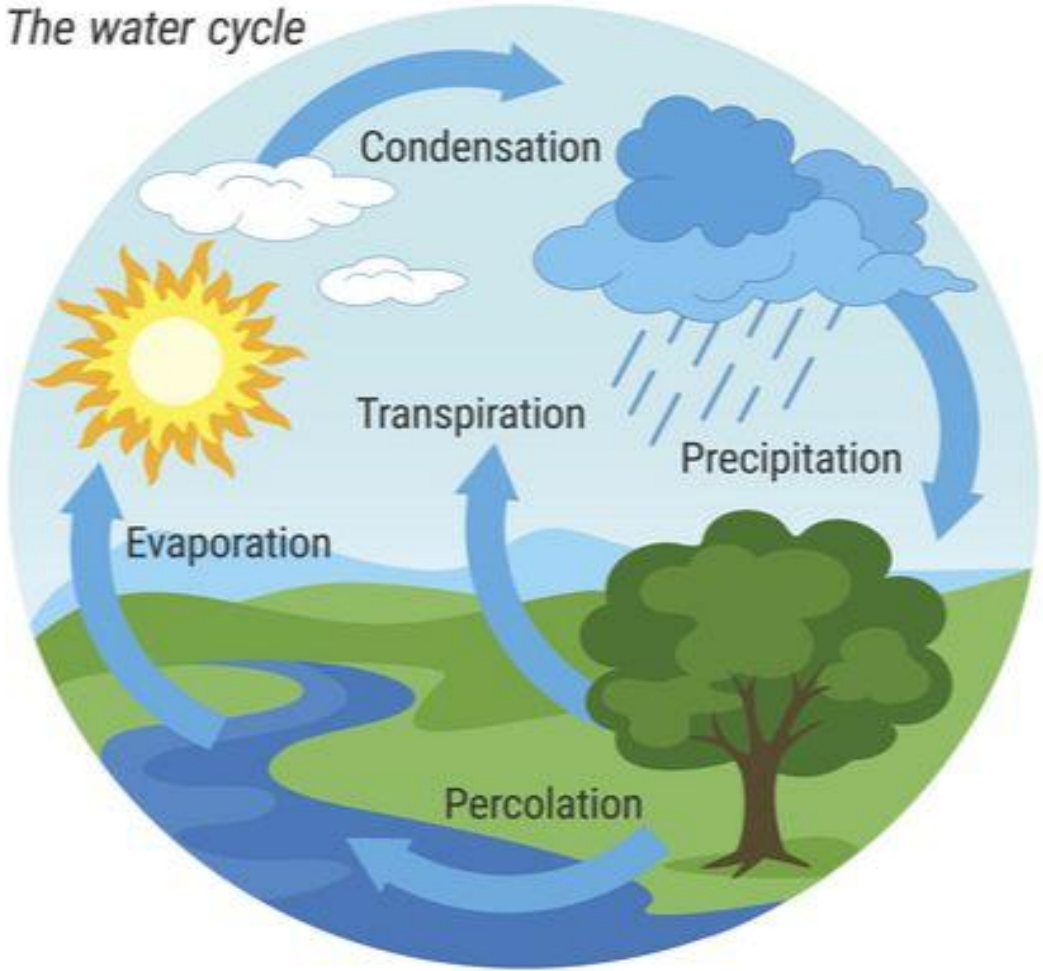
Aquifers are typically made up of gravel, sand, sandstone, or fractured rock, like limestone. Water can move through these materials because they have large connected spaces that make them permeable. The speed at which groundwater flows depends on the size of the spaces in the soil or rock and how well the spaces are connected.

Aquifers Con.

Groundwater supplies are replenished, or **recharged**, by rain and snow melt that seeps down into the cracks and crevices beneath the land's surface. In some areas of the world, people face serious water shortages because groundwater is used faster than it is naturally replenished. In other areas groundwater is polluted by human activities.

Water in aquifers is brought to the surface naturally through a spring or can be discharged into lakes and streams. Groundwater can also be extracted through a well drilled into the aquifer. A well is a pipe in the ground that fills with groundwater.

The Water Cycle


The water cycle
Condensation
Transpiration
Precipitation
Evaporation
Percolation

The Water Cycle

The water cycle is a way that water moves all around the Earth. It never stops and doesn't really have a beginning or an end. It's like a big circle. We'll describe it by starting with water that's on land.

Water On Land To Vapor

Evaporation - This is the main process by which water goes from the ground to vapor in the atmosphere. Around 90 percent of the water vapor in the atmosphere got there through evaporation. Evaporation takes place only on the water's surface. It takes energy in the form of heat. Hot water will evaporate more easily than cold water. The sun provides a lot of the energy for evaporation in the water cycle, primarily causing evaporation from the surface of the ocean.

Water On Land To Vapor Con.

Sublimation - This is when water moves directly to vapor from ice or snow without ever melting into water. Good conditions for sublimation to occur is when ice or snow is in very cold conditions, but it is windy and the sun is shining.

Transpiration - Transpiration is when plants release water on to their leaves that then evaporates into vapor. Plants will release a lot of water as they grow. Around 10 percent of the water vapor in the atmosphere is estimated to come from transpiration.

Condensation

We see water in the atmosphere in the form of clouds. There is a small amount of water even in clear skies, but clouds are where water has started to condense. Condensation is the process of water vapor becoming liquid water. Condensation is a major step in the water cycle. The atmosphere helps to move water around the world. It takes water that evaporated from the ocean and moves it over land where clouds and storms form to water plants with rain.

Precipitation

Precipitation is when water falls from the atmosphere back to land. Once enough water gathers in a cloud droplets of water will form and fall to the earth. Depending on the temperature and weather this could be rain, snow, sleet, or even hail.