

Class quiz

What do you understand by the Water Recycling process? (10 Marks)

All water is recycled and reused as a part of natural water processes such as the hydrologic cycle. This are some of the different processes that lead to movements and phase changes in water.

- i. Precipitation - Condensed water vapor that falls to the Earth's surface. Most precipitation occurs as rain, but also includes snow, hail, fog drip, graupel, and sleet.
- ii. Subduction & Mineral hydration Sea water seeps into the oceanic lithosphere through fractures and pores, and reacts with minerals in the crust and mantle to form hydrous minerals (such as serpentine) that store water in their crystal structures. Water is transported into the deep mantle via hydrous minerals in subducting slabs. During subduction, a series of minerals in these slabs such as serpentine can be stable at different pressures within the slab geotherms, and may transport significant amount of water into the Earth's interior. As plates sink and heat up, released fluids can trigger seismicity and induce melting within the subducted plate and in the overlying mantle wedge. This type of melting selectively concentrates volatiles and transports them into the overlying plate. If an eruption occurs, the cycle then returns the volatiles into the oceans and atmosphere
- iii. Canopy interception- The precipitation that is intercepted by plant foliage eventually evaporates back to the atmosphere rather than falling to the ground.
- iv. Snow melt - The runoff produced by melting snow.
- v. Runoff - The variety of ways by which water moves across the land. This includes both surface runoff and channel runoff. As it flows, the water may seep into the ground, evaporate into the air, become stored in lakes or reservoirs, or be extracted for agricultural or other human uses.
- vi. Infiltration - The flow of water from the ground surface into the ground. Once infiltrated, the water becomes soil moisture or groundwater. A recent global study using water stable isotopes, however, shows that not all soil moisture is equally available for groundwater recharge or for plant transpiration.
- vii. Subsurface flow - The flow of water underground, in the vadose zone and aquifers. Subsurface water may return to the surface (e.g., as a spring or by being pumped) or eventually seep into the oceans. Water returns to the land surface at lower elevation than where it infiltrated, under the force of gravity or gravity induced pressures. Groundwater tends to move slowly and is replenished slowly, so it can remain in aquifers for thousands of years.
- viii. Evaporation - The transformation of water from liquid to gas phases as it moves from the ground or bodies of water into the overlying atmosphere. The source of energy for evaporation is primarily solar radiation. Evaporation often implicitly includes

- transpiration from plants, though together they are specifically referred to as evapotranspiration.
- ix. Sublimation - The state change directly from solid water (snow or ice) to water vapor by passing the liquid state.
 - x. Deposition - This refers to changing of water vapor directly to ice.
 - xi. Advection - The movement of water through the atmosphere. Without advection, water that evaporated over the oceans could not precipitate over land.
 - xii. Condensation - The transformation of water vapor to liquid water droplets in the air, creating clouds and fog.
 - xiii. Transpiration - The release of water vapor from plants and soil into the air.
 - xiv. Percolation - Water flows vertically through the soil and rocks under the influence of gravity.
 - xv. Plate tectonics - Water enters the mantle via subduction of oceanic crust. Water returns to the surface via volcanism.