

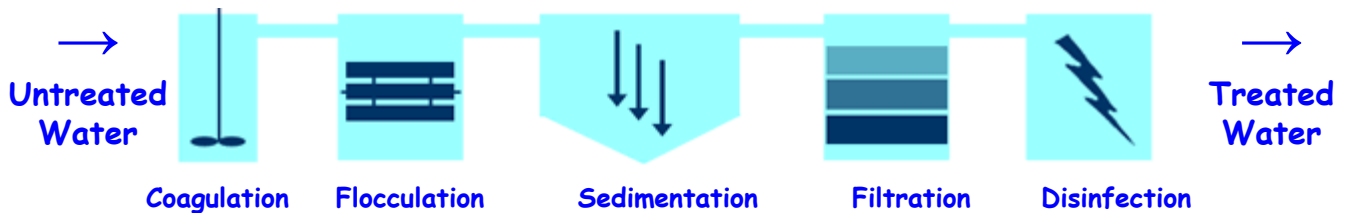
A Drinking Water Treatment Process Train

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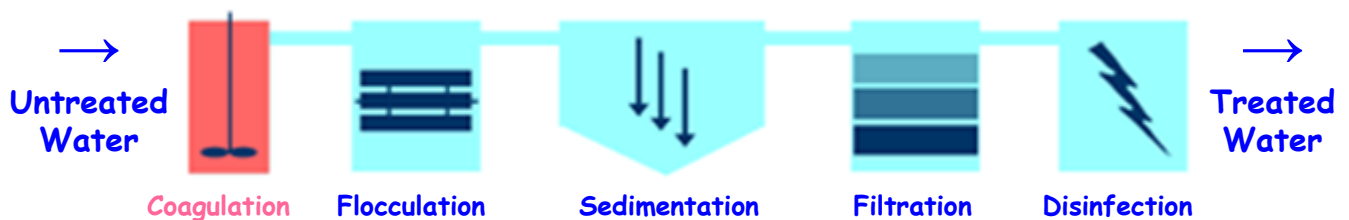
Our demonstration of a drinking water treatment process train will be held in the Environmental Process Simulation Center, a teaching facility to supplement the unit operation theory learned in class. This one-of-a-kind facility provides students with hands-on opportunities to explore bench and pilot-scale processes for water treatment, wastewater treatment and air pollution control.



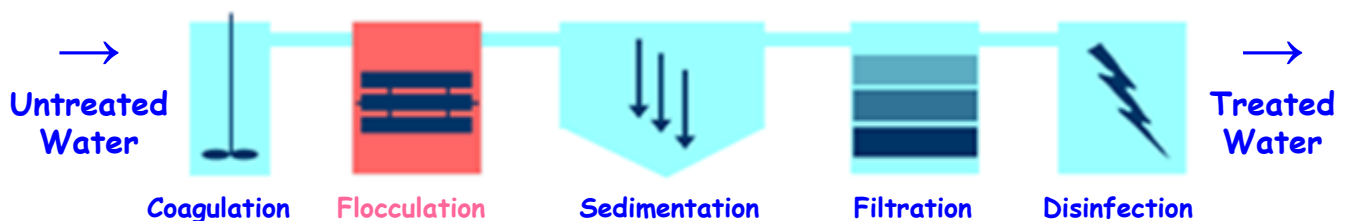
Drinking water treatment seeks to make a water supply both potable (safe) and palatable (good-tasting) by removing pathogens (disease-causing organisms) and particles (that might shield pathogens from disinfection).



This is accomplished through a process train that includes coagulation, flocculation, sedimentation, filtration and disinfection.



In coagulation, aluminum sulfate (alum) is flash-mixed with the raw water. The aluminum ions form positively-charged hydroxy-metallic complexes that neutralize the negative charges of clay particles allowing them to clump together (coagulate) into larger, more easily sedimented flocs. The complexes also encourage floc formation by bridging.

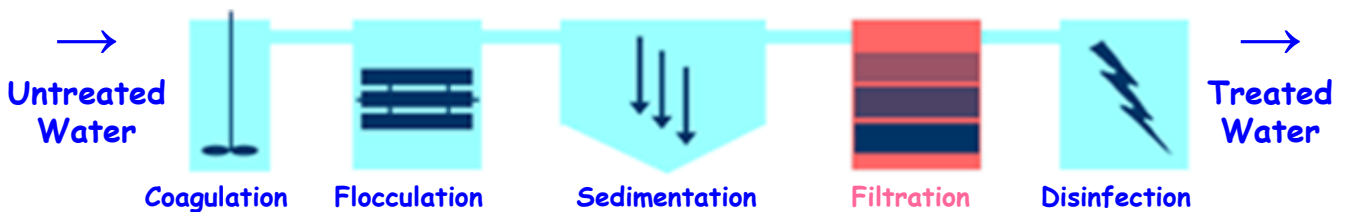


In flocculation, the water is gently mixed encouraging particle contact and building larger flocs. The mixing rate is reduced as the water moves through a series of flocculation units to avoid breaking up the large particles.

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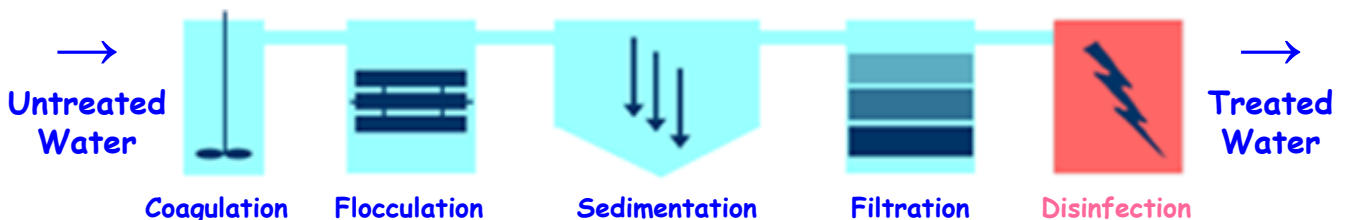
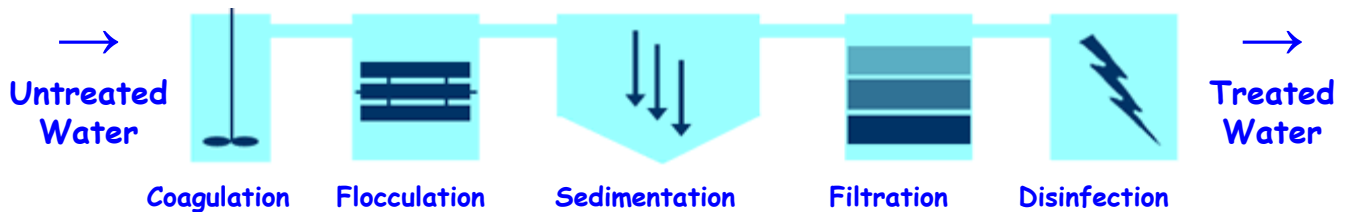
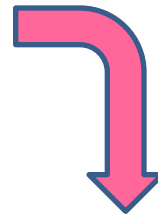


In sedimentation, particles settle to the bottom of a tank and are removed to waste. It is not efficient to remove all particles in this way because small particles settle very slowly and thus an immense sedimentation tank would be required.



The water is then passed through a rapid sand filter to remove the remaining particles. After a period of operation, the filtration apparatus becomes clogged and must be backwashed.

In this drinking water treatment demonstration, we are adding removal of organic chemicals by adsorption with granular activated carbon.



The final step prior to distribution is to insure that all pathogens have been destroyed and that residual disinfectant is present to protect the distribution system. This disinfection is typically accomplished by the addition of chlorine.