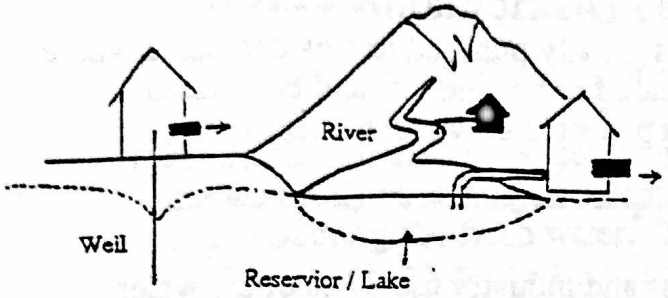
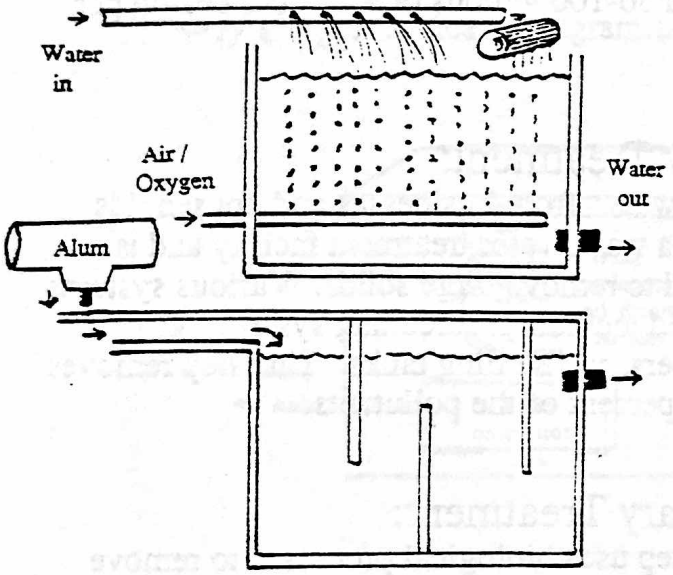
# WATER TREATMENT SYSTEMS




## Intake:

All surface water from rivers or lakes must be purified. It is initially passed through intake screens to remove large debris.

Most groundwater sources do not require extensive purification treatment The process may consist of all the steps describe below or just the disinfection step.

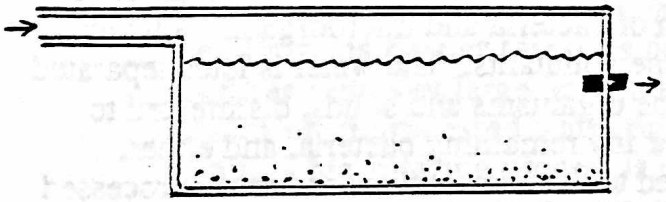



## Aeration / Mixing:

Water is mixed with air to add oxygen (additional oxygen promotes the growth of microorganisms that consume solids) and release trapped gasses. Air mixing is done by spraying water into the air, by bubbling air through the water, or by running water through water wheel turbines.

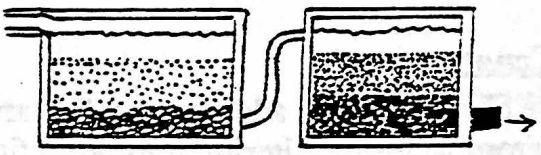
## Coagulation / Flocculation:

Chemicals, including alum, are added to the water. Dissolved alum forms a sticky substance called **floc**. Contaminants (hardness ions, dirt, etc.) in the water adhere to the floc.



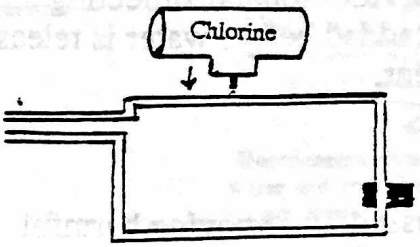
## Sedimentation:

The heavy floc particles settle to the bottom and the clear water above is drained off.



## Filtration:

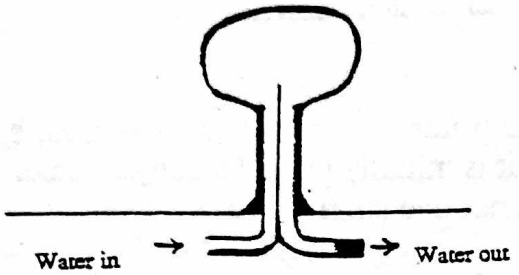
Water is passed through a series of sand and gravel filled vats to remove suspended particles.




## Disinfection:

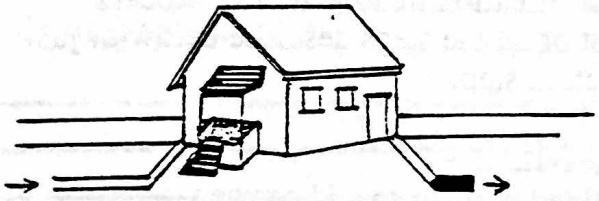
Chemicals, such as chlorine, are added to kill any bacteria or microorganisms

# WATER TREATMENT CONT.



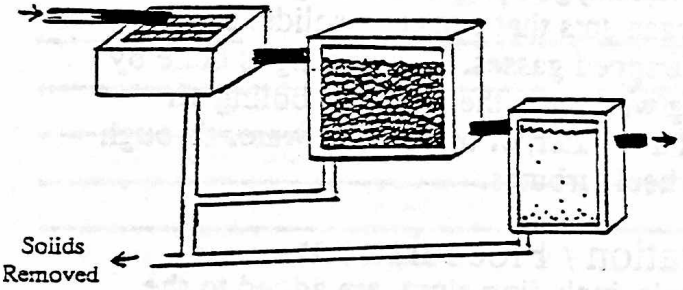

## Storage / Distribution:

Water is usually pumped to elevated tanks where it is released to households and businesses through pipes called water mains.



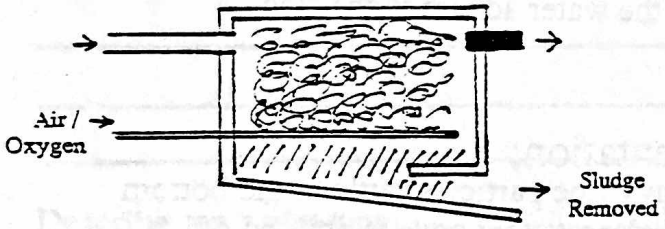
## Consumption:

Business and industry use 87 % of the water supplied to a community. Household water use averages 50-100 gallons of water per person per day.



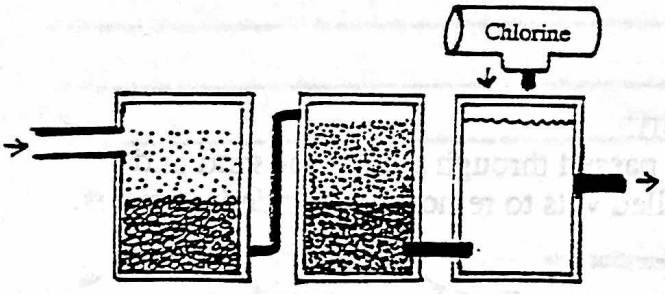

## Primary Treatment:

Wastewater from businesses and households enters a wastewater treatment facility and is filtered to remove large solids. Various systems are used including: screening systems, grit chambers, and settling tanks. This step removes 40-50 percent of the pollutants.




## Secondary Treatment:

This step uses biological processes to remove pollutants. The water is aerated to stimulate the growth of bacteria and microorganisms which consume pollutants. The water is later separated from the organisms and solids, disinfected to remove any remaining bacteria, and either, returned to the lake or river or further processed in tertiary treatment.




## Tertiary Treatment:

Man made chemicals and additional solids are removed from water by filtering it through fine sand and coal. Additional disinfecting chemicals are added before water is released to the environment.

## Sludge:

The material that is removed from wastewater is processed by removing harmful bacteria and excess water to from a product called cake. Cake is used as fertilizer or fuel.