Water Quality

 The United States has one of the safest water supplies in the world. How do we judge water quality? Water quality is commonly defined by its biological, physical, chemical, aesthetic (appearance and smell) characteristics. **Biological characteristics include** bacteria and algae. **Physical characteristics include:** temperature, turbidity and clarity, color, salinity, suspended solids, and dissolved solids. **Chemical characteristics include:** dissolved oxygen, biological oxygen demand, nutrients (including nitrogen and phosphorus), organic and inorganic compounds (including toxicants) and neutral pH of 7. **Aesthetic characteristics include:** odors, taints, color, and floating matter.

 The US Geological Survey (USGS) collects and analyzes chemical, physical, and biological properties of water, sediment and fish tissue samples from across the Nation. At selected surface-water and ground-water sites, the USGS maintains instruments that continuously record physical and chemical characteristics of the water including pH, specific conductance, temperature, dissolved oxygen, percent dissolved-oxygen saturation, air temperature, and barometric pressure. Measurements of these indicators can be used to determine, and monitor changes in, water quality, and determine whether the quality of the water is suitable for the health of the natural environment and the uses for which the water is required. To learn more about United States Water Quality refer to the US Geological Survey National Water Quality Assessment.

Steps used in a Water Treatment Plant

Aeration Coagulation Sedimentation Filtration Disinfection

Now you try it!

Supplies: 2 clear plastic cups, 1 foam cup, 1 paper towel, 1 pencil, a little gravel, sand, alum, and bleach.

1. Take a clear plastic cup and fill it with water from outside (perhaps from a puddle). This is the dirty water you want to ‘treat’ so you can use it.

2. Take a foam cup. Use a pencil to punch small holes in the bottom of the cup. Place a piece of paper towel on the inside of the cup bottom. Put one inch of gravel in the cup. Cover the gravel with one inch of sand. This will be your ‘filter’.

3. Pour the water from one clear cup to the other clear cup 3 times. This is **aeration.**

4. Add ½ teaspoon alum to the clear cup holding the water. The alum will bind to the dirt. This is **coagulation**. The alum and dirt will form a layer on the bottom of the cup. This is **sedimentation**.

5. Place the empty clear cup underneath the form cup. Pour the water into the form cup. This is **filtration**. The water that comes through is free of dirt.

6. **Disinfection** will kill bacteria and micro-organisms. Add 2 drops of bleach to the clear cup of water.

7. You have completed the steps used at the water treatment plant. Use the treated water to wash your hands.