

# WATER TREATMENT

## Objective:

To provide an understanding of water treatment. Provide a general understanding of the sources of water and the unit processes used for treatment. Discuss water transportation from the treatment plant to the household. Discuss the regional water treatment systems in Hampton Roads. (4 hours)

- I Water Treatment Job Opportunities
  - A. Pay
  - B. Job requirements
  - C. License requirements
  - D. Types of jobs
  
- II Local Public Water Systems
  - A. Regionally who has plants
  - B. How plants fit in within the organization of cities
  
- III Why Treat Water?
  - A. History of waterborne diseases
  - B. Introduction of chlorination
  - C. Current drinking water standards
  - D. Future trends
  
- IV Water Sources
  - A. Groundwater sources
  - B. Surface water sources
  - C. Watershed management
  
- V Water Treatment
  - A. Coagulation and flocculation
  - B. Sedimentation and clarification process
  - C. Filtration
  - D. Water softening
  - E. Oxidation
  - F. Iron and manganese removal
  - G. Membrane treatment
  - H. Activated carbon treatment
  - I. Ion exchange

- J. Disinfection
- K. Fluoridation
  
- VI Distribution Systems
  - A. System design and capacity
  - B. Storage systems
  - C. Pumping systems
  - D. Corrosion control
  - E. Water quality control
  
- VII Residuals Management
  - A. Thickening and dewatering
  - B. Characterization of residuals
  - C. Current applications
  
- VIII Economic and Financial Issues
  - A. Economic evaluation of alternatives
  - B. Funding sources
  - C. Rate structures
  
- IX Review
  - A. Questions and Answers
  - B. Written Test

# Water Treatment Quiz

Name \_\_\_\_\_

Date \_\_\_\_\_

Circle the correct answers

1. The most important purpose of water treatment is to:
  - a. Make water useful for industrial purposes
  - b. Protection of human health
  - c. Appearance purposes
  - d. So it can be used in swimming pools
  
2. pH is used as:
  - a. A measure of water clarity
  - b. A measure of electro-conductivity
  - c. A measure of acidity
  - d. A method to measure the amount of odor in water
  
3. The water source for conventional water treatment is typically:
  - a. Salt water
  - b. Brackish water
  - c. Freshwater surface waters (rivers and lakes)
  - d. Groundwater (wells)
  - e. Polar ice water
  
4. Which is not a process used to disinfect water:
  - a. Chlorine addition
  - b. Ozone
  - c. Chloramines
  - d. Lime addition
  
5. To become a certified Waterworks Operator in Virginia, one must:
  - a. Have a college degree in some field of science
  - b. Have worked at a water treatment plant for at least 6 years
  - c. Have passed a state certification examination
  - d. Have a strong background in environmental issues
  - e. Be able to drink at least two 8 oz glasses of water within ten minutes

## Water Treatment Quiz (answer sheet)

Name \_\_\_\_\_

Date \_\_\_\_\_

Circle the correct answers

1. The most important purpose of water treatment is to:
  - a. Make water useful for industrial purposes
  - b. Protection of human health
  - c. Appearance purposes
  - d. So it can be used in swimming pools
  
2. pH is used as:
  - a. A measure of water clarity
  - b. A measure of electro-conductivity
  - c. A measure of acidity
  - d. A method to measure the amount of odor in water
  
3. The water source for conventional water treatment is typically:
  - a. Salt water
  - b. Brackish water
  - c. Freshwater surface waters (rivers and lakes)
  - d. Groundwater (wells)
  - e. Polar ice water
  
4. Which is not a process used to disinfect water:
  - a. Chlorine addition
  - b. Ozone
  - c. Chloramines
  - d. Lime addition
  
5. To become a certified Waterworks Operator in Virginia, one must:
  - a. Have a college degree in some field of science
  - b. Have worked at a water treatment plant for at least 6 years
  - c. Have passed a state certification examination
  - d. Have a strong background in environmental issues
  - e. Be able to drink at least two 8 oz glasses of water within ten minutes