



Water Treatment Exam Review - Grade 1 Course Syllabus

Support

Students can contact our student support staff with any course-related, content-related or technology-related inquiries.

Our office hours are Monday-Thursday, 9 to 5 PST, and Friday 9-12 PST.

Contact Info

Phone Number: (661) 874-1655

General Course Inquiries: Info@americanwatercollege.org

Purpose

This course is designed to prepare you for your entry level water treatment operator exam.

Topics

Basic Water Math

Unit Conversions

Working with Formulas

Understanding Percentages

Calculating Area

Calculating Volume

Weight Volume Relationships

Force-Pressure-Head

Velocity and Flow Rate

Pumps

The Metric System

Problem Solving

Math and Treatment Review

Flow Problems

Chemical Dose Problems

Source Water Review

Reservoirs Review

Reservoirs Problems

Disinfection Review

Disinfection Problems

Laboratory Problems

Regulations Review

CEUs (Contact Hours)

Upon completion of this course you will receive a certificate for 2.7 CEUs (27 contact hours).

Completion Requirements

In order to receive [IACET CEU](#) credit for this course, you must complete the following:

- Complete each individual lesson module by watching the video lecture, completing the lesson handout, and passing the lesson quiz. A score of 70% or higher is required to pass each quiz.
- Complete and pass the practice certification exams (Test A and Test B).
- Complete and pass the additional certification style math problems quiz.
- Spend time reviewing the course flashcards.

Once you have completed all of these elements, your course completion certificate will be automatically placed into your learning account for printing/downloading. It will remain in your learning account even after your course access has expired.



Learning Objectives

Unit Conversions

Upon completion of this lesson the student will be able to:

- Define what a unit is.
- Define what an equivalent is.
- Demonstrate how units and equivalents are used to solve math problems.

Working with Formulas

Upon completion of this lesson the student will be able to:

- Define what a formula is
- Demonstrate how a formula is used.
- Demonstrate how formulas are rearranged
- Demonstrate how to solve math problems using formulas.

Understanding Percentages

Upon completion of this lesson the student will be able to:

- Demonstrate how to convert between fractions and percentages.
- Demonstrate how to convert between decimals and percentages.

Calculating Area

Upon completion of this lesson the student will be able to:

- Demonstrate how to solve for the area of a square
- Demonstrate how to solve for the area of a rectangle
- Demonstrate how to solve for the area of a circle
- Demonstrate how to solve for the area of a triangle

Calculating Volume

Upon completion of this lesson the student will be able to:

- Demonstrate how to solve for the volume of a cube
- Demonstrate how to solve for the volume of a cylinder
- Demonstrate how to solve for the volume of a cone
- Demonstrate how to solve for the volume of a sphere



Weight/Volume Relationships

Upon completion of this lesson the student will be able to:

- Recall how many pounds one gallon of water weighs
- Recall how many gallons are in one cubic foot
- Recall how many pounds one cubic foot of water weighs
- Recall how many liters are in one gallon
- Recall how many pounds are in one kilogram
- Discuss and demonstrate how these weight and volume relationships are used to solve math problems.

Force-Pressure-Head

Upon completion of this lesson the student will be able to:

- Define force
- Define pressure
- Define water head
- Recall how many psi (pounds per square inch) is one foot of water head
- Discuss and demonstrate how to solve math problems involving force-pressure-head calculations

Velocity and Flow Rate

Upon completion of this lesson the student will be able to:

- Define velocity
- Demonstrate how velocity is calculated
- Define flow rate
- Demonstrate how flow rate is calculated

Pumps

Upon completion of this lesson the student will be able to:

- Define horse power
- Define water horse power
- Define break horse power
- Define motor horse power
- Discuss and demonstrate how to solve pump math problems involving horse power.



The Metric System

Upon completion of this lesson the student will be able to:

- Define what metric system units
- Demonstrate how to convert between weight and volume measurements in the metric system.
- Demonstrate how to convert between metric units and standard units.

Problem Solving

Upon completion of this lesson the student will be able to:

- Define the five steps to problem solving
- Determine if all five steps are needed to solve a specific problem
- Explain how the five steps work
- Apply the five step problem solving method to water math problems

Flow Problems

Upon completion of this lesson the student will be able to:

- Recall the conversion factor between MGD (million gallons per day) and gpm (gallons per minute).
- Demonstrate how to calculate problems using the MGD to gpm conversion factors
- Recall the conversion factor between MGD and CFS (Cubic Feet Per Second)
- Demonstrate how to calculate problems using the MGD to CFS conversion factors.

Chemical Dose Problems

Upon completion of this lesson the student will be able to:

- Describe what units are used in Polymer and Alum Dosing
- Describe what units are used in chemical feed pump calibrations and settings
- Explain the jar testing process
- Demonstrate how to calculate jar testing problems
- Explain chemical feed system calibrations
- Demonstrate how to calculate chemical feed calibration problems
- Demonstrate how to calculate feed pump settings in percent stroke
- Demonstrate how to calculate chlorinator settings



Reservoir Problems

Upon completion of this lesson the student will be able to:

- Describe what units are used in calculating the storage volume of a reservoir
- Demonstrate how to calculate reservoir storage volume problems
- Describe what units are used in calculating copper sulfate chemical dose problems
- Demonstrate how to calculate copper sulfate dosing problems

Disinfection Problems

Upon completion of this lesson the student will be able to:

- Define what units and formulas are used in disinfection problems
- Demonstrate how to solve chlorine dose problems
- Demonstrate how to solve chlorine demand problems
- Demonstrate how to solve chlorine usage problems
- Demonstrate how to solve hypochlorinator flow rate problems
- Demonstrate how to solve hypochlorite solution strength problems
- Demonstrate how to solve hypochlorite dilution problems
- Demonstrate how to solve average pounds per day problems
- Demonstrate how to calculate chlorine supply in days

Laboratory Problems

Upon completion of this lesson the student will be able to:

- Define what units and formulas are used in laboratory problems
- Demonstrate how to solve temperature conversions between Fahrenheit to Celsius
- Demonstrate how to solve for the mean and median values of a data set
- Demonstrate how to solve removal efficiency

Source Water Review

Upon completion of this lesson the student will be able to:

- Define source water vocabulary
- Discuss proper water source evaluation
- Recall the different types of source water contaminants
- Explain the hydrologic cycle
- Distinguish the different types of public water systems
- Describe the main objectives of water treatment
- Formulate solutions to water quality problems



Reservoirs Review

Upon completion of this lesson the student will be able to:

- Define reservoir vocabulary
- Discuss stratification in reservoirs
- Relate problems with anaerobic conditions
- Discuss potential problems algae can cause
- Apply algae control techniques using copper sulfate

Disinfection Review

Upon completion of this lesson the student will be able to:

- Define disinfection vocabulary
- Recall the factors influencing disinfection
- Describe the agents of disinfection
- Identify the properties of chlorine gas
- Describe the relationship between pH and chlorine species
- Describe breakpoint chlorination
- Discuss the pros and cons of alternative disinfectants
- Relate chlorine safety principles

Regulations Review

Upon completion of this lesson the student will be able to:

- Define regulation vocabulary
- Describe and identify each of the following rules/regulations
 1. Safe Drinking Water Act (SDWA)
 2. Surface Water Treatment Rule (SWTR)
 3. Total Coliform Rule (TCR)
 4. Lead and Copper Rule (LCR)
 5. Stage 1 Disinfection by Product Rule (DBP)
 6. Interim Enhanced Surface Water Treatment Rule (IESWTR)
 7. Long Term 2 Surface Water Treatment Rule (LT2SWTR)
 8. Stage 2 Disinfection by Products Rule (DBP)