

OPERATOR BASICS TRAINING SERIES NATIONAL VERSION 2005  
GROUND WATER SYSTEMS COURSE ACTIVITY DATA

Activity Location / Title	Type	Time
<b>1.1 - What Is A Public Water Supply System?</b>		
Characteristics Of A Public Water System	Illustration	:30
Classification Of Public Water Supply Systems	True/False	2:00
Water "Fit For Human Consumption"	Check All That Apply	1:00
<b>1.1.1 - Purpose Of Public Water Supply Systems</b>		
Compare Acute And Chronic Health Effects	Drag and Drop	1:00
Ethical And Legal Obligations	True/False	:15
<b>1.1.2 - Types Of Public Water Supply Systems</b>		
Categories Of Public Water Supply Systems	Multiple Choice	2:00
<b>1.2 - Operator Certification Program</b>		
Identify Certified Operator Responsibilities	Shooting Gallery	1:30
<b>1.2.1 - Operator Certification Requirements</b>		
What Is Needed To Become A Certified Operator And Maintain Certification?	Drag and Drop	1:30
<b>1.2.2 - Operator Need For Continuing Education</b>		
Collect Credits From Appropriate Sources To Maintain Certification	Check All That Apply	:45
<b>2.1 - The Hydrologic Cycle</b>		
Hydrologic Cycle	Illustration	:45
<b>2.2 - Types Of Aquifers</b>		
Identify Aquifer Types And Characteristics	Multiple Choice	2:30
Identify Zones Of Saturation	Drag and Drop	1:00
<b>2.3 - Ground Water Movement</b>		
Aquifer Characteristics Quiz	Drag and Drop	1:30
Calculate The Direction Of Ground Water Flow	Illustration	:45
Calculate A Hydraulic Gradient	Illustration/Quiz	1:30
<b>2.3.1 - Well Pumping</b>		
Identify Effects Of Well Pumping	Quiz	1:30
Compare The Effects Of Competing Wells	Illustration	1:00
Calculate Pumping Level Drawdown	Quiz	:30
<b>2.3.2 - Recharge Of Aquifers</b>		
Identify Recharge Areas	Quiz	1:00
Receiving Streams Vs. Losing Streams	Illustration	:30

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<b>2.4 - Brief Chemistry Of Water</b>		
Mineral Content In Groundwater	Quiz/Illustration	1:30
Chemical And Physical Characteristics Of Water	Drag and Drop	2:30
<b>2.5 - Types Of Ground Water Sources</b>		
Overview Of Ground Water Collection Devices	Illustration	3:00
<b>2.5.1 - What Is GWUDISW?</b>		
Natural Filtration Of Pathogens	Illustration	:30
What Is Done In A Microscopic Particulate Analysis	Quiz	1:00
<b>2.6 - Ground Water Contamination</b>		
Sources Of Contamination	Illustration	2:30
How Can A Well Become A Contamination Source?	Quiz	:30
Landfill Leachate Contamination	Illustration	1:00
What Are The Possible Results Of Ground Water Contamination?	Shooting Gallery	1:30
<b>2.6.1 - Biological Contaminants</b>		
What Is An Indicator Organism And Why Would It Be Used?	Multiple Choice	1:00
Pathogen Quiz	Quiz	1:30
<b>2.6.2 - Chemical Contaminants</b>		
Identify The Contaminants That Are Organic Compounds	Check All That Apply	:45
Contamination To Guard Against	Illustration	1:30
Identify Chemical Substances Found Naturally In Rocks And Soils	Shooting Gallery	1:30
Identify Adverse Health Effects Due To Chemical Contamination	Check All That Apply	1:15
<b>2.6.3 - Radiological Contaminants</b>		
What Can Be Done To Solve Radiological Contamination Of A Public Water Supply?	Check All That Apply	:45
<b>2.7 - Source Water Protection</b>		
What Is The Multiple Barrier Concept?	Illustration	1:30
<b>3.1 - Overview of Disinfection</b>		
What Is Indicated By A Positive Coliform Test?	Check All That Apply	:30
Distribution System Contamination Risks	Illustration	1:15
What Is The Difference Between Disinfection And Sterilization?	Multiple Choice	1:00
Identify Prominent Waterborne Diseases	Check All That Apply	2:30
Factors That Influence The Effectiveness Of Chlorine	True/False	4:00

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<b>3.2 - Chlorination</b>		
Why Is Chlorine The Most Commonly Used Disinfectant In Drinking Water?	Check All That Apply	1:00
“Breakpoint Chlorination” Experiment	Hot Spot	2:30
Use The (DPD) Colorimeter Test Method To Determine Chlorine Residuals	Multiple Choice	1:30
How Much Chlorine Is Enough?	Multiple Choice	1:30
What Is The Significance Of “Free Available Chlorine”?	True/False	:30
<b>3.2.1 - Forms Of Chlorine</b>		
Identify Characteristics Of Chlorine As A Gas, A Liquid And A Solid	Multiple Choice	5:00
<b>3.2.2 - Full-Time Chlorination</b>		
How Does A Basic Gas Chlorination System Work?	Illustration	1:00
Take The Full-Time Chlorination Quiz	Check All That Apply	:30
<b>3.2.3 - Periodic Or Emergency Chlorination</b>		
Discharge Of Chlorinated Water	Check All That Apply	:45
Iron Bacteria	Shooting Gallery	1:15
<b>3.2.4 - Substituting Hypochlorite for Gas Chlorine</b>		
Recalculating Chlorine Amounts	Multiple Choice	5:00
<b>3.2.5 - Gas Chlorine</b>		
Take The Chlorine Safety Quiz	True/False	4:15
What Special Design Features Are Required For Chlorine Rooms?	Illustration	:45
<b>3.3 - Ultra Violet Light (UV)</b>		
Ultraviolet Light Quiz	True/False	3:15
<b>3.4 - Other Disinfectants</b>		
Overview Of Alternative Disinfection Systems	Illustration	1:30
<b>3.4.1 - Ozone</b>		
Ozone Quiz	True/False	1:00
<b>3.4.2 - Mixed Oxidants</b>		
Mixed Oxidant Quiz	True/False	1:00
<b>3.4.3 - Chlorine Dioxide</b>		
Chlorine Dioxide Quiz	Multiple Choice	1:00
<b>3.5 - Treatment For Chemical/Physical Contaminants</b>		
Overview Of Common Contaminants	Illustration	4:00

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<b>3.5.1 - Nitrate And Nitrite</b>		
Nitrate Quiz	Multiple Choice	1:00
<b>3.5.2 - Iron And Manganese</b>		
Iron And Manganese Quiz	Multiple Choice	1:00
<b>3.5.3 - Taste And Odor</b>		
Taste And Odor Quiz	Multiple Choice	1:00
<b>3.5.4 - Sulfate And Sulfide</b>		
Sulfate And Sulfide Quiz	Multiple Choice	1:00
<b>3.5.5 - Fluoride</b>		
Fluoride Quiz	Multiple Choice	1:00
<b>3.5.6 - Sand And Sediment</b>		
Sand And Sediment Quiz	Multiple Choice	:30
<b>3.5.7 - Corrosivity</b>		
Corrosivity Quiz	Multiple Choice	1:00
<b>3.5.8 - Hardness</b>		
Hardness Quiz	Multiple Choice	1:00
<b>4.1 - System Components</b>		
Basic Water Distribution System Components	Illustration	:30
Unaccounted-For Water In A Distribution System	Multiple Choice	1:00
<b>4.1.1 - Piping</b>		
Characteristics Of Water Supply Piping	Illustration	1:00
Pipe Materials	Matching	1:00
<b>4.1.2 - Valves</b>		
Distribution System Valve Operation	Illustration	2:00
Cause Of Water Hammer	Multiple Choice	:45
Valve Maintenance	Check All That Apply	:30
<b>4.1.3 - Fire Hydrants</b>		
Hydrant Basics	Hot Spot	1:15
Hydrant Maintenance	Check All That Apply	1:00
The Flushing Program	Shooting Gallery	1:15
<b>4.1.4 - Storage Reservoirs</b>		
Maintenance Of Large Storage Tanks	True/False	2:00
Hydropneumatic Tanks Vs. Large Water Storage Tanks	Drag & Drop	1:15
Protecting Stored Water From Contamination	Check All That Apply	:45
<b>4.1.5 - Booster Stations</b>		
Basics Of The Booster Station	Shooting Gallery	1:00
<b>4.2 - System Pressure And Basic Hydraulics</b>		
Water Behavior In The Distribution System	Check All That Apply	1:00

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<b>4.2.1 - System Pressure</b>		
Distribution System Water Pressure	Illustration	:45
Pressure Readings In The System	Matching	1:00
<b>4.2.2 - Hydraulics</b>		
Flow In A Pipe	True/False	1:45
Pressure Within A Tank Of Water	Drag & Drop	1:00
Information From The Meter	Matching	1:00
The Weight Of Water	Multiple Choice	:45
Conversion Of Flow Units	Multiple Choice	1:00
<b>4.3 - Construction and Repair</b>		
New Water Line Construction	Multiple Choice	2:00
<b>4.3.1 - Minimum Separation Distances</b>		
Pipe Placement	Shooting Gallery	1:15
<b>4.3.2 - Looped Systems And Dead End Mains</b>		
Dead End Water Lines	Hot Spot	:30
Layout Of Water Lines	Hot Spot	:30
<b>4.3.3 - Preventing Contamination</b>		
Procedures For Disinfection	Illustration	3:30
Prevention Of Contamination During Construction And Repair	Check All That Apply	1:00
<b>4.3.4 - System Repairs</b>		
How A Repaired System Is Put Back Online	Ordered List	1:00
Making Repairs To The Distribution System	Check All That Apply	:45
<b>4.3.5 - Distribution System Recordkeeping</b>		
Reasons For Water Systems To Keep Records	Shooting Gallery	1:15
Types Of Records To Keep	Check All That Apply	:45
<b>4.4 - Cross Connections And Backflow Defined</b>		
Examples Of Small System Cross-Connections	Illustration	2:00
Cross-Connection Definitions	Matching	1:15
Back-Pressure, Backflow And Back-Siphonage	Drag & Drop	1:30
<b>4.4.1 - Public Health Significance</b>		
Public Health Implications	Check All That Apply	1:00
Backflow Event Degree Of Hazard	Hot Spot	1:15
Backflow Events	Shooting Gallery	1:00
<b>4.4.2 - Types Of Cross-Connection Control</b>		
Distinguishing Between Containment And Isolation	Drag & Drop	1:15

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<b>4.5 - Backflow Preventers</b>		
Cross-Connection Prevention Devices	Simulation	2:45
Specialty Valve Roles	Check All That Apply	1:00
<b>4.5.1 - Air Gap</b>		
Identification Of Air Gaps	Hot Spots	1:15
<b>4.5.2 - Atmospheric / Hose Bibb Vacuum Breakers</b>		
AVB At Work	Illustration	1:00
Atmospheric Vacuum Breaker Basics	Check All That Apply	1:15
<b>4.5.3 - Pressure Vacuum Breaker Assembly</b>		
How A PVB Works	Illustration	1:00
PVB Basics	Shooting Gallery	1:00
<b>4.5.4 - Double Check Valve Assembly</b>		
How A Double Check Valve Works	Illustration	:45
Double Check Valve Basics	Hot Spot	1:15
<b>4.5.5 - Reduced Pressure Principle Assembly</b>		
Functioning Of The RP	Illustration	1:00
Basics Of The Reduced Pressure Principle Assembly	True/False	1:15
<b>4.5.6 - Installation And Servicing</b>		
General Installation Requirements	Check All That Apply	:45
Providing For Thermal Expansion	Hot Spot	:45
Inspection And Testing	True/False	1:15
<b>4.6 - Cross-Connection Control Plans</b>		
Elements Of The Cross-Connection Plan	Check All That Apply	1:00
Managing And Reporting Backflow Events	Illustration	1:00
<b>5.1 - Water Rights And Well Log Reports</b>		
Interpret Well Log Data	Multiple Choice	2:00
How Do Water Rights Apply To Ground Water Systems?	Shooting Gallery	1:00
What Information Is Included In A Well Log Report?	Illustration	1:00
<b>5.2 - Well Construction</b>		
Well Construction Basics	Illustration	1:30
<b>5.2.1 - Well Construction Methods</b>		
Common Methods Used To Construct A Well	Illustration	3:00
What Are Good Reasons For Replacing An Old Dug Well?	Check All That Apply	1:00

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<b>5.2.2 - Casing Type And Size</b>		
Minimum Design Standards For Well Casings	Multiple Choice	1:15
Casing Basics	Shooting Gallery	1:00
<b>5.2.3 - Perforated Interval And Screens</b>		
Why Perforate The Well Casing?	Multiple Choice	1:00
When Is A Well Screen Needed?	Hot Spot	1:00
<b>5.2.4 - Grouting And Sealing</b>		
Grouting Procedure For Public Wells	Illustration	1:30
<b>5.2.5 - Test Pumping</b>		
What Is The Reason For Test Pumping A Well?	Check All That Apply	1:00
Well Production Terms And Concepts	Illustration	1:30
<b>5.2.6 - Adapters, Caps, Seals And Vents</b>		
Pitless Adapter Parts Identification	Hot Spot	2:30
Why Must Wells Be Vented?	Check All That Apply	1:00
<b>5.3 - Site Considerations</b>		
Identify Well Location Specifications	Hot Spot	2:30
Well Setback Criteria	True/False	1:00
<b>5.3.1 - Drainage Around The Wellhead</b>		
Wellhead Drainage	True/False	1:00
<b>5.3.2 - Well Pits</b>		
Identify Problems Associated With Well Pits	Check All That Apply	1:30
<b>5.3.3 - Pump Power Cable Installation</b>		
What To Watch For In Cable Conduit Installations	Illustration	1:00
<b>5.3.4 - Yard Hydrants And Sample Taps</b>		
What Is The Main Purpose Of The Sample Tap	Multiple Choice	1:00
Potential For Contamination By Improper Yard Hydrant Installations	Illustration	2:00
<b>5.3.5 - Artesian Wells</b>		
Artesian Well Site Considerations	Hot Spot	2:30
<b>5.3.6 - Well Abandonment</b>		
Identify Conditions That May Require A Well To Be Abandoned	Check All That Apply	1:00
<b>5.4 - Well Pumps And Components</b>		
How A Well Pump System Works	Illustration	3:00
Identify Submersible Pump Components	Hot Spot	1:30
Identify Pump Characteristics	Matching	1:00
The Process Of Selecting A Pump	Illustration	1:30
<b>5.4.1 - Plumbing A Pump Station</b>		
Eliminate Galvanic Corrosion By Choosing Compatible Materials	Drag & Drop	2:30

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<b>5.4.2 - Electrical Safety</b>		
What Is The Correct Procedure Used To “Lock Out” Electrical Equipment?	Illustration	3:30
Identify Unsafe Conditions	True/False	1:00
<b>5.4.3 - Pressure Tanks</b>		
How A Pressure Tank Works	Illustration	2:00
<b>5.5 - Well And Pump Maintenance</b>		
Why Is It Important To Keep Well Records?	Check All That Apply	:45
<b>5.5.1 - Routine Maintenance</b>		
Routine Well And Pump Maintenance	Illustration	1:30
<b>5.5.2 - Troubleshooting Declining Yield</b>		
How To Troubleshoot Declining Yield	Illustration	1:30
Ways To Measure The Water Level In A Well	True/False	2:30
Elements Of The Preventive Maintenance Plan	Matching	1:30
<b>6.1 - Laws and Regulations</b>		
What Is System Capacity?	Check All That Apply	:30
What Is The Safe Drinking Water Act (SDWA)?	Check All That Apply	:45
Define The Concept Of Primacy	Multiple Choice	1:15
<b>6.2 - Types Of Drinking Water Regulations</b>		
What Is A Maximum Contaminant Level Goal?	True/False	:45
What Is The Primary Purpose Of Public Water System Regulations?	Multiple Choice	1:00
Multiple Barrier Concept For Ground Water Systems	Multiple Choice	3:30
<b>6.3 - Plan / Specification Review And Approval</b>		
Which Plans Must Receive Approval Prior To Construction?	Drag & Drop	1:00
<b>6.4 - Monitoring And Reporting</b>		
Monitoring: Who Does What?	True/False	1:15
<b>6.4.1 - Microbiological Quality</b>		
Indicator Organisms	Matching	1:15
Total And Fecal Coliform Bacteria	Drag & Drop	1:15
Routine, Repeat, And Special Samples	Shooting Gallery	1:15
What Is Included In A Sample Site Plan?	Check All That Apply	1:00

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<b>6.4.2 - Chemical Contaminants</b>		
Responsibility For Lab Test Results	True/False	:30
Organic And Inorganic Chemicals	Check All That Apply	1:00
Health Effects Of Chemical Contamination	True/False	1:30
<b>6.4.3 - Disinfectants And Disinfection Byproducts</b>		
Define “Point Of Application” And “Distribution System Residual”	Check All That Apply	1:15
<b>6.4.4 - Fluoridation</b>		
What Is The Regulatory Philosophy Concerning Fluoride?	Multiple Choice	:30
What Fluoride Level Is Considered To Be Optimal?	Hot Spot	:45
<b>6.4.5 - Lead And Copper / Corrosion Control</b>		
Identify Health Effects Caused By Lead And Copper Consumption	Drag & Drop	:45
<b>6.4.6 - Secondary Contaminants And Concerns</b>		
What Is A Sequestering Agent?	Multiple Choice	:30
Health Concerns Vs. Aesthetic Concerns	Drag & Drop	:45
<b>6.4.7 - Professional Water Haulers For Cisterns</b>		
Regulations For Commercial Water Haulers	Multiple Choice	:30
<b>6.5 - The Sanitary Survey</b>		
Preparing For A Sanitary Survey	Illustration	9:00
Points Classification System	Simulation	6:45
<b>6.6 - Public Notification</b>		
What Is The Primary Purpose Of Public Notification?	Multiple Choice	1:15
In What Circumstances Is Public Notification Required?	Check All That Apply	:30
<b>6.7 - Future Regulations</b>		
New Requirements For The Small System	Check All That Apply	:45
<b>7.1 - Elements Of A Safety Program</b>		
Common Water System Safety Hazards	Illustration	1:30
Risks Of Injuries To Water System Workers	Multiple Choice	2:00
<b>7.1.1 - Electrical Safety</b>		
Identifying Electrical Hazards	Hot Spot	1:45
Safety Precautions To Use Around Electrical Equipment	True/False	2:15

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<b>7.1.2 - Chemical Safety</b>		
What Information Do You Get In An MSDS?	Illustration	4:00
What Do You Do If Corrosive Chemicals Get On Your Clothing?	True/False	1:00
Acids, Bases and Water	Drag & Drop	1:30
<b>7.1.3 - Chemical Storage Issues</b>		
Define Compatibility and Containment	Matching	1:00
The Do's And Don'ts Of Storing Flammable Chemicals	True/False	1:45
<b>7.1.4 - Chlorine Safety</b>		
Chlorine Safety Issues	True/False	1:00
<b>7.1.5 - Traffic Control Clothing</b>		
Traffic Safety	Illustration	1:00
<b>7.1.6 - Shoring And Trenching</b>		
Know What You're Getting Into	Illustration	:30
Shoring And Trenching	Check All That Apply	1:00
<b>7.1.7 - Confined Spaces</b>		
Test Your Knowledge Of Confined Spaces	True/False	1:45
Gases In Confined Spaces	Check All That Apply	:45
Safety Procedures	Check All That Apply	1:00
<b>7.1.8 - Fire Safety</b>		
What Type Of Fire Extinguisher Should Be Used?	Matching	1:30
<b>7.1.9 - First Aid</b>		
What's In A Red Cross First Aid Kit?	Illustration	:45
<b>7.1.10 - Personal Hygiene And Protective Clothing</b>		
Protective Equipment And Clothing	Check All That Apply	:45
<b>7.2 - Identification Of Possible Disruption Threats</b>		
Examples Of Emergency Events	Illustration	1:30
Effects Of Emergencies On A Water System	Multiple Choice	2:00
Water System Tampering	Illustration	2:00
<b>7.2.1 - System Protection And Security</b>		
Fencing Around The Wellhead	Multiple Choice	:30
Protect Your Well From Livestock	Illustration	:45
Beefing Up System Security	Multiple Choice	1:15
<b>7.2.2 - Designation Of An Emergency Coordinator</b>		
Role Of The Emergency Coordinator	Check All That Apply	1:00

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<b>7.2.3 - Available Resources</b>		
Emergency Notification	True/False	:30
Important Items To Have On Hand	True/False	:30
Extra Help Is Available	Shooting Gallery	1:30
<b>7.2.4 - Well Shutdown Procedures</b>		
Continued Operation In An Emergency	Check All That Apply	1:00
Water Outages	Shooting Gallery	1:30
<b>7.2.5 - Communicating During An Emergency</b>		
Communication With Customers	Check All That Apply	:45
Trucking Water In An Emergency	True/False	1:00
<b>7.2.6 - Resumption Of Water</b>		
How To Resume Water Service	Illustration	1:15
<b>7.3 - Records Maintenance</b>		
Important Drinking Water Records	Matching	1:15
<b>7.3.1 - Planning For The Future</b>		
Rate Structures	Matching	2:00
How To Compute The True Cost Of Water	Illustration	7:40
<b>7.3.2 - Effective Communication</b>		
Effective Communication	Illustration	1:00
<b>7.3.3 - Consumer Confidence Reports</b>		
The Anatomy Of A CCR	Illustration	4:00
<b>7.3.4 - Public Notification</b>		
What Is To Be Included In A Public Notification?	Illustration	3:00
Time Allowed For The Public To Be Notified	Matching	1:00
The Basics Of Public Notification	Check All That Apply	1:00
<b>7.3.5 - Relief Operator</b>		
Who Can Serve As A Relief Operator?	Multiple Choice	:45
<b>7.3.6 - Contacts For The Small Water System Operator</b>		
Important Contacts For Small Systems	Drag & Drop	2:00