

OPERATOR BASICS TRAINING SERIES NATIONAL VERSION 2005
 WASTEWATER LAGOONS COURSE ACTIVITY DATA

Activity Location / Title	Type	Time
1.1 - Importance of Wastewater Treatment		
Effects Of Pollutants In The Receiving Waters	Shooting Gallery	1:30
Oxygen Sag Curve	Illustration	1:15
1.2 - Origins of Wastewater Lagoon Treatment		
Wastewater Treatment Systems	Matching	2:00
1.3 - Nature of Wastewater		
Wastewater Incidents	Hot Spot	3:00
1.3.1 - Wastewater Contributors		
Wastewater Contributors	Multiple Choice	1:00
Wastewater Sources	Drag & Drop	1:15
1.3.2 - Wastewater Constituents		
Organic Compounds In Wastewater	Shooting Gallery	1:45
Inorganic Materials In Wastewater	Check All That Apply	1:30
1.3.3 - Solids		
Solid Particles In Wastewater	Multiple Choice	:45
Solids	True/False	1:15
1.3.4 - Biochemical Oxygen Demand		
Biochemical Oxygen Demand Testing	Illustration	2:00
BOD	True/False	1:00
1.3.5 - pH		
pH	True/False	1:30
1.3.6 - Nutrients		
Nutrients	True/False	1:45
1.4 - Rules Governing Wastewater Discharge		
Local Rules And Regulations	Check All That Apply	:30
Federal, State And Local Rules And Regulations	Matching	1:00
1.4.1 - Clean Water Act		
Clean Water Act	Check All That Apply	1:00
National Policy	Multiple Choice	:45
National Secondary Standards	True/False	:30
1.5 - Responsible Parties and Management		
Responsible Parties and Management	Multiple Choice	1:15
1.5.1 - Owner		
Owner Responsibility	Check All That Apply	1:00
Provisions By The Owner	Shooting Gallery	1:45
1.5.2 - Operator(s)		

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Operator In Charge	Multiple Choice	:45
Maintaining Operator Certification	Check All That Apply	:45
Who Is Responsible For What?	Drag & Drop	1:30
1.5.3 - Regulatory Agencies		
Plan Approval	Drag & Drop	1:45
Primacy	Multiple Choice	:45
Environmental Protection Agency	Check All That Apply	:45
1.5.4 - Records		
Important Records To Maintain	Matching	:45
1.5.5 - Planning for the Future		
Rate Structures	Matching	2:00
1.5.6 - Effective Communication		
Effective Communication	Illustration	2:00
1.5.7 - Relief Operator		
Who Can Serve As A Relief Operator?	Multiple Choice	1:00
1.5.8 - Important Contacts		
Important Contacts For Wastewater Lagoon Operators	Drag & Drop	2:00
2.1 - Collection Systems		
Gravity Collection System (Layout)	Drag & Drop	3:00
2.1.1 - Lift Station Operation And Maintenance		
Inflow, Infiltration And Exfiltration	Drag & Drop	1:15
Lift Station Maintenance Check List	Check All That Apply	1:30
Lift Station Safety Quiz	Multiple Choice	3:15
2.2 - Lagoon Types		
Facultative Lagoon Layers	Drag & Drop	:45
2.3 - Design Standards		
Modes Of Operation	Simulation	1:15
2.4 - Design Components		
Riprap, Liners And Dikes: The Good And The Bad	Illustration	1:30
Water Levels: The Good And The Bad	Illustration	1:30
Control Structures	Illustration	1:00
2.5 - Flow And Load		
Flow and Load	Check All That Apply	1:00
2.5.1 - Flow Measurement		
Weir Calculations	Simulation	5:00
Parshall Flume Calculations	Simulation	4:00
Calculate Flow Based On Lift Station Data	Simulation	8:00

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2.5.2 - Load Variations		
Population Loading	Simulation	1:45
Daily Variation In BOD And Wastewater Flow	Illustration	:45
Population Equivalent	Simulation	2:30
2.6 - Cross-Connections		
Back-Pressure, Backflow And Back-Siphonage	Drag & Drop	1:30
2.6.1 - Public Health Significance Of Cross-Connections		
Public Health Implications	Check All That Apply	1:00
Backflow Event Degree of Hazard	Hot Spot	1:15
2.6.2 - Types Of Cross-Connection Control Protection		
Cross-Connection Definitions	Matching	1:15
2.7 - Backflow Preventers		
Cross-Connection Prevention Devices	Simulation	2:45
2.7.1 - Air Gap		
Identification Of Air Gaps	Hot Spot	1:15
2.7.2 - Atmospheric/Hose Bibb Vacuum Breakers		
AVB At Work	Illustration	1:00
Atmospheric Vacuum Breaker Basics	Check All That Apply	1:15
2.7.3 - Pressure Vacuum Breaker Assembly		
How A PVB Works	Illustration	1:00
2.7.4 - Double Check Valve Assembly		
How A Double Check Valve Works	Illustration	:45
Double Check Valve Basics	Hot Spot	1:15
2.7.5 - Reduced Pressure Principle Assembly		
Functioning Of The RP	Illustration	1:00
Basics Of The Reduced Pressure Principle Assembly	True/False	1:15
2.7.6 - Specialty Valves		
Specialty Valve Roles	Check All That Apply	1:00
2.7.7 - Installation and Servicing of Backflow Preventers		
General Installation Requirements	Check All That Apply	:45
Providing For Thermal Expansion	Hot Spot	:45
Inspection And Testing	True/False	1:15

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2.8 - Cross-Connection Control Plans		
Elements Of The Cross-Connection Plan	Check All That Apply	1:00
Managing And Reporting Backflow Events	Illustration	1:00
3.1 - Microorganisms		
The Main Microorganisms	Multiple Choice	:45
Cooperation Occurs Between Organisms	Illustration	1:00
3.1.1 - Bacteria		
Bacterial Functions In A Lagoon	Shooting Gallery	2:00
Bacteria And Oxygen	Drag & Drop	1:30
Autotrophic Bacteria	Check All That Apply	:45
3.1.2 - Algae		
Characteristics Of Green Algae And Blue-Green Algae	Drag & Drop	3:00
Process Of Algal Metabolism In A Lagoon	Illustration	:45
3.1.3 - Animals Found in Lagoons		
Role Of Protozoa In A Wastewater Lagoon	Check All That Apply	:45
Role Of Rotifers In A Wastewater Lagoon	True/False	1:00
Role Of Daphnia In A Wastewater Lagoon	Multiple Choice	1:15
3.1.4 - Higher Plants		
Higher Plants In Wastewater Lagoons	Check All That Apply	:45
3.2 - Biological and Chemical Treatment		
Aerobic And Anaerobic Layers	Hot Spot	2:00
Characteristics Of Wastewater Lagoon Sludge	Check All That Apply	1:15
Biological Processes In A Wastewater Lagoon	Illustration	2:00
3.3 - Natural Physical Treatment		
Sunlight, Temperature, Wind and Seasonal Changes	True/False	5:00
Natural Physical Treatment	Check All That Apply	:45
4.1 - Multi-Cell Lagoon Operations		
Operational Modes	Multiple Choice	1:45
Advantages And Disadvantages Of The Modes Of Operation	Hot Spot	1:30
4.1.1 - Facultative Lagoon Systems		
Facultative Lagoon Systems	Multiple Choice	2:45
4.1.2 - Aerated Lagoon Systems		
Aerated Lagoon Systems	Check All That Apply	1:45
Why Aeration Is Used	Shooting Gallery	2:00

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4.2 - Direct Discharge Operations		
Determining Factors In Lagoon Design	Check All That Apply	:30
4.2.1 - Indirect Discharge Operations		
Discharge Permit Requirements	True/False	1:00
Non-Discharging Wastewater Lagoons	Check All That Apply	1:00
Methods Of Indirect Discharge	Matching	1:45
4.3 - Disinfection for Direct Discharge Operations		
When To Disinfect Wastewater	Check All That Apply	:45
The Purpose Of Disinfection	Multiple Choice	:30
Coliform Bacteria	True/False	1:30
4.3.1 - Chlorination		
Chlorination Terms	Matching	1:45
Forms Of Chlorine	Shooting Gallery	2:00
Chlorine Contact Time	Multiple Choice	:30
4.3.2 - Gas Chlorination		
How Does A Basic Gas Chlorination System Work?	Illustration	1:00
4.3.3 – Hypo-chlorination		
Percentage Of Available Chlorine In Strong Sodium Hypochlorite	Multiple Choice	:45
Percentage Of Available Chlorine In Strong Calcium Hypochlorite	Multiple Choice	:30
4.3.4 – De-chlorination		
De-chlorination Quiz	True/False	1:45
4.3.5 - Ultraviolet Light (UV)		
UV Advantages And Disadvantages	Drag & Drop	1:45
4.3.6 - Ozone		
Properties Of Ozone	Shooting Gallery	2:00
4.4 - Sludge Removal		
Excessive Sludge Buildup	Check All That Apply	:45
Determining Sludge Volume	Simulation	2:00
Constituents Released By Sludge	Illustration	1:00
4.5 - Maintenance		
Maintenance Scheduling	Hot Spot	2:15
Equipment And Maintenance Log / Record Sheet	Illustration	1:15
4.6 - Safety		
Common Wastewater System Safety Hazards	Illustration	1:15
Risks Of Injuries To Wastewater System Workers	Multiple Choice	1:30

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4.6.1 - Disease		
Waterborne Disease Quiz	Matching	7:30
Lagoon To Well House Quiz	Check All That Apply	1:00
4.6.2 - Confined Spaces		
Test Your Knowledge Of Confined Spaces	True/False	1:45
Confined Spaces	Check All That Apply	:30
Safety Procedures	Check All That Apply	1:00
4.6.3 - Traffic Control		
Traffic Safety	Illustration	1:00
4.6.4 - Shoring And Trenching		
Know What You're Getting Into	Illustration	:30
Shoring And Trenching	Check All That Apply	1:00
4.6.5 - Personal Hygiene and Protective Clothing		
Protective Equipment And Clothing	Check All That Apply	:45
4.6.6 - Electrical Safety		
What Is The Correct Procedure Used To "Lock-Out" Electrical Equipment?	Illustration	3:30
Identifying Electrical Hazards	Hot Spot	1:45
Safety Precautions To Use Around Electrical Equipment	Check All That Apply	1:00
4.6.7 - Chemical Safety		
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
4.6.8 - Chemical Storage Issues		
Define Compatibility And Containment	Matching	1:00
Identify The Cause Of Most Injuries	Multiple Choice	1:00
The Do's And Don'ts Of Storing Flammable Chemicals	True/False	1:45
4.6.9 - Chlorine Safety		
Take The Chlorine Safety Quiz	True/False	4:15
What Special Design Features Are Required For Chlorine Rooms?	Illustration	:45
Chlorine Safety Issues	True/False	1:00
4.6.10 - Fire Safety		
What Type Of Fire Extinguisher Should Be Used?	Matching	1:30

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4.6.11 - First Aid		
What's In A Red Cross First Aid Kit?	Illustration	:45
4.7 - Security		
Secure The System	Hot Spot	1:30
5.1 - Sampling		
Purposes Of Sampling And Monitoring	Check All That Apply	1:00
5.1.1 - Types of Samples		
Sampling Tables	Illustration	1:15
5.1.2 - Sample Site Location		
Sampling Locations	Drag & Drop	1:00
5.1.3 - Sampling Devices And Sample Containers		
Sampling Devices For Collecting Dissolved Oxygen Samples	Illustration	1:30
Sampling Devices	Drag & Drop	1:00
Sampling Containers	Multiple Choice	2:30
5.1.4 - Preservation, Shipping & Holding Time		
Preparing And Shipping A Sample	Illustration	:45
Holding Times And Sample Analysis	Drag & Drop	2:15
5.2 - Monitoring: Flows And Sludge Accumulation		
Influent And Effluent Flow Measurements	True/False	2:15
Sludge Accumulation	True/False	1:30
5.3 - Reporting		
Importance Of Reporting Test Results	Check All That Apply	:45
5.3.1 - National Pollutant Discharge Elimination System (NPDES)		
NPDES Permit Requirements	Multiple Choice	:45
NPDES Permit Specifications	Check All That Apply	1:00
BOD, TSS And pH Permit Limitations	Multiple Choice	1:00
5.3.2 - General Pretreatment Regulations		
Identify Significant Industrial Users	Drag & Drop	3:00
Limitations On Waste Characteristics	Check All That Apply	:45
Permits And Limits	Shooting Gallery	1:30

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5.3.3 - Standards for the Use or Disposal of Sewage Sludge		
Land Application And Disposal Methods For Wastewater Sludge	Drag & Drop	2:00
Land Application Of Wastewater Sludge	Check All That Apply	1:00
Surface Disposal Of Wastewater Sludge	Multiple Choice	:45
6.1 - Troubleshooting		
Problems Leading To Effluent Violations	Shooting Gallery	1:45
6.2 - Short-Circuiting		
Short-Circuiting	Illustration	:45
Occurrence Of Short Circuiting	Multiple Choice	:45
6.3 - Overloading/Low Dissolved Oxygen		
Measurements Of Overloading	Check All That Apply	:45
Low Dissolved Oxygen Due To Overloading	Multiple Choice	:45
Remedies For An Overloaded Lagoon	Shooting Gallery	2:15
6.4 - Algae		
Problems Algae Can Cause	Shooting Gallery	2:30
6.4.1 - Temperature And Algae		
Temperature Effects On Algae	True/False	1:00
6.4.2 - pH and Algae		
How Algae Lower pH In A Lagoon	Check All That Apply	1:00
How Algae Raise pH In A Lagoon	True/False	1:00
6.4.3 - BOD, TSS and Algae		
Algae Removal Processes	Drag & Drop	3:45
6.4.4 - Color and Algae		
Color And Algae In Wastewater Lagoons	Suspended Solids Filter Match	2:00
6.4.5 - Odors and Algae		
Types Of Algae And Odors	Matching	:45
6.5 - Effluent High in Suspended Solids		
Suspended Solids In A Wastewater Lagoon	True/False	2:45
Excessive Effluent TSS: Causes And Solutions	Matching	1:00
6.6 - Effluent High in BOD - Nitrogenous/ Carbonaceous		
Biochemical Oxygen Demand	True/False	2:00
6.7 - Decrease in pH		
Decreasing pH In A Wastewater Lagoon	True/False	1:15
6.8 - Dike Vegetation		
Vegetation Control Practices	Check All That Apply	:45

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6.9 - Water Weeds		
Problems Caused By Water Weeds	Shooting Gallery	2:45
Identify The Water Weeds	Drag & Drop	1:30
6.10 - Odors		
Lagoon System Odor Problems	Shooting Gallery	2:15
Sulfur Smells	Multiple Choice	:30
Solutions To Lagoon Odor Problems	True/False	2:30
6.11 - Scum		
Preventing Scum Formation	Check All That Apply	:30
Solutions To Scum Problems	Shooting Gallery	2:00
6.12 - Insects		
Insects	True/False	1:00
Solutions To Insect Problems	Check All That Apply	1:00
6.13 - Burrowing Animals		
Control Methods For Burrowing Animals	Shooting Gallery	2:00
6.14 - Waterfowl		
Problems Caused By Large Gatherings Of Waterfowl	Shooting Gallery	2:00
Solutions To Waterfowl Problems	Check All That Apply	:45