



Instructor Background And Information Form

Thank you for filling out this form.

Presentation Title: Math for Operators - Grades III & IV

Presenter: Lance Mason Title: Senior Operations Consultant

Employer: Brown & Caldwell Address: 10777 Westheimer Road #975

City: Houston State: TX Zip: 77042 Phone: 602-296-9951

Summary of Lesson content: Basic math and algebra skills including fractions, decimals, percentages, significant figures, rounding, proportions, rations, conversions, and manipulation of equations. Water quality industry specific math including area/volume, flow, pressure, detention time, pounds formula, removal/reduction, and horsepower/electricity.

Professional Background: (Note a brief - 2 page maximum - resume may be submitted in lieu of the following data. Please be sure the resume includes all requested information. Qualifications should be related to your presentation.) Use the reverse side of this form if more room is needed to fully answer the following questions.

Primary Knowledge/Skills/Abilities related to presentation: _____

Resume Attached

Education (High School, Upgrades, Colleges and Degrees): _____

Resume Attached

Professional Registration/Certification: _____

Resume Attached

Related papers/instruction you have presented:

Title: Operator Math Workshop Date: 8/16/2018 Event: Oregon Operator Conference

Title: Operator Math Workshop Date: 8/13/2020 Event: Oregon Operator Conference

Professional Organizations/Activities:

_____ Date: _____

_____ Date: _____

Course sponsor: Brown & Caldwell/Umpqua Community College

Signature of Instructor: [Signature] Date: 1/25/23

DO NOT WRITE BELOW THIS LINE

Date Evaluated: _____ By: _____ Approved: Yes _____ No _____

Return Completed Form To: OESAC CEU COMMITTEE
P.O. Box 577
Canby, OR 97013-0577
Email: info@oesac.org
Phone: 503-698-6486

Lance Mason

Senior Operations Specialist

Education

M.S., Biology, Stephen F. Austin State University, 1994

B.S., Biology, Chemistry, Stephen F. Austin State University, 1992

Certifications

- Grade Four Wastewater Treatment Operator, State of Arizona, Certification No. 20253
- Grade Four Wastewater Collections Operator, State of Arizona, Certification No. 20253
- Grade Four Water Treatment Operator, State of Arizona, Certification No. 20253
- Grade Four Water Distribution System Operator, State of Arizona, Certification No. 20253
- Currently Obtaining Reciprocity in State of Texas

Relevant Experience

Mr. Mason has experience in water and wastewater operations, including process optimization, operations training, water and wastewater facilities' and staff management, process troubleshooting, and facility start-up/commissioning. Additionally he has experience in wastewater plant mathematical modeling and on-line monitoring instrumentation. Mr. Mason has been involved in numerous research projects on three different continents dealing with wastewater process, chemistry, instrumentation, mathematical modeling and energy efficiency. He has a thorough knowledge of regulations in regard to drinking water, wastewater and biosolids compliance. Mr. Mason also gained teaching experience through graduate school and as an instructor at a local community college.

Currently Mr. Mason's main focus as an operations consultant is working with operations staffs all around the country to provide them with the learning tools needed to optimize and/or troubleshoot the process to achieve the highest level of efficiency while maintaining regulatory compliance for water quality.

Experience Prior to Jacobs / CH2M HILL

Senior Operations Specialist; Brown & Caldwell; Houston, Texas. Responsibilities included providing assessment and consultation to wastewater process operations, provide operational training for process optimization and troubleshooting, assist water and wastewater operations in the start-up of new or upgraded facilities, creation of facility electronic O&M manuals, provide operational review of facility engineering design, provide project management support to engineering jobs, and remain current to regulatory requirements related to water, wastewater, and biosolids compliance. Projects included Greater Cincinnati Metropolitan Sewer District; City of Chandler, AZ; City of Santa Barbara, CA; City of Kingman, AZ; and Orange County Sanitary District, CA.

Adjunct Faculty Instructor; Gateway Community College; Phoenix, Arizona. Responsibilities included part-time instructor for Water Technology Calculations (Operator Math), Chemical and Biochemical Processes in Water/Wastewater Treatment, and Water Quality for Treatment Industry. The first two of the courses are face-to-face instruction while the latter is an online course. This was the first time that the live courses had been offered face-to-face, thus a new lesson plan, course work, and schedule were created. Class includes operators, engineers, and students working for an associate's degree in Water Technology.

Project Manager; Severn Trent Services; Ocotillo Water Reclamation Facility; Chandler, Arizona.

Mr. Mason was responsible for supervising a staff of 15 administrative, operations, maintenance, and laboratory personnel at the 10 MGD water reclamation facility for Ocotillo Water Reclamation. The plant

Lance Mason

serves approximately 60,000 people and must meet strict reuse criteria for distribution to recreational areas and the Intel Computer property. Other responsibilities included operator training, troubleshooting, online monitoring, budgeting, energy conservation, and biological nutrient removal.

Process Specialist; Technical Services; Severn Trent Services. Responsibilities included technical support to the wastewater operations staff throughout the U.S. by resolving process deficiencies, enhancing plant performance, improving process control and developing training programs. He was responsible for the management of the MAT2000 wastewater plant monitoring system from remote locations by way of online instrumentation and interpreting data to improve economic and environmental impacts. He provided process analysis and cost calculations for contract proposals and support of business development by appropriate presentation to prospective clients and/or consultants. He prepared and presented scientific research papers to technical conferences to promote technology and services of the company. As Project Manager for the MAT 2000 online wastewater monitoring unit, Mr. Mason was involved in studies done in Texas, New York, Virginia, Pennsylvania, Mississippi, New Mexico and Arizona. He trained in equipment operation and process analysis used in remote on-line process monitoring in the U.S., Canada, Great Britain and South Africa treating industrial and municipal wastes.

Wet Chemist; Huntingdon/Southwestern Laboratories. Responsibilities included various water quality tests in compliance with EPA Standard Methods, documented and researched results, maintained standards of cleanliness in lab and communicated information to management, colleagues and field staff.

Professional Organizations/Affiliations

Water Environment Federation

Arizona Water Association

Water Environment Association of Texas

Honors and Awards

Arizona Water and Pollution Control Association, Wastewater Supervisor of the Year, 2004

Publications and Presentations

"Investigation Using Advanced On-Line Instrumentation of Industrial Loading on a Wastewater Treatment Plant in Glen Cove, New York; Lance K. Mason, Dan Ryan, John Watts, Marc Bingley, Andrew Shaw, John Upton, WEFTEC 2000

"A New On-line Monitoring Instrument for the Measurement of Nitrification and Denitrification Rates; Dr. John B. Watts, Ian Parrott, Andrew Shaw, Lance K. Mason, 2000

"Experience with Auto-calibrating Dissolved Oxygen Systems in Paper and Pulp Wastewater Treatment Facilities", Lance K. Mason, Dr. John B. Watts, TAPPI 1999

"Improvement of Energy efficiency and Plant Performance in a Water Reclamation Facility in Gilbert, Arizona Using MAT2000 Online Monitoring; Lance K. Mason, Andrew Shaw, Dennis Plzak, Jay Lydon, John B. Watts, WEFTEC 2001

"Assessment of Biomass Health Using Advanced On-line Instrumentation in a Small Facility Converted From Contact Stabilization to Extended Aeration in Houston, Texas"; Lance Mason, Dr. J.B. Watts, Andrew Shaw, 2000

"International Symposium on On-line Sensors for Water and Wastewater"; Dr. J.B. Watts, Lance Mason, Andrew Shaw, 1999

"Improvements of Energy Efficiency and Plant Performance in a Water Reclamation Facility in Chandler, Arizona Using Advanced Online Monitoring", Lance Mason, Dennis Plzak Andrew Shaw, Jodey Lane, Robert Braymiller, Dr. John Watts, WEFTEC 2002

"A Process Analysis for the Expansion of a Wastewater Facility in Bullhead City, Arizona Using Advanced Online Monitoring and Computer Modeling", Lance Mason, Dennis Plzak, David Prinzhorn, Glen Roth, WEFTEC 2003

Lance Mason

"Improving Plant Performance and Energy Efficiency in a Sequencing Batch Reactor and Extended Aeration Facility in Central Oklahoma Using Advanced Respirometric Monitoring", Lance Mason, Kelvin Peters, John Nichols, Matt Lail; WEFTEC 2004

"SRT and OUR: Simplicity with Meaning", Lance Mason, Eric Wahlberg; AZ Water Annual Conference 2009

"Wastewater Process Optimization: A Non-Traditional Approach", Lance Mason, Eric Wahlberg; AZ Water Annual Conference 2010

"Aeration System Upgrades at the Chandler Ocotillo WRF: High-Speed Blower Technology", Lance Mason, Edmond Low; AZ Water Annual Conference 2011

"New Primary Solids Rotary Drum Thickener Benefits Multiple Treatment Processes", Edmond Low, Steven Puterbaugh, Lance Mason, Tristate Seminar 2011

"Nitrite Lock: Incomplete Nitrification Effects on Downstream Processes During Commissioning in Kingman, AZ". Lance Mason, AZ Water Annual Conference 2012

"Considerations in Design and Operations in Flat Panel Membrane Bioreactor (MBR) System in Kingman, AZ". Lance Mason, AZ Water Annual Conference 2012

"Operational Process Control Methods for Filamentous Bacteria Infestation in Avondale, AZ". Lance Mason, AZ Water Annual Conference 2014

"To Remove P or not Remove P: (Biologically?) That is the Question"; Mason, Lance, Hindy E.J., Texas WET, Issue 2 2017: 31-36

"To Remove P or not Remove P: (Biologically?) That is the Question"; Mason, Lance, Hindy E.J., Oklahoma OWEA Annual Conference 2019

Level III and IV: Operator Math

Time Allocated (Minutes)

I.	Review Intro	
	a. Dimensional Analysis (Area and Volume)	15
	b. Metric Conversions	10
	c. Flow Conversions	10
	d. Percent Removal	10
	e. Box Method of Unit Conversion	15
II.	Unit Conversion Math	
	a. The Big Five	10
	b. Conversion Intro Examples (Formula)	10
	c. Dimensional Relationships (Non-formula)	10
III.	Flow and Hydraulics	
	a. Flow Rate	10
	b. Velocity ($Q = VA$)	15
	c. Pressure and Head	10

BREAK-----15 Minutes

IV.	Loading Calculations	
	a. Pie Chart	15
	b. Population Equivalents	5
	c. Detention Time	10
	d. Filtration Rates	15
V.	Chemical Dosing Calculations	
	a. Chlorine Dosing	15
	b. Feed Rates	10
	c. Specific Gravity	10
VI.	Clarifier Calculations	
	a. Overflow Rate	10
	b. Solids Loading Rate	10
	c. Weir Loading Rate	10

LUNCH BREAK-----60 Minutes

VII.	Process Control Calculations	
	a. SVI	10
	b. F:M Ratio	10
	c. MLSS Inventory	10
	d. MCRT / SRT	20
	e. Wasting Rate	15

VIII.	Solids Handling	
	a. Digester Loading Rate	10
	b. Volatile Destruction	10
	c. Mixing Sludge Streams	10
	d. Percent Capture	10

BREAK-----15 Minutes

IX.	Horsepower / Electrical Consumption	
	a. Horsepower Definition	10
	b. Motor Horsepower	10
	c. Brake Horsepower	10
	d. Water Horsepower	10
	e. Electrical Consumption	10
X.	Certification Review Example Problems	
	a. Class Suggestion	60
	b. **Instructor Suggestion	

** Instructor will perform review question calculation for any time that a suggestion is not made by students to satisfy any remaining time of the allotted 60 minutes for review.

Umpqua Community College
Community & Workforce Training
Course Outline – Math for Operators Level III and IV

Course Description: This class will provide operators with the basic math and algebra skills to use the formulas required to complete the operator grade III & IV exams.

Course Prerequisites:

Level III – Level II must be completed prior to taking Level III

Level IV – Level III must be completed prior to taking Level IV

Course Objectives/Outcomes:

1. Students will demonstrate understanding of basic math and algebra skills including fractions, decimals, percentages, significant figures, rounding, proportions, rations, conversions, and manipulation of equations
2. Students will demonstrate understanding of water quality industry specific math including area/volume, flow, pressure, detention time, pounds formula, removal/reductions, and horsepower/electricity.
3. Students will be prepared for the Math Section of the Level III and IV Wastewater System Operator Certification exam.

Training Goal: This course will focus on preparing students for the math sections of the Water & Wastewater Certification Exams.

**Umpqua Community College
Community & Workforce Training
Level III & IV Math for Operators
Student Tracking**

Method of Tracking for In-Person: *Sign In/Out*

Method of Tracking for Online: *Online assistant will monitor class via Zoom and will take attendance throughout the day*