



Environmental Systems: Basic and Advanced Water Resources

Youth Apprenticeship

ENVIRONMENTAL SYSTEMS: BASIC AND ADVANCED WATER RESOURCES

Environmental systems youth apprentices learn core skills needed by the water industry to promote protection, improvement, and sustainability of water resources.

Length of Apprenticeship: One or Two years

COMPETENCIES

Youth apprentices work with a job site mentor to demonstrate the following competencies.

Year 1: Youth apprentices must complete a **total of 11** competencies. **Ten** must be from the list below. If necessary, employers can substitute **1** competency with another occupationally appropriate skill. That skill should be added to the competency list for assessment.

Year 2: Youth apprentices must complete a **total of 12** competencies. **Eleven** must be from the list below. If necessary, employers can substitute **1** competency with another occupationally appropriate skill. That skill should be added to the competency list for assessment.

YEAR 1 Competencies	YEAR 2 Competencies
1. Interpret work order	1. Assist with report submissions
2. Create work order	2. Prepare chemicals
3. Monitor operating conditions, meters, pumps, and gauges	3. Add chemicals to systems
4. Collect operational data	4. Perform start-up and shut down of pumps and equipment
5. Use operations software (such as SCADA, PLC, DBs)	5. Inspect operational equipment
6. Perform basic facility maintenance	6. Troubleshoot basic operations
7. Collect samples	7. Analyze lab results
8. Measure weight	8. Maintain schedules, communication, and documentation
9. Measure volume	9. Perform preventive maintenance (PM)
10. Perform calculations and conversions	10. Calibrate equipment
11. Conduct basic lab tests	11. Troubleshoot and repair equipment
	12. Analyze operational data for productivity/trends



Environmental Systems: Basic and Advanced Water Resources

Youth Apprenticeship
ON-THE-JOB LEARNING PERFORMANCE STANDARDS GUIDE

YOUTH APPRENTICE INFORMATION

Youth Apprentice Name	
YA Coordinator	YA Consortium
School District	High School Graduation Date

REQUIREMENTS

Level One Requirements

Youth apprentices must complete ALL the items listed below. Check completed areas.

- Year 1 Competency checklist
- Employability Skills checklist (in this OJL Guide) or the DPI Employability Skills Certificate
- Related instruction equal to 1 high school credit or at least 3 college credits
- Minimum of 450 work hours

Level Two Requirements

Youth apprentices must complete ALL the items listed below. Check completed areas.

- Year 2 Competency checklist
- Employability Skills checklist (in this OJL Guide) or the DPI Employability Skills Certificate
- Related instruction equal to 2 high school credits or at least 6 college credits
- Minimum of 900 work hours

HOURS

Record the hours the youth apprentice worked.

Total Hours Employed	Company Name	Telephone Number

YEAR 1 COMPETENCIES

Youth apprentices must complete a **total of 11 competencies**. **Ten** must be from the list below. If necessary, employers can substitute **1** competency with another occupationally appropriate skill. That skill should be added to the competency list for assessment.

Rating Scale

3: Exceeds entry level criteria | Requires minimal supervision | Consistently displays this behavior

2: Meets entry level criteria | Requires some supervision | Often displays this behavior

1: Needs improvement | Requires much assistance and supervision | Rarely displays this behavior

Competency and Rating Criteria	Minimum Rating of 2 for EACH Check Rating		
	1	2	3
1. Interpret work order <ul style="list-style-type: none"> • use work order to plan work • identify procedures to be completed • follow work order to complete the work 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Create work order <ul style="list-style-type: none"> • work order is entered into the computer • work order includes all the key information • work order is accurate 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Monitor operating conditions, meters, pumps, and gauges <ul style="list-style-type: none"> • operate the flow measuring device • monitor alarm systems • follow site-specific alarm procedures • identify alarm locations • respond to alarms • document results 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Collect operational data <ul style="list-style-type: none"> • obtain operational data • collect and store samples for testing • download data from meters and data loggers to computer databases • perform physical measurements and process control calculations 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Use operations software (such as SCADA, PLC, DBs) <ul style="list-style-type: none"> • locate file • add and edit data • query data • verify data • monitor processes 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Competency and Rating Criteria	Minimum Rating of 2 for EACH Check Rating		
	1	2	3
6. Perform basic facility maintenance <ul style="list-style-type: none"> • don appropriate personal protective equipment (PPE) • perform cleaning • use appropriate cleaning solutions 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Collect samples <ul style="list-style-type: none"> • wear proper personal protective equipment (PPE) • setup sampling equipment and materials • setup field testing equipment, materials, etc. (test kits) • identify proper method and container for sample • label sample or container • collect required amount of sample • store sample as required • preserve chain of custody 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Measure weight <ul style="list-style-type: none"> • select the appropriate equipment and materials for the measurement • calculate the accuracy and standard deviation of your values • record measurements in appropriate units and significant figures 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Measure volume <ul style="list-style-type: none"> • select the appropriate container for measuring volume • measure using graduated cylinders • measure using serological pipettes • measure using micro pipettors • record measurements in appropriate units and amount of significant figures 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Perform calculations and conversions <ul style="list-style-type: none"> • select appropriate formula • perform the calculation • verify accuracy • convert flow rates • record calculations or conversions 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Competency and Rating Criteria	Minimum Rating of 2 for EACH Check Rating		
	1	2	3
11. Conduct basic lab tests <ul style="list-style-type: none"> • select and setup equipment and supplies • prepare reagents, solutions, and/or buffers • prepare quality control samples as needed • prepare sample for testing • test the sample • record results • clean glassware and instruments • segregate, recycle, or dispose of waste following facility guidelines • apply standard precautions • document testing results 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Competency Substitute (if you replaced a competency above, note the competency and rating)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:			

YEAR 2 COMPETENCIES

Year two youth apprentices must complete a **total of 12** competencies. **Eleven** must be from the list below. If necessary, employers can substitute **1** competency with another occupationally appropriate skill. That skill should be added to the competency list for assessment.

Rating Scale

- 3: Exceeds entry level criteria | Requires minimal supervision | Consistently displays this behavior
- 2: Meets entry level criteria | Requires some supervision | Often displays this behavior
- 1: Needs improvement | Requires much assistance and supervision | Rarely displays this behavior

Competency and Rating Criteria	Minimum Rating of 2 for EACH Check Rating		
	1	2	3
1. Assist with report submissions <ul style="list-style-type: none"> • obtain data and information • complete forms • obtain authorizations as indicated • submit reports 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Competency and Rating Criteria	Minimum Rating of 2 for EACH Check Rating		
	1	2	3
<p>2. Prepare chemicals</p> <ul style="list-style-type: none"> perform calculations and conversions as needed determine the concentration and amount required mix the proper concentration of solutions from solids and/or liquids test and adjust pH or concentration if required label and store prepared item as required per protocol document chemical preparation as required clean up 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>3. Add chemicals to systems</p> <ul style="list-style-type: none"> confirm chemical required verify chemical is properly mixed and within expiration date transport chemical to system site for addition to system add chemical to system site document chemical addition as required transport, store, and dispose of materials as indicated 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>4. Perform start-up and shut down of pumps and equipment</p> <ul style="list-style-type: none"> check equipment fluid, air, pressure levels as required set equipment settings as required monitor start-up as required to ensure correct operation shut-down equipment safely identify any process or equipment maintenance concerns take corrective action to report and correct maintenance concerns 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>5. Inspect operational equipment</p> <ul style="list-style-type: none"> inspect equipment for function and damage assist to troubleshoot and repair equipment problems take corrective actions lockout/tag out equipment that is inoperable document inspection 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>6. Troubleshoot basic operations</p> <ul style="list-style-type: none"> regularly review quality control indicators for water treatment operations assist to analyze lab results assist to analyze operational data for productivity/trends take corrective actions for item out of compliance following required protocol adjust processes for water treatment as required (add chemicals, adjust equipment rates, etc.) document operational correction 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Competency and Rating Criteria	Minimum Rating of 2 for EACH Check Rating		
	1	2	3
<p>7. Analyze lab results</p> <ul style="list-style-type: none"> • collect data and results from testing • select and use statistical tools to analyze and synthesize data • create tables and graphs to organize data • query and extract information from data • interpret graphs and the trends in data • use tools to manipulate data creating models, reports, plans, processes, or projects from data provided • document analysis process and tools used • draw conclusions based on analysis with worksite professional • assist to troubleshoot operations and adjust processes based on lab results 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>8. Maintain schedules, communication, and documentation</p> <ul style="list-style-type: none"> • update schedules as maintenance is completed • communicate maintenance and repair needs clearly • use the correct reporting formats for documentation and communication • document maintenance and repair activities accurately • maintenance is documented clearly and completely 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>9. Perform preventive maintenance (PM)</p> <ul style="list-style-type: none"> • ensure that equipment is properly labeled and pulled from production use • follow appropriate Lockout/Tag Out procedures prior to performing PM • follow all safety requirements and wear appropriate personal protective equipment (PPE) as required • document preventative actions completed 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>10. Calibrate equipment</p> <ul style="list-style-type: none"> • clean and adjust instruments before calibrating • calibrate tools and instruments accurately and correctly • promptly re-calibrate tools out of calibration • re-qualify tools and instruments sent out for recalibration or repairs • label tools and equipment that have been calibrated • document all calibration activities 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Competency and Rating Criteria	Minimum Rating of 2 for EACH Check Rating		
	1	2	3
11. Troubleshoot and repair equipment <ul style="list-style-type: none"> ensure that equipment is properly labeled and pulled from production use (Lock Out/Tag Out) follow all safety requirements and wear appropriate personal protective equipment (PPE) as required take appropriate readings using meters and testing equipment determine the cause of the problems reported assist with basic repair assist to re-qualify equipment document testing, evaluation, repair, and requalification 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Analyze operational data for productivity/trends <ul style="list-style-type: none"> obtain questionable or out of compliance data and reports define question/problem to be evaluated select data analysis tool collect additional data if needed organize data using quality tools analyze lab results and other operational data assist to troubleshoot operations and adjust processes based on analysis 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Competency Substitute (if you replaced a competency above, note the competency and rating)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:			

RELATED INSTRUCTION

YEAR 1: Indicate which related instruction courses the youth apprentice completed:

Course Title	Credits	Location