



# Stormwater Quality Leadership™ - Overview

## PHASE 1 - DISCOVERY

Meeting	Summary	Standards
1	<p><b>Intro to Stormwater Quality Leadership™ and the History of Water Quality:</b> Poseidon Education’s Stormwater Quality Leadership™ Program will launch in this first staff meeting as student leaders will be introduced to the structure of the program, the inspiration behind the environmental movement, and the regulatory framework that WQIPs fall under through a slideshow presentation and video that showcases some of the activities they will be doing over the course of the program.</p>	<p><b>Common Core:</b> SL.9-10.1, SL.11-12.1</p> <p><b>NGSS: Disciplinary Core Ideas</b> ESS3.C</p> <p><b>Crosscutting Concepts</b> Cause and Effect</p>
2	<p><b>Role Selection &amp; Training:</b> Student leaders of the Stormwater Quality Leadership™ Program will learn about the roles and responsibilities necessary in a job and project that lead to a cohesive collaborative working environment and ultimately the creation of the end product of the program, the WQIP document and final presentation.</p>	<p><b>Common Core:</b> SL.9-10.1.B, SL.11-12.1.B</p> <p><b>NGSS: Science &amp; Engineering Practices</b> Obtaining, Evaluating, and Communicating Information</p>
3	<p><b>Investigating Urban vs. Natural Watersheds and Their Boundaries:</b> Watersheds are explained by using an interactive watershed activity and drainage concepts such as impervious vs. pervious are explored. Student leaders will begin working on two sections of the WQIP and will be introduced to watersheds using resources including maps, a video, and delineating a watershed boundary outside.</p> <p><b>WQIP Sections:</b> 1.2 Contact Information, 1.6 Site Map</p>	<p><b>Common Core:</b> SL.9-10.1, SL.11-12.1, CCSS.MATH.PRACTICE.MP5</p> <p><b>NGSS: Science &amp; Engineering Practices</b> Developing and Using Models</p> <p><b>Cross-Cutting Concepts</b> Scale, Proportion, and Quantity</p>



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## PHASE 1 (continued)

Meeting	Summary	Standards
4	<p><b>Anatomy of a Storm Drain and the Path Stormwater Takes:</b> Student leaders will predict the path of stormwater flow from where the rain falls on campus, through its micro-watershed, and to the storm drain. Then, on a macro-scale using local watershed and city drainage maps, student leaders will track the flow from the school, through the city storm drainage system, to the outlet, and finally out to the ocean.</p> <p><b>WQIP Sections:</b> 1.1 School Information, 1.4 Site Activities, 1.5 General Location Map</p>	<p><b>Common Core:</b> SL.9-10.1, SL.11-12.1</p> <p><b>NGSS: Cross-Cutting Concepts</b> Systems and System Models <b>Science &amp; Engineering Practices</b> Developing and Using Models</p>
5	<p><b>Pollutant Research:</b> Working within their originally assigned drain groups, student leaders will identify the pollutants of study at their drain, the source of the pollutants, and conduct research using instructor-provided internet sources (videos, websites) to learn about each pollutant and determine why it is harmful to the environment. student leaders will provide the pollutant information to be included in the WQIP.</p> <p><b>WQIP Section:</b> 2.1 Potential Pollutants Associated with Site Activity</p>	<p><b>Common Core:</b> W.9-10.7, W.11-12.7</p> <p><b>NGSS: Disciplinary Core Ideas</b> HS-LS4.D <b>Crosscutting Concepts</b> Cause and Effect <b>Science and Engineering Practices</b> Analyzing and Interpreting Data</p>
6	<p><b>Visual Observation Training:</b> Student leaders conduct their first visual inspection by recording specific observations detailing the condition of the storm drain and identifying pollutants in the micro-watershed and around the storm drain. student leaders will record their observations on paper or digital form and submit their data for inclusion in the WQIP.</p> <p><b>WQIP Sections:</b> 1.6 Site Map, 4.1 Visual Observations, 4.3 Student Leader Training, Appendix E: Student Leader Training Documentation</p>	<p><b>Common Core:</b> W.9-10.3D, W.11-12.3D</p> <p><b>NGSS: Cross-Cutting Concepts</b> ESS3.C: Human Impacts on Earth Systems <b>Science &amp; Engineering Practices</b> Obtaining, Evaluating, and Communicating Information</p>



# Stormwater Quality Leadership™ - Overview

## PHASE 1 (continued)

Meeting	Summary	Standards
7	<p><b>Safety Training and Catch Basin Maintenance:</b> Student leaders participate in safety training that covers confined spaces, hazardous substances, and hand tools. After signing the safety training log, student leaders conduct maintenance on one or more catch basins to prevent debris from being washed into the storm drain system.</p> <p><b>WQIP Sections:</b> 3.2 Good Housekeeping BMPs, 4.3 Student Leader Training, Appendix D: BMP Documentation, and Appendix E: Student Leader Training Documentation</p>	<p><b>Common Core:</b> CCSS.Math.Practice.MP5</p> <p><b>NGSS: Science &amp; Engineering Practices</b> Planning and Carrying Out Investigations</p>
8	<p><b>Stormwater Sample Collection Training:</b> student leaders are introduced to the procedures for collecting a stormwater sample, including proper use of personal protective equipment (PPE), how to collect a sheet flow sample, how to store the sample, and how to complete a Chain of Custody form.</p> <p><b>WQIP Section:</b> 4.3 Student leader Training, Appendix E: Student leader Training Documentation</p>	<p><b>Common Core:</b> SL.9-10.1, SL.11-12.1</p> <p><b>NGSS: Disciplinary Core Ideas</b> ETS1.C Optimizing the Design Solution</p> <p><b>Science &amp; Engineering Practices</b> Asking Questions and Defining Problems</p>

## PHASE 2 - FIELD INVESTIGATION

Meeting	Summary	Standards
9	<p><b>Field Trip:</b> Student leaders explore the real world of the water industry by touring a watershed preserve, visiting a wastewater treatment plant, interacting with scientists at a water testing lab, or meeting with city officials at large-scale BMPs (e.g., parking lot designs, outfalls, etc.).</p>	<p><b>Common Core:</b> Varies based on field trip location</p> <p><b>NGSS: Disciplinary Core Ideas</b> ESS3.C: Human Impacts on Earth Systems <b>Science and Engineering Practices</b> Obtaining, Evaluating, and Communicating Information</p>
10	<p><b>Industry Professional Guest Speaker:</b> An industry professional, such as a water quality agency engineer, consultant engineer, city stormwater manager, or city stormwater crew will share their expertise in the stormwater management industry. Their presentation may also include ideas for stormwater improvements on the school campus, which student leaders will be tasked to develop later on in Phase 3.</p>	<p><b>Common Core:</b> SL.9-10.1, SL.11-12.1</p> <p><b>NGSS: Disciplinary Core Ideas</b> ESS3.C <b>Science &amp; Engineering Practices</b> Obtaining, Evaluating, and Communicating Information</p>
11	<p><b>Visual Observation and Catch Basin Maintenance:</b> Student leaders will conduct a visual observation of their drain of study and document their observations for the WQIP. Maintenance (cleaning) of catch basins and the surrounding micro-watershed will also be conducted.</p> <p><b>WQIP Sections:</b> 1.6 Site Map, 3.2 Good Housekeeping BMPs, 4.1 Visual Observations, Appendix D: BMP Documentation</p>	<p><b>Common Core:</b> W.9-10.3D, W.11-12.3D CCSS.Math.Practice.MP5</p> <p><b>NGSS: Disciplinary Core Ideas</b> ESS3.C <b>Science &amp; Engineering Practices</b> Obtaining, Evaluating, and Communicating Information</p>

## PHASE 2 (continued)

Meeting	Summary	Standards
12	<p><b>Stormwater Sample Collection:</b> During a qualified rain event, student leaders will collect a stormwater sample from their assigned storm drain, complete a Chain of Custody form, and send their samples via courier to a professional lab for testing.</p> <p><b>WQIP Sections:</b> 4.2 Visual Assessment of Rain Events, Appendix A: Rain Event Visual Inspection Forms, Appendix B: Chain of Custody Forms</p>	<p><b>Common Core:</b> W.9-10.7,W.11-12.7</p> <p><b>NGSS: Science &amp; Engineering Practices</b> Planning and Carrying Out Investigations</p>
13	<p><b>Stormwater Sample Testing Lab:</b> Student leaders will conduct testing on their samples using LaMotte testing kits. Samples will be tested for phosphorus, nitrogen, pH, BOD, dissolved oxygen, turbidity, and total coliform.</p>	<p><b>Common Core:</b> W.9-10.7,W.11-12.7 CCSS.Math.Practice.MP6</p> <p><b>NGSS: Cross-Cutting Concepts</b> Scale, Proportion, and Quantity <b>Science &amp; Engineering Practices</b> Planning and Carrying Out Investigations</p>
14	<p><b>Understanding Stormwater Sample Results and Serial Dilution Lab:</b> Student leaders will evaluate the pollutant results from the lab report, comparing the concentrations of their samples to EPA benchmarks and identifying the pollutants that exceeded benchmarks. Interns will then perform a series of dilutions with water and food coloring to demonstrate what the concentration of pollutants in parts per million (ppm) and parts per billion (ppb) looks like to gain a better understanding of their stormwater sample results.</p> <p><b>WQIP Sections:</b> 2.3 Sampling Data vs. EPA Benchmark, Appendix C: Laboratory Reports</p>	<p><b>Common Core:</b> SL.9-10.1, SL.11-12.1 CCSS.Math.Practice.MP6</p> <p><b>NGSS: Cross-Cutting Concepts</b> Scale, Proportion, and Quantity <b>Science &amp; Engineering Practices</b> Using Mathematics and Computational Thinking, Analyzing and Interpreting Data</p>

## PHASE 3 - SOLUTION DESIGN & IMPLEMENTATION

Meeting	Summary	Objectives	Standards
15	<p><b>Introduction to BMPs:</b> Student leaders will discover the differences between Source Control and Treatment Control Best Management Practices (BMPs). The student leaders will then preliminarily brainstorm solutions, or Best Management Practices (BMPs), to address areas where the pollutants exceeded EPA benchmarks.</p>	<p>Identify and explain ways in which pollutant levels could be reduced through implementation of BMPs.</p>	<p><b>Common Core:</b> SL.9-10.1, SL.11-12.1</p> <p><b>NGSS: Disciplinary Core Ideas</b> ETS1.B <b>Science &amp; Engineering Practices</b> Obtaining, Evaluating, and Communicating Information</p>
16	<p><b>Creating Effective Source Control BMPs:</b> Student leaders will discover business terms and strategize ways to market their message to the school at large. Discover branding and marketing techniques that will apply to their educational voice among their peers to inspire behavioral change that reduces the overall pollution produced on their school campus.</p> <p><b>WQIP Section:</b> 3.1 Source Control BMPs</p>	<p>Identify triggers that cause behavior change, Develop a recognizable brand for promoting environmental stewardship, and determine the most effective Source Control BMPs for the school and the time available.</p>	<p><b>Common Core:</b> SL.9-10.1, SL.11-12.1</p> <p><b>NGSS: Disciplinary Core Ideas</b> ETS1.B <b>Science &amp; Engineering Practices</b> Constructing Explanations and Designing Solutions</p>

## PHASE 3 (continued)

Meeting	Summary	Objectives	Standards
17	<p><b>Source Control BMP Design and Implementation:</b> The goal of this meeting is to work to completion on the selected Source Control BMP projects, implementing completed projects where possible, and writing a summary of completed work to be entered into the final WQIP document.</p> <p><b>WQIP Sections:</b> 3.1 Source Control BMPs</p>	Collaborate with other student leaders with like interests to develop a Source Control BMP.	<p><b>Common Core:</b> SL.9-10.1, SL.11-12.1</p> <p><b>NGSS: Disciplinary Core Ideas HS-ESS3-4 Science &amp; Engineering Practices</b> Constructing Explanations and Designing Solutions</p>
18	<p><b>Treatment Control BMPs:</b> Student leaders conduct research to select or design applicable structural BMPs for their drain, determine the pollutants of focus, and justify the use of the selected BMPs based on their data, while also considering the consequences of their solutions. Student leaders will provide treatment control BMPs recommendations to include in the WQIP.</p>	Identify different BMPs to reduce the pollutants from entering in the storm drain system.	<p><b>Common Core:</b> W.9-10.7, W.11-12.7</p> <p><b>NGSS: Disciplinary Core Ideas</b> HS-ESS3-4 <b>Science &amp; Engineering Practices</b> Analyzing and Interpreting Data</p>

## PHASE 3 (continued)

Meeting	Summary	Objectives	Standards
19	<p><b>Treatment Control BMP Design and Implementation:</b> Student leaders will design and implement treatment control BMPs that aim to reduce pollutants from entering their drain and/or micro-watershed areas. Student leaders will provide a description of the work completed to include in the WQIP.</p> <p><b>WQIP Section:</b> 3.3 Treatment Control BMPs</p>	<p>Implement different BMPs to reduce and/or remove the pollutants in their drain and/or micro-watershed.</p>	<p><b>Common Core:</b> SL.9-10.1, SL.11-12.1</p> <p><b>NGSS: Disciplinary Core Ideas</b>            HS-ESS3-4 <b>Science &amp; Engineering Practices</b>            Constructing Explanations and Designing Solutions</p>

## PHASE 4 - FINAL REPORT & PUBLIC OUTREACH

Meeting	Summary	Objectives	Standards
20	<p><b>Public Speaking Techniques:</b> Student leaders will learn public speaking techniques and demonstrate their skills in a practical format through short presentations, peer to peer feedback, and self-evaluation rubric.</p>	<p>Learn presentation techniques and tips for conducting a confident and professional presentation.</p>	<p><b>Common Core:</b> SL.9-10.1, SL.11-12.1</p> <p><b>NGSS: Disciplinary Core Ideas</b> ETS1.B  <b>Science &amp; Engineering Practices</b> Obtaining, Evaluating, and Communicating Information</p>
21	<p><b>Presentation Techniques &amp; Development:</b> Student leaders will learn and practice tips and techniques that will prepare them for presenting information professionally during slide presentation opportunities and beyond.</p> <p><b>WQIP Sections:</b> 1.3 Stormwater Quality Leadership™ Team</p>	<p>Give a slide presentation with a professional appearance, understand the visuals that demonstrate information and provide impactful messaging, and develop slide presentation skills that can be used in future projects and various other aspects of life and career.</p>	<p><b>Common Core:</b> SL.9-10.4, SL.11-12.4</p> <p><b>NGSS: Disciplinary Core Ideas</b> ETS1.B  <b>Science &amp; Engineering Practices</b> Obtaining, Evaluating, and Communicating Information</p>

## PHASE 4 (continued)

Meeting	Summary	Objectives	Standards
22	<b>Final Presentation Development:</b> Student leaders will work towards completion of their slide presentation and script writing.	Write a script and practice individual speaking parts, create one to three slides for the final slideshow presentation.	<b>Common Core:</b> SL.9-10.4, SL.9-10.5, SL.11-12.4, SL.11-12.5  <b>NGSS: Disciplinary Core Ideas</b> ETS1.B <b>Science &amp; Engineering Practices</b> Obtaining, Evaluating, and Communicating Information
23	<b>Presentation &amp; WQIP Review:</b> Student leaders will work towards completion of their WQIP Report, slide presentation and script writing.	Complete any editing and reporting writing, and understand the value of meeting deadlines in the workplace.	<b>Common Core:</b> SL.9-10.4, SL.9-10.5, SL.11-12.4, SL.11-12.5  <b>NGSS: Disciplinary Core Ideas</b> ETS1.B <b>Science &amp; Engineering Practices</b> Obtaining, Evaluating, and Communicating Information

## PHASE 4 (continued)

Meeting	Summary	Objectives	Standards
24	<b>Final Presentation Rehearsal:</b> Student leaders will work on fine tuning their presentation using the techniques they have learned in previous staff meetings.	Practice speaking parts and familiarize with the wording, content, and flow of the presentation, working towards a final presentation preparedness.	<p><b>Common Core:</b> SL.9-10.4, SL.9-10.5, SL.11-12.4, SL.11-12.5</p> <p><b>NGSS: Disciplinary Core Ideas</b> ETS1.B  <b>Science &amp; Engineering Practices</b> Obtaining, Evaluating, and Communicating Information</p>
25	<b>Final Presentation:</b> Student leaders will present their WQIP findings and recommendations in a professional presentation to the funding organization and other interested authoritative bodies.	Present final WQIP findings and recommendations to the interested authoritative bodies.	<p><b>Common Core:</b> SL.9-10.4, SL.9-10.5, SL.11-12.4, SL.11-12.5</p> <p><b>NGSS: Disciplinary Core Ideas</b> ETS1.B  <b>Science &amp; Engineering Practices</b> Obtaining, Evaluating, and Communicating Information</p>