



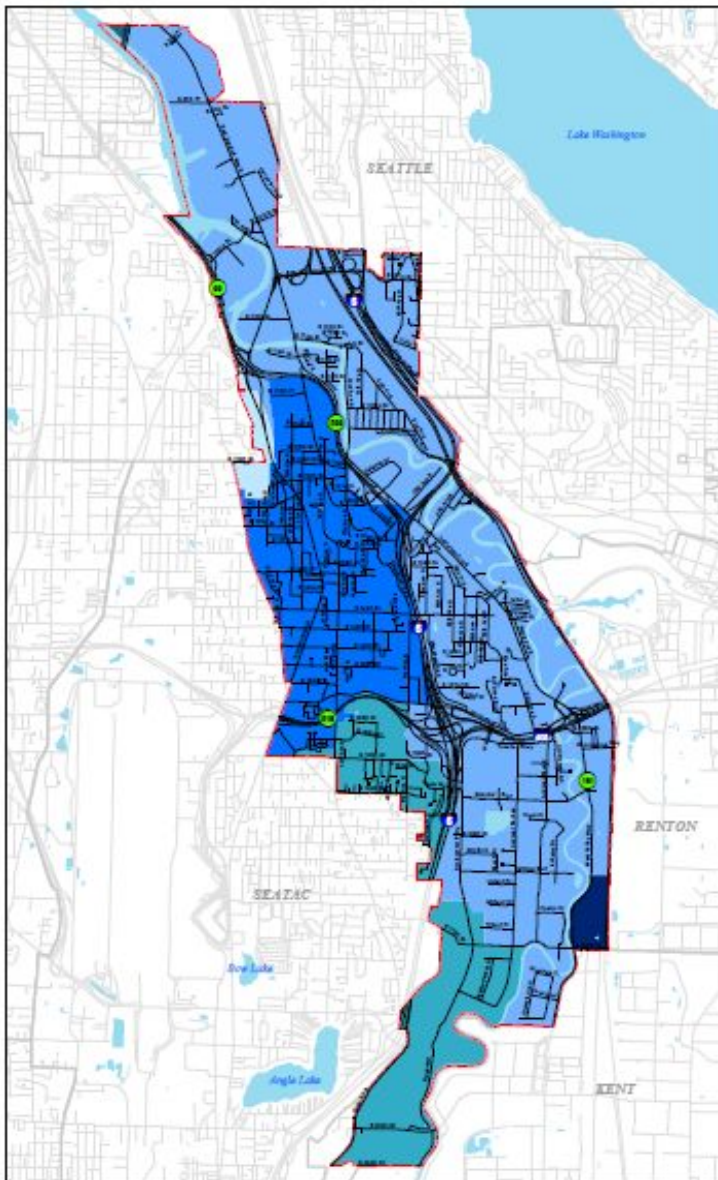
**Water Systems Teacher Fellows Program
Community Curriculum Case Study**

Water Systems Civics

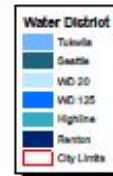
Grade 12 Civics

Problem Statement

“How can I support the City Council and staff on improving my city’s water systems policies, programs, and performance?”



**City of
Tukwila**
Water Districts



Teacher
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Grade 12 Civics
Foster High School
Tukwila School
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Date: March 23, 2010

About the Water Systems Teacher Fellows Program

Teacher Fellows (grades 6-12) are paid a stipend over a 12-month period to develop new or refine existing problem-based curriculum pathways that integrate water supply, wastewater, and stormwater management systems. Fellows integrate classroom rigor with community impact while advocating for district-wide adoption of the methods and resources they develop. Fellows are selected from the Lake Washington, Bellevue, Issaquah, and Tukwila School Districts. The Program is funded by Cascade Water Alliance and facilitated by Sustainability Ambassadors.

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About Problem-Based Learning

Problem-based learning (PBL) is experiential learning organized around the investigation and resolution of messy, real-world problems. Teachers coach student thinking and guide student inquiry as a co-investigator. PBL increases student motivation through the pull of problem dissonance, intrinsically inspiring students to take on more and delve deeper as they make a personal investment in the outcome of their inquiry. Coupled with cognitive coaching strategies, PBL calls upon critical and creative thinking by suspending the guessing game of: "What's the answer that the teacher wants me to find?" PBL promotes metacognition and self-regulated learning as students generate strategies for defining problems, gathering information, analyzing data, building and testing hypotheses, comparing strategies with those of other students and mentors, and sharing results with real-world stakeholders. Source: <http://pbln.imsa.edu/model/intro>

School District Context

The Tukwila School District's strategic plan was established in 2014 through an extensive community process. The strategic plan outlines the shared values of engaging families as equal partners in student learning, strengthening community partnerships, fostering trust and mutual respect, and ensuring equitable access and opportunities for all students. "Student Vital Signs" embedded in the plan include: (1) perseverance and passion for learning; (2) critical thinking and problem solving; (3) student voice, self-advocacy, and goal orientation; (4) proficiency in all subjects; (5) closing the achievement gaps; and (6) successful transitions from level to level. These shared values and vital signs are reinforced through a problem-based approach to teaching and learning where students align academic rigor with community relevance.

City Context

The City of Tukwila Strategic Plan, as well as the long range community blueprint set forth in the Comprehensive Plan guides decision making on private and public development, long-range planning, and the environmental sustainability of projects and programs that impact the City and its residents. The city welcomes a close partnership with the Tukwila School District.

Water Systems Civics

High School Grade 11-12

Problem Statement

“How can I support the Tukwila community on improving my city’s water systems policies, programs, and performance?”

Project Summary (6 Weeks)

Project Summary: The unit begins with a hook to build interest around urban water issues. This year, the drinking water issues in Flint, Michigan lent themselves to conversations on water supply systems, class and race, and government accountability. These conversations help build conceptual and emotional context for analyzing policy, programs, and performance measures related to water systems in our own community.

Second, students took an online True/False pre-test on water systems. Students analyzed aggregate results for their class to see where they have agreement, break into small groups to research probable answers for selected questions, and write and present an answer guide for the entire class. Students use a research guide of annotated links to support their inquiry. This process aids teachers and students in identifying areas of interest for problem-based learning.

Third, students familiarize themselves with the key policy frameworks, programs and performance measures our city uses to manage local water systems. Students consider their own role in water conservation as a resident of their city and how their personal actions support city programs and policies. Crucial at this stage, is for students to understand what metrics the city uses to measure its performance against policy goals so that students can clearly see how their own actions are part of the city’s framework for improving water systems.

The next step is for students to design and implement a Community Impact Project. Student voice is central in project development and selection. The focus is on a local, measurable improvement in one of the following areas: personal stewardship actions, community education, policy recommendations, and the construction of new facilities or infrastructure such as designing a new home, apartment complex, multi-use urban village, school campus or city facility. Students will communicate the results of their Community Impact Projects to local stakeholder groups that may include city council, city staff, school board, chamber of commerce, local utility operators, community members, younger students, or civic groups such as the Rotary Club.

As the unit closes, students will take a post-test (a repeat of the pre-test) analyzing aggregate data, comparing improvements from their pre-test responses, and discussing issues or concepts needing more attention. As a final assessment for this project, students complete an essay in a “Document Based Question” format where they make a claim that answers a question around the need for water conservation and back it up with evidence.

Community Impact Project Menu for Student Voice

1. Attend a series of City Utilities Committee meetings to develop joint outreach programs to educate consumers on conserving water and saving money.
2. Help City Council develop a resolution to conserve water through student-to-community outreach.
3. Work with City staff to develop one or more fact sheets to educate families and other residents on the city water system. Facts sheets may include information on: reservoirs, wells, pumps, maintenance protocols, consumption rates, billing, or budget prioritization.
4. Conduct home water audits and report total retrofit savings to stakeholders. Critique tools to improve the audit process for future years.
5. Challenge City Council, School Board and other civic stakeholders to conduct home water audits to lead by example and inspire through modeling.
6. Build rapport with apartment managers or owners to retrofit and report savings to stakeholders. Work with Mike Brent, Water Resources Manager at Cascade Water Alliance, to develop a fact sheet to help communicate conservation opportunities.
7. Produce a set of water conservation design recommendations for the construction of new homes or apartments and share with staff and City Council.
8. Produce a set of water conservation design recommendations for new school district or commercial construction and share with staff and City Council.
9. Produce a 20-year planning framework for expanding the use of reclaimed water from the Wastewater Treatment Facility.
10. Produce a career track table for water systems internships, college pathways, and careers.
11. Develop a lesson plan to educate younger students on the importance of conserving water and stewardship actions they can implement at home.
12. Write a series of op-ed pieces for publication in a local newspaper aimed at furthering community education. Link these essays to city and school district e-news.

Breaking Down the Problem Statement

How can I support the City Council and staff on improving my city's water systems policies, programs, and performance?

How can I...

- Where is my civic power? What are my civic responsibilities?
- How do I "vote" with my own resource use and consumption habits?
- What is my role in educating my family on water conservation issues?
- How do I empower my peers to care about and take action on water conservation?
- How do we engage a diverse community with different cultural and language needs?

support the City Council and staff...

- Who is currently on the City Council and what are their policy positions?
- Who is currently on the City staff and what are their job descriptions?
- What is the relationship between the city and Cascade Water Alliance?
- What is the utility revenue base for City Council to be able to do its work?

on improving my city's water systems policies...

- How do we rely on local water supply systems?
- How do we rely on local wastewater treatment systems?
- How do we rely on local stormwater management systems?
- Are these local systems working? Could they work better? What's my role?
- How is the City's Comp Plan organized?
- What is the City's NPDES Stormwater Permit and the plan that is required?
- What is the City's role in the Green Duwamish Strategy?
- How clean is the Green River? Based on what shared criteria?
- What are the population growth expectations for our city over the next couple decades and how will this impact water systems? How is our government planning for this?
- How can new technologies be applied to solving water systems challenges?
- How will climate change trends have an impact on local water systems?

programs...

- What are the goals of the Stormwater Management Program?
- What are the goals of the Urban Tree Canopy Program?
- What are the goals of the Water Conservation Program?
- What are the goals of the Tukwila Shoreline Master Program?
- What are the goals of the Green Duwamish Strategy?
- How is my city aligning with King County's Equity and Social Justice Initiative?

and performance?

- Do annual program reports show that our City is on track to meet its policy goals?
- Can I design a Community Impact Project that helps improve my city's performance?

Community Impact Statement

Evidence that we have measurably contributed to solving the problem.

<p>Goal: By directly engaging in the civic process of local government to improve local water systems, students will demonstrate the following vital signs as described in the Tukwila School District Strategic Plan.</p> <ul style="list-style-type: none"> ● Perseverance and passion for learning ● Critical thinking and problem solving ● Student voice, self-advocacy, and goal orientation 			
Original Conditions <i>What were the conditions before we took action?</i>	Results <i>How did conditions improve as a result of our action?</i>	Recommendations <i>What do we think should happen next?</i>	Stakeholders <i>Who should know about our results and recommendations?</i>
<p>Pre-test benchmarks students knowledge of the problem</p> <p>Student water footprint</p> <p>Home water audit or apartment complex</p> <p>Home or apartment testing for lead in pipes</p> <p>Current city policies</p> <p>City Water Conservation Outreach Program</p> <p>Current City Drinking Water Report</p> <p>City Tree Canopy (% land coverage)</p> <p>City Stormwater Management Report</p>	<p>Post Test and student pledge cards</p> <p>Student and family behavior change</p> <p>Upgrade to water efficient fixtures, showerheads and faucet aerators. At least one apartment complex is retrofitted.</p> <p>Building codes improved for water conservation and GSI integration</p> <p>Students and families practice one or more stormwater BMP's</p> <p>Students and families participate in tree planting and habitat restoration</p>	<p>Roll out student-to-adult communication campaign, refine social media strategy, outreach to major partners, champions and key figures in the community</p> <p>New construction for Foster High School adheres to state of the art water conservation guidelines</p>	<p>ASB, Green Team, faculty, plus personal and professional connections</p> <p>School Board</p> <p>City Council</p> <p>Multifamily housing owners and managers</p> <p>Green Duwamish Symposium</p> <p>Cascade Water Alliance</p> <p>Rotary</p> <p>Chamber of Commerce</p> <p>Somali Community Center / Mosque</p> <p>Tukwila Community Center / Networks</p>

Curriculum Rigor meets Community Relevance

Civic engagement and conservation of water resources

Standard Assessed	Critical Content	Community Connections
<p>History/Social Studies Common Core Standards, Grades 11-12</p> <p>CCSS.ELA-LITERACY.RH.11-12 .1 Cite specific textual evidence to support analysis of primary and secondary sources, connecting insights gained from specific details to an understanding of the text as a whole.</p> <p>CCSS.ELA-LITERACY.RH.11-12 .2 Determine the central ideas or information of a primary or secondary source; provide an accurate summary that makes clear the relationships among the key details and ideas.</p> <p>CCSS.ELA-LITERACY.RH.11-12 .3 Evaluate various explanations for actions or events and determine which explanation best accords with textual evidence, acknowledging where the text leaves matters uncertain.</p> <p>CCSS.ELA-LITERACY.RH.11-12 .7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, as well as in words) in order to address a question or solve a problem.</p>	<p>How city government works, and how students can engage with city government</p> <p>Water supply, water quality treatment, water reservoir and distribution system</p> <p>Plumbing systems and water conservation in my home or apartment</p> <p>Water meter, water billing, city budget prioritization</p> <p>City water conservation goals and measures</p> <p>City Stormwater management goals and measures, and BMP's students can do at home</p> <p>How the King County Wastewater Treatment system works and what students and families should never flush down the toilet</p> <p>Public speaking skills</p> <p>Persuasive writing skills</p> <p>Research skills</p> <p>Using social media to raise awareness among Tukwila residents</p> <p>Career paths in water resource management</p>	<p>School District Strategic Plan</p> <p>School District / McKinstry Resource Conservation Plan</p> <p>City Stormwater Management Plan</p> <p>City Water Conservation Plan</p> <p>King County Wastewater Management Plan</p> <p>City Climate Action Plan</p> <p>City Comprehensive Plan - Environment Section</p> <p>STAR Community Rating System</p> <p>WRIA 9 Salmon Recovery Plan</p> <p>Green-Duwamish Strategy</p> <p>Puget Sound State of the Sound Report</p> <p>Results Washington</p> <p>EPA - Clean Water Act</p>
<p>Civics Standards for High School</p> <p>D2.Civ.5.9-12. Evaluate citizens' and institutions' effectiveness in addressing social and political problems at the local, state,</p>		

<p>tribal, national, and/or international level.</p> <p>D2.Civ.7.9-12. Apply civic virtues and democratic principles when working with others.</p> <p>D2.Civ.9.9-12. Use appropriate deliberative processes in multiple settings.</p> <p>D2.Civ.10.9-12. Analyze the impact and the appropriate roles of personal interests and perspectives on the application of civic virtues, democratic principles, constitutional rights, and human rights.</p>		
<p>Economic Standards for High School</p> <p>D2.Eco.1.9-12. Analyze how incentives influence choices that may result in policies with a range of costs and benefits for different groups.</p>		
<p>Geography Standards for High School</p> <p>D2.Geo.2.9-12. Use maps, satellite images, photographs, and other representations to explain relationships between the locations of places and regions and their political, cultural, and economic dynamics.</p> <p>D2.Geo.4.9-12. Analyze relationships and interactions within and between human and physical systems to explain reciprocal influences that occur among them.</p>		

Learning Products & Assessment Strategies

Learning Products	Assessment Strategies
Succinct informational Google slide answering pre-test questions.	Formative - Pre Test and Student generated "Answer Guide"
Document Based Question style essay focusing on water conservation.	Use of Evidence to prove a claim Summative
Student generated plan addressing a chosen issues.	Performance Task (Claim, Evidence, Reasoning)
Student responses to teacher generated questions on learning and effectiveness of unit.	Reflection

Teacher Reflection

Teaching about water conservation in my Civics classroom has been a new and rewarding experience. One of the main goals of this class is to engage students in real issues affecting their community, and teach them how to interact with local government. Issues surrounding water conservation provide a perfect vehicle to meet this goal. Although the ideas surrounding environmental stewardship are not new to students at Foster High School, there is a lot of learning to be done on how we are environmental stewards in our communities and what drives the need for conservation. In an urban setting such as Tukwila I recognize the challenge to thrust water to the forefront of my students' lives when so many other obstacles already exist. One of the most rewarding parts of this work was seeing students engage with one another and become invested in water conservation, especially in our city. Students always become inspired when they are empowered. Allowing young people to engage with this work allows space for this to occur naturally. Next year I hope to work more closely with members of Tukwila city staff, City Council, and the Cascade Water Alliance to engage students on learning beyond our classroom. Even though the ideas and motivation from students were present, we didn't get to put them into action.

Student Testimonials on Learning, Motivation and Application

"The most memorable unit in the class was our water unit...Aside from learning about Flint, we also looked at water more generally. How it's used, how much of it is used, and what we can do to conserve it. This was a very interesting topic for me. Water conservation has always been at the back of my mind, but I've never thought about it too deeply. This unit has allowed me to see

some facts and statistics about water, and learn ways to conserve it. This isn't just a significant topic for US society, but for everyone. Simply put, we all need water, but we don't have an unlimited amount, especially drinkable water. Saving water now is the best way to help ensure that everyone in the future has some to drink and use as well."

"These ideas are significant to the U.S society in a sense that, they all contribute to the issues in our surroundings. For instance, without this issue in Flint, I wouldn't be very concerned about the conservation of water but since the introduction of this topic I realized how important it's to save water because most people need it in their lives. I find these issues interesting because, I actually learned a lot more than expected."

"In twenty five years I think the most memorable thing about this class would be the water unit. This is simply because I've never done anything about it. I learned many things about water. Many statistics that surround it. I learned what my community is doing to conserve water, and some of the safeguards we have in place. It's not that amazing or anything, but it was something unique that I didn't think a civics class would address."

Really Helpful Resources

City of Tukwila Comprehensive Plan

<http://www.tukwilawa.gov/departments/community-development/comprehensive-plan/>

City of Tukwila Public Works - Landing page with "popular Links" to:

- City Comprehensive Water Plan
- City Comprehensive Surface Water Plan
- City Comprehensive Sanitary Sewer Plan

<http://www.tukwilawa.gov/departments/public-works/>

City of Tukwila Drinking Water Annual Report for 2014

<http://tukwilawa.gov/wp-content/uploads/PW-Water-Quality-Report.pdf>

Cascade Water Alliance

<http://cascadewater.org/>

Water Systems Video Library - expert talks plus annotated links

<http://www.sustainabilityambassadors.org/apps/videos/channels/show/4243207-water-systems>

Stormwater Pollution Solutions - Classroom Resources

<http://www.sustainabilityambassadors.org/stormwater-education>