Council Meeting Date: June 4, 2012 **Agenda Item:** 7(a)

CITY COUNCIL AGENDA ITEM

CITY OF SHORELINE, WASHINGTON

AGENDA TITLE:	Surface Water Utility Discussion –Shoreline School District Fee Credit Options
DEPARTMENT:	Public Works, Administrative Services
PRESENTED BY:	
ACTION:	____ Ordinance ____ Resolution ____ Motion __X__ Discussion ____ Public Hearing

PROBLEM/ISSUE STATEMENT:

The King County Code provides a surface water management (SWM) fee public school district discount program. It allows school districts in their service area to apply for a waiver of the annual fee based on the school districts providing documentation of their activities supportive of the goals of the surface water program. A recent state audit of the City's Surface Water Utility revealed that King County had continued to give a 100% credit of the Shoreline School District's surface water management fees per the original King County Code; however, when the City's code was adopted using the King County code as a template, it was silent on the issue of a fee credit . Preliminary annual utility fee estimates for the School District, using the City's current surface water fee structure, would be approximately $180,000.

The City of Shoreline must resolve this issue as the City cannot continue to allow for the fee waiver without having this option included in the City's code. Staff has already notified the School District of this situation.

On April 2 the Council discussed a potential fee credit program for the School District. The April 2nd staff report can be found at **http://cosweb.ci.shoreline.wa.us/uploads/attachments/cck/Council/Staffreports/2012/Staffreport040212-7e.pdf**.

Given the length of the meeting on April 2, the Council was not able to complete their discussion. They did request that staff return at a later date with additional information and options for the Council to consider.

RESOURCE/FINANCIAL IMPACT:

Given that King County has been applying the fee credit to the Shoreline School District, the City has not been collecting SWM fees from the School District since the City incorporated, nor has the City included the potential revenue from SWM fees from the School District in future utility revenue projections. If Council elects to incorporate an educational credit program for surface water related curriculum taught at Shoreline School District it is likely that there would be no financial impact to the Surface Water

Utility Fund. If the Council does not adopt a fee credit program, then the Shoreline School District would be subject to the payment of SWM fees, which are estimated at $180,000 annually. This additional revenue could be used to delay future SWM fee increases for existing rate classes, such as residential and commercial accounts.

RECOMMENDATION

Staff recommends the development a fee credit program for the Shoreline School District. If Council provides this direction, staff will return to Council with the appropriate ordinance to incorporate the fee credit program into the Shoreline Municipal Code and work with the School District to implement the program in 2012.

Approved By: City Manager - *JU* City Attorney - *IS*

INTRODUCTION

The King County Code provides a surface water management (SWM) fee public school district discount program. It allows school districts in their service area to apply for a waiver of the annual fee based on the school districts providing documentation of their activities supportive of the goals of the surface water program. A recent state audit of the City's Surface Water Utility revealed that King County had continued to waive the City's surface water management fees per the original King County Code; however, when the City's code was adopted using the King County code as a template, it was silent on the issue of a fee credit. Preliminary annual utility fee estimates for the School District, using the City's current surface water fee structure, would be approximately $180,000. King County has not been requiring the Shoreline School District to provide documentation of their educational programs that justify the fee credit since the administration of any credit is the responsibility of the individual jurisdiction.

The City of Shoreline must resolve this issue as the City cannot continue to allow for the fee credit without having this option included in the City's code. Staff has already notified the School District of this situation. This analysis presents information regarding the estimated SWM fees for the Shoreline School District, regional survey results on other municipality school district fee credit programs, and financial considerations.

BACKGROUND

The policy of providing an educational credit toward stormwater fees from public schools is a program first established by King County through the adoption of King County's stormwater code (KCC Title 9). The program allows public school districts to demonstrate that they are providing an equivalent amount of value in the form of a curriculum around stormwater education.

SCHOOL DISTRICT FEE CREDIT PROGRAM DISCUSSION & ALTERNATIVES

King County Surface Water Management Fee School Discount Program

The King County SWM Fee School Discount program was part of the County's SWM program since inception in 1987. It allows public school districts in the service area to apply for a credit of the annual fee based on the school districts providing documentation of their activities supportive of the goals of the surface water program. The intent of the school credit program is to encourage school districts to administer curricula that encourage community stewardship of King County's water resources. Public school district properties, like other properties with impervious surfaces, contribute to surface water problems, but schools can also help meet the utility's community education goals. The program benefits the public in two ways: school district funds that would be spent on the SWM fees can be used for other purposes and students learn how to protect and appreciate water resources.

Neighboring Jurisdictions

A recent 2010 survey by the City of Federal Way regarding fee credit programs for school districts shows that approximately 7 (about 25 percent) of the 29 jurisdictions that responded provide a fee credit to the local public school district (Attachment A). The April 2nd staff report included sample fee credit programs from King County, Marysville, Federal Way, and Bremerton. The Bremerton model identified a list of acceptable curriculum topics, along with a methodology to determine the value of the

credit based on the school district's cost to provide the qualifying educational classes to students. The school district submits a list of their curriculum along with a cost to implement and this is applied towards their stormwater fees for a credit of up to 100% of the charged fee. Bremerton's program also allows for credit for qualifying hands-on special events that promote education and surface water stewardship.

Surface Water Fee Rate - Intent

The City's Surface Water Utility is a self-supporting enterprise fund. As such, the stormwater fee is intended to fully fund all aspects of the program including annual inspections, maintenance and capital improvements, along with the City's NPDES permit requirements.

National Pollutant Discharge Elimination System (NPDES) Education Requirements

The City's NPDES permit, as required by the federal government and State, requires the development of an education and outreach program that targets specific audiences. Because of Shoreline's large school age children population, staff recognizes the importance of having an education program that targets them. But there are other target outreach groups listed in the permit aside from the general public that include businesses, contractors, engineers, developers and property managers. Even with an extensive school education program, Shoreline is still required to address the other target groups.

Councilmember Roberts had asked if there were any studies that show that the educational materials provided by school districts in order to comply with educational mandates are effective. To date staff has not been able to find any studies that address this topic.

The Shoreline School District has directly benefited from the Surface Water Environmental Mini-Grant program. The City, through the SWM Operations budget of the Environmental Mini-grant program, has provided educational programs to the school district in the amount of $11,385 since 2009. These educational programs help the City meet its NPDES requirements.

Previous Year Waivers

Over the last sixteen years staff estimates that King County has credited between $1.7 and $2 million of surface water fees from the Shoreline School District. Given that King County has been inadvertently providing a full credit for SWM fees to the Shoreline School District for a number of years, the City will be requesting that the School District document the educational programs that they provided during the last three years that would have justified the King County fee credit. The City Attorney's office has recommended that staff work with the School District to document their qualifying educational programs for the last three years, which follows the time period for the statute of limitations.

The City currently contracts with King County to bill the City's surface water bill on the semi-annual property tax bill. Thus, property owners pay their surface water bill in two

semi-annual installments with the first payment due April 30 and the second due October 31 each year.

Fee Credit Options
The Council can determine whether they would like Shoreline's SWM Utility to offer a fee credit program to the Shoreline School District. Below are the pros and cons for each alternative.

Alternative 1. Do Not Provide a SWM Fee Credit for the School District
The City is not required to provide a SWM fee credit for public school districts. Currently there is no such program provided for private schools or any other educational institution. The City does provide a fee waiver for qualifying low-income seniors and persons with disabilities, along with opportunities for discounts and cost-sharing for projects that reduce impervious surface on commercial properties.

If the Council does not want to provide a fee credit program for the school district, then the school district will need to start paying SWM fees, which are estimated at $180,000 annually. The school district has not included these fees in their budget, as they have never paid them either to King County, before City incorporation, or to the City following incorporation.

Pros
The SWM fee revenue collected from the School District would support surface water operational and capital improvements throughout the City. This additional revenue could be used to improve operational programs, construct more capital projects for replacing aging infrastructure, delay future rate increased or reduce fees of existing rate classes. The $180,000 would be approximately equivalent to a rate reduction to existing residential accounts of $7.30 per year.

Cons
The School District would need to allocate $180,000 of their budget for the City's SWM fees, which will impact their ability to provide some of their existing educational programs.

Alternative 2. Implement a SWM Fee Credit Program for the Shoreline School District
The City can develop a SWM fee credit program based on the King County and Bremerton programs that allows for the public school district to receive credit for qualifying educational programs that benefit the City's surface water utility. If Council desires to consider a fee credit program, then staff recommends that it be based on a model similar to that of the City of Bremerton. Staff recently met with a representative from the Shoreline School District to discuss existing educational curriculum that would benefit the City's SWM utility along with a method to determine the value of the credit towards the district's SWM fees (Attachment B). The City would require that the annual credit determination be documented. Staff would recommend that the fee credit program be re-examined by the Council in three to five years. Council could consider sunsetting the credit program at the end of this time.

Staff would recommend that if the City implements a fee credit program for the school district, then that the City would no longer fund educational programs for the school district through the environmental mini-grant program.

The King County fee credit program is only applicable to public school districts for kindergarten through grade twelve schools. If the Council wanted to expand a fee waiver program to private schools, there would be a significant reduction in revenue to the City's surface water utility given that the private schools currently pay the utility fee. Lost revenues would limit severely our ability to meet the Utilities obligations to infrastructure improvements and maintenance. This, increased fees would need to be considered to address short and long terms Utility obligations.

Pros
The School District's educational programs provide a benefit to the City's Surface Water Utility and protection of the environment. Educated students will have a greater understanding of stormwater pollution; this awareness positively benefits the community and local environment. The School District will not have to reallocate $180,000 of their budget to pay for SWM fees.

Cons
Providing a fee credit for the School District shifts the burden for revenue collection to other residential and commercial accounts, in other words their fees could be slightly lower if the Utility collected SWM fees from the district. Another option would be that the additional SWM fees from the School District would increase the revenue for future maintenance and capital projects. In addition, the fee credit program adds another operation program that will require existing staff resources to implement.

Credit Alternatives
On April 2nd Council members asked staff to explore if there were opportunities for the School District to perform activities or capital projects that had a more direct contribution to the surface water utility. Staff did explore the potential for receiving exchanging a credit for easement rights to facilitate some surface water improvements using property at Cedarbrook and North City schools. Unfortunately, the easement rights have a one-time value and therefore would not provide an option for a multi-year credit program.

RESOURCE/FINANCIAL IMPACT

Given that King County has been applying the fee credit to the Shoreline School District, the City has not been collecting SWM fees from the School District since the City incorporated, nor has the City included the potential revenue from SWM fees from the School District in future utility revenue projections. If Council elects to incorporate an educational credit program for surface water related curriculum taught at Shoreline School District it is likely that there would be no net financial impact to the existing Surface Water Utility Fund; the educational credit program would be a new work program to be administered by existing staff. If the Council does not adopt a fee credit program, then the Shoreline School District would be subject to the payment of SWM fees, which are estimated at $180,000 annually. This additional revenue could be used to either delay future SWM fee increases for the Surface Water Utility or to fund future operational, maintenance, and capital programs.

RECOMMENDATION

Staff recommends the development a fee credit program for the Shoreline School District. If council concurs, with staff recommendation,staff will return to Council with the appropriate ordinance to incorporate this into the Shoreline Municipal Code and work with the School District to implement the program in 2012.

ATTACHMENTS

Attachment A: SWM Fee Credit Survey Summary, conducted by City of Federal Way regarding SWM Fee Credits for local school districts

Attachment B: Shoreline School District Qualifying Educational Programs

Survey of Local Jurisdictions-
Stormwater Reduction Programs for Local Schools

(Conducted by the City of Federal Way, March 2010)

1. Does your jurisdiction offer a Surface Water fee waiver/reduction program for the local school district?

Auburn	No
Battleground	No
Black Diamond	No
Bothel	No
Bremerton	**Yes**
Edmonds	No
Enumclaw	No
Everett	No
Federal Way	**Yes**
Fife	No
Issaquah	**Yes**
Kent	No
Kirkland	No
Longview	**Yes**
Marysville	**Yes**
Mill Creek	**Yes**
Monroe	No
Mount Vernon	No
Mountlake Terrace	No
Poulsbo	No
Puyallup	No
Renton	No
SeaTac	No
Shoreline	No
Sumner	No
Tukwila	No
Pierce County	No
King County	**Yes**
Whatcom County	No

2. If so, do you require the school district meet certain requirements in order to receive a waiver or a reduction of fees?

Bremerton	Yes
Federal Way	Yes, but we are re-evaluating the requirements.
Issaquah	Yes, same as King County.
Longview	Yes
Marysville	Yes, Marysville has an ordinance that describes the curriculum requirements for the school's environmental education program.
Mill Creek	Yes, however there are no set requirements. The City periodically requests information regarding the curriculum.
King County	Yes, local school districts provide educational opportunities related to environmental subjects included hydrology, stormwater, water quality, etc. Schools are also required to maintain their stormwater facilities and will be charged, for that parcel, if it is not maintained. The schools are also required to implement source control measures per King County's Stormwater Pollution Prevention Manual.

3. If your jurisdiction waives fees in exchange for surface-water related curriculum, do you play a role in helping develop the curriculum?

Bremerton	Yes, the curriculum must be specific to the problems and issues pertaining to surface and stormwater.
Federal Way	No
Issaquah	No. The City reviews the annual report each year and typically finds that their program is fairly extensive.
Longview	Yes
Marysville	The City does not develop the programs but do require the school district to submit their curriculum for approval.
Mill Creek	No
King County	The County has a list of subjects that need to be chosen from.

4. Do you track these activities as public education & outreach for the NPDES permit?

Bremerton	Yes
Federal Way	Not in the past, but plan to.
Issaquah	No, but this is a good idea.
Longview	Not in the past.
Marysville	Yes
Mill Creek	Yes
King County	We haven't tracked this for the permit but it does provide opportunities. We would have to get more deeply involved in the curriculum to ensure stormwater issues were part of the class work.

5. Does your jurisdiction assess or evaluate the success or understanding of storm water related topics that are taught by the school district?

Bremerton	Yes
Federal Way	Not in the past, but plan to.
Issaquah	No
Longview	No
Marysville	Yes
Mill Creek	No
King County	No

6. Does your jurisdiction provide additional surface water related education to schools?

Auburn	**Yes**
Battleground	No
Black Diamond	No
Bothel	**Yes**
Bremerton	Upon request.
Edmonds	Upon request.
Enumclaw	No
Everett	**Yes**
Federal Way	Upon request.
Fife	No
Issaquah	No
Kent	**Yes**
Kirkland	**Yes**
Longview	**Yes**
Marysville	**Yes**
Mill Creek	Upon request.
Monroe	No
Mount Vernon	**Yes**
Mountlake Terrace	**Yes**
Poulsbo	No
Puyallup	Upon request.
Renton	No
SeaTac	Upon request.
Shoreline	No
Sumner	No
Tukwila	No
Pierce County	**Yes**
King County	No
Whatcom County	No

List of WLR (Water and Land Resource) Division – Approved Curriculum Topics

1. The Hydrologic Cycle
2. Rainfall and its functions in the system
3. Wetlands, streams, rivers, lakes, and their ecological systems
4. The effects of urbanization on surface water quality and quantity
5. Water pollution point and non-point sources
6. Land uses effects on runoff and stormwater (impervious surfaces, livestock, motor vehicles, gardening, etc.)
7. The causes and effects of flooding
8. Wetland wildlife: birds, amphibians, insects, and their roles in the ecosystem
9. Salmonids (salmon and trout)
   a. Life cycle
   b. Habitat requirements
   c. Fisheries
10. Wetland plants/native plants and their benefits
11. Studies of the watershed or stream basin in which the school or district is located

SHORELINE SCHOOL DISTRICT

TOTAL HOURS OF WATER AND LAND RESOURCE DIVISION - APPROVED CURRICULUM

2011-2012

Grade Level	Curriculum Topic	Title of Class, Activity, Field Trip or Teacher Training	(a) # of Classrooms	(b) Hours per Class	(c) Total hours
K-6 @ BC		Stream of Dreams Classroom	20	4.50	90.00
K-6 @ BC		Stream of Dreams Principal	1	40.00	40.00
K-6 @ BC		Stream of Dreams	30	3.00	90.00
2	1. The Hydrologic Cycle 2. Rainfall and its functions in the system	Weather	23	13.00	299.00
4		Water Kit	22	3.00	66.00
5		Hazards on the Home Front	4	3.00	12.00
5		Landforms kit, rivers, specifically erosion and deltas	22	3.00	66.00
7	The Hydrologic Cycle	Cycles of Matter	22	3.00	66.00
7		Energy Flow in Ecosystems	22	4.50	99.00
7		Environmental Issues	22	4.50	99.00
7		Hazards on the Homefront and Eco Connections	11	3.00	33.00
8	The causes and effects of flooding. Land uses effects on runoff and storm water	Science and Society: Protecting Homes in Flood Plains/Water Erosion	5	22.00	110.00
8		Surface Water/River Systems/Ponds/Lakes/Wetlands	22	5.00	110.00
8	Land uses effects on runoff and storm water	Using Freshwater Resources/Water to Drink	22	7.50	165.00
8	The effects of urbanization on surface water quality and quantity.	Using Freshwater Resources/Water to Drink	22	13.50	297.00
8	Rainfall and its functions in the system	Water on the Earth/Types of Precipitation	22	3.50	77.00
8		Water Erosion	22	1.00	22.00
8	Wetland wildlife	The importance of wetlands on the environment and their effect on the overall ecosystem	22	5.50	121.00
8	The Hydrologic Cycle	Where does Water Come From?/Water on Earth/Water in the Atmosphere	22	6.00	132.00
7, 8 Honor Society		Paper Recycling	1	36.00	36.00
Biology: 9, 10, 11	Wetlands, streams, rivers, lakes, and their ecological systems, The Hydrologic Cycle, wetlands, wildlife	What on Earth Unit	25	3.00	75.00
Biology: 9, 10,11	Wetlands, streams, rivers, lakes, and their ecological systems	Wetlands, Streams, Lakes & Ecological systems	13	8.00	104.00
Environmental Science: 11, 12		The effects of urbanization on surface water quality and quantity	7	5.00	35.00
TOTAL					**2,244.00**

NOTE: This does not yet include District staff support costs or the costs of supplies and materials.

5/15/12

Shoreline School District
Stormwater Credit Lesson

Grade Level: K-6

Approved Curriculum Topic:
• Studies of the watershed and stream basin in which the school district is located

Related Power Standard(s):
K-1: I understand that habitats are places that meet the daily needs of living things. LS2 A,B
I understand that humans can influence habitats LS2 C
2-3: I can understand that ecosystems contain living and non-living parts and support life on earth. I can describe how changes within ecosystems affect the living populations and non-living parts. LS2 A-D
4th: I know that humans use Earth materials in many ways that can have a positive/negative impact on a given ecosystem. ES 2
5th: I understand that an ecosystem includes living and non living recourses. LS 2
6th: I can investigate an answerable question through valid experimental techniques. 6-8 Inq A,B,C,D,E

Lesson /Unit Title:
Streams of Dreams Project done by Briarcrest Elementary

Program Content: Our mission is to educate communities about the life and function of their watersheds, rivers and streams, while dazzling them with the charm of community art. Eco-Education with a focus on local Watersheds, Streams, Rivers and the Ocean.

Calculations Table:

Number	Activity	# Students	# Teachers	Hours	Total Hours
	Watershed Education	480	20	1.5	30
	Painting Dreamfish	480	20	1.5	30
	Mural Installation	480	20	1.5	30
	Principal	$491/hr	1	40	40
	Parent volunteers		30	3	

- Stream of Dreams Instructors present the watershed education and Dreamfish painting workshops (usually 1 to 4 days, depending on school size). Your school needs to supply a well-ventilated, bright room with space for 5-7 tables for painting.

After the workshops are completed, Stream of Dreams staff design and direct the mural installation with the help of community volunteers, **ideally 6-8 people**.

- •Design, planning and watershed research
- Art paint and all other supplies for the workshops
- Art and environmental instructors for the workshops (**Generally 6 classes per day, 80-90 minutes per class split into two parts: first part watershed education/stream talk and second part painting the Dreamfish. For example a school of about 400 students (18 divisions) takes 3 days.**
- Mural Installation - 1 to 2 days depending on the number of volunteer helpers and the number of pieces.
- Assembly – for 1 hour

•The Stream of Dreams education model inspires protection and enhancement of fish habitat and fresh water resources:

- A highly interactive and imaginative project.
- An effective method of engaging whole communities to think about the water that moves through their lives.
- Helps to conserve freshwater resources, protect and restore fish habitat.
- Unites communities and beautifies neighborhoods.

Gives children hope and shows them the power of a dream.

Shoreline School District
Stormwater Credit Lesson

Grade Level: 2

Approved Curriculum Topic:
- The Hydrologic Cycle
- Rainfall and its functions in the system

Related Power Standard(s):
#2 Inquiry: Making Observations

I can carry out natural world investigations using the scientific process:
* I can use instruments
* I can make observations
* I can record and share data
* I can draw evidence based conclusions

Lesson /Unit Title: Weather observations

Program Content:
The students have made weather observations using their five senses and then learned about the various tools used to measure and record wind and temperature. They both made model thermometers to practice reading a thermometer, but also used real thermometers to measure outside and inside temperatures. They graphed their results and made observations regarding precipitation, sunny/cloudy, and wind. They have not done any large projects, but did smaller things such as graphing, recording hot/cold water temps, and summarizing weather trends. We have spent about 12-13 hours on this.

Calculations Table:

Number	Activity	# Students	# Teachers	Hours
				13

Shoreline School District
Stormwater Credit Lesson

Grade Level: 5

Approved Curriculum Topic:

a. Wetlands, streams, rivers, lakes, and their ecological systems
b. The causes and effects of flooding

Related Power Standard(s): Earth and Space Sciences

• I know soils are made by weathering and erosion of earth materials and can be deposited in various land forms ES2
• I understand that the Earth materials include solid rocks, soil, water ES2

Lesson /Unit Title:

Program Content:

Calculations Table:

Number	Activity	# Students	# Teachers	Hours	Total Hours
	#3. Landforms kit, rivers, specifically erosion and deltas,			3	
	#7. Landforms kit			3	

Shoreline School District
Stormwater Credit Lesson

Grade Level: Grade 7

Approved Curriculum Topic:
• Wetlands, streams, rivers, lakes and their ecological systems

Related Power Standard(s):
• I can explain how the water cycle creates fresh water and can dissolve minerals and gases that end up in the oceans.
• I can explain how current local landforms show evidence of past weather and geological events. Earth's geology is changed by rapid catastrophic events, slow gradual changes and by living organisms.

Lesson /Unit Title: Energy Flow in Ecosystems
Program Content: The role energy has on organisms in the ecosystem, how energy moves through the ecosystem. Terms: food chain, decomposer, food web, producer

Calculations Table:

Number	Activity	# Students	# Classes / Sections	Hours
p 740 -745	King County Waste Presentation	510	17	1

Shoreline School District
Stormwater Credit Lesson

Grade Level: Grade 7

Approved Curriculum Topic:
• The Hydrologic Cycle

Related Power Standard(s):
• I can explain how the sun's energy drives winds, ocean currents, and water cycles

Lesson /Unit Title: Cycles of Matter
Program Content: Processes involved in the water cycle, understanding the workings of the water cycle. Using terms such as: water cycle, precipitation, evaporation and understanding the effects of the water cycle on the environment.

Calculations Table:

Number	Activity	# Students	# Classes / Sections	Hours
p.746 - 747		630	22	4

Shoreline School District
Stormwater Credit Lesson

Grade Level: Grade 7

Approved Curriculum Topic:
• Wetlands, streams, rivers, lakes and their ecological systems

Related Power Standard(s):
• I can explain how the water cycle creates fresh water and can dissolve minerals and gases that end up in the oceans.
• I can explain how current local landforms show evidence of past weather and geological events. Earth's geology is changed by rapid catastrophic events, slow gradual changes and by living organisms.

Lesson /Unit Title: Energy Flow in Ecosystems
Program Content: The role energy has on organisms in the ecosystem, how energy moves through the ecosystem. Terms: food chain, decomposer, food web, producer

Calculations Table:

Number	Activity	# Students	# Classes / Sections	Hours
p 740 -751		620	22	3
p 767		620	22	1.5

Shoreline School District
Stormwater Credit Lesson

Grade Level: Grade 7

Approved Curriculum Topic:
- Water pollution point and non-point sources
- The effects of urbanization on surface water quality and quantity
- Land uses effects on runoff and stormwater.
- The causes and effects of flooding.

Related Power Standard(s):
- I understand that scientists and engineers work in teams and use technology to solve problems (6-8 app A,C,D,E)
- I can describe how technologies have changed over time to help people deal with the world they live in. (6-8 App A&G)
- I can investigate a problem and suggest possible solutions based on scientific research. (6-8 App D,E &F)
- I can safely investigate an answerable question through valid experimental techniques. (6-8 Inq A,B,C,D,E)

Lesson /Unit Title: Environmental Issues
Program Content: Students will study environmental issues, how decision makers balance different needs and concerns. They will learn about natural resources, renewable resources, nonrenewable resources, pollution and environmental science.

Calculations Table:

Number	Activity	# Students	# Classes / Sections	Hours
p 778 -782	Environmental effects of populations	630	22	4.5
p 783	Recycling Paper	630	22	4.5

Shoreline School District
Stormwater Credit Lesson

Grade Level: 8

Approved Curriculum Topic:
Wetland wildlife: birds, amphibians, insects and their roles in the ecosystem

Related Power Standard(s):

Lesson /Unit Title: Wetlands

Program Content: The importance of wetlands on the environment and their effect on the overall ecosystem

Calculations Table:

Number	Activity	# Students	# Classes / Sections	Hours
P 398-399 P 401-403	Discussion of Wetlands, their makeup and importance	630	22	3
	Lab involving making their own wetlands	630	22	2.5

Shoreline School District
Stormwater Credit Lesson

Grade Level: 8

Approved Curriculum Topic:
The causes and effects of flooding
Lands uses effects on runoff and storm water

Related Power Standard(s):

Lesson /Unit Title:
Science and Society: Protecting Homes in Flood Plains/Water Erosion

Program Content: Rain and the consequences of flooding. Understanding the water cycle process in conjunction with flooding and the erosion process.

Calculations Table:

Number	Activity	# Students	# Classes /Sections	Hours
P 272-281	Reviewing the erosion process, lab on rain and erosion effects	630	22	2
P 284-290	Viewing the effects of rainfall, understanding the flood plain process and its overall effects on land.	630	22	3

Shoreline School District
Stormwater Credit Lesson

Grade Level: Grade 8

Approved Curriculum Topic:
The effects of urbanization on surface water quality and quantity.

Related Power Standard(s):
• I can explain how landforms are created by processes that build up structures and processes that break down and carry away material through erosion and weathering. **ES2G**

Lesson /Unit Title:
Using Freshwater Resources/Water to Drink

Program Content: How water is used, conserving fresh water, the impact of industry transportation, agriculture.

Calculations Table:

Number	Activity	# Students	# Classes / Sections	Hours
p 412-419	Describing water usages and the environmental effects on it	630	22	3.5
p 418- 419	What is Pollution and what are the solutions	630	22	3.5
p 420-427	Class presentations of pollution cause and effect	630	22	4
p 420-427	Water Quality lab testing the water	630	22	2.5

Shoreline School District
Stormwater Credit Lesson

Grade Level: Grade 8 (Red book)

Approved Curriculum Topic:
Rainfall and its functions in the system

Related Power Standard(s):

Lesson /Unit Title:
Water on the Earth/Types of Precipitation

Program Content: Examining the bodies of water created by the water cycle, how clouds formed and how they relate to all ecosystems.

Calculations Table:

Number	Activity	# Students	# Classes / Sections	Hours
p 392 - 400	Lesson on Rainfall and its relation to the water cycle and systems roles of those cycles	630	22	2
p 568- 571	Types of precipitation lab	630	22	1.5

Shoreline School District
Stormwater Credit Lesson

Grade Level: Grade 8

Approved Curriculum Topic:
The Hydrologic Cycle
Wetlands, streams, rivers lakes, and their ecological systems

Related Power Standard(s):
- I can explain how the sun's energy drives winds, ocean currents and water cycles (ES2B, ES2C)
- I can explain how the water cycle creates fresh water and can dissolve minerals and gases that end up in oceans. (ES2D)

Lesson /Unit Title:
Where does Water Come From?/Water on Earth/Water in the Atmosphere

Program Content: Understanding the workings of the water cycle, discussing fresh and salt water formations: oceans, ice, lakes, rivers. Using terms such as: water cycle, precipitation, ground water, humidity, evaporation and understanding the effects of the water cycle on the environment.

Calculations Table:

Number	Activity	# Students	# Classes / Sections	Hours
p.14 p.392	Discussion / Condensation	630	22	3
448-455	Why is the ocean salty? Articles and worksheets	630	22	1.5
p. 560	Lab on how Fog forms	630	22	1.5

Shoreline School District
Stormwater Credit Lesson

Grade Level: 9,10,11 Biology

Approved Curriculum Topic:
The Hydrologic Cycle; Wetlands, streams, lakes and their ecological systems; Wetland wildlife: birds, amphibians, insects, and their riles in the ecosystem

Related Power Standard(s):
- I can explain the role of different organisms in communities (LS2E)
- I can explain how living and non-living things are connected in an ecosystem
- I can identify whether something is living or non-living using 5 characteristics of life
- I can describe how energy is passed from organism to organism in a food web (LS2A)
- I can describe how carbon, nitrogen, and water are cycled in ecosystems (LS2A)
- I can explain why carbon, nitrogen, and water are cycled in ecosystems (LS2A)
- I can explain how toxins are passed between levels of a food chain (LS2A)

Lesson /Unit Title: What on Earth Unit

Program Content:
Students study the biochemical cycles of the earth in a lesson entitled "The Infinite Loop". Students also create a biome project studying food webs and abiotic factors. Students conduct significant out of class research and spend two hours of class time "What's for Lunch Unit".

Calculations Table:

Number	Activity	# Students	# Classes / Sections	Hours
1	Biochemical cycles	780	25 sections	1
1	Biome Project	780	25	2

Shoreline School District
Stormwater Credit Lesson

Grade Level: 9,10,11 Biology

Approved Curriculum Topic: Wetlands, streams, lakes and their ecological systems

Related Power Standard(s):

- I can explain the role of different organisms in communities (LS2E)
- I can explain how living and non-living things are connected in an ecosystem
- I can identify whether something is living or non-living using 5 characteristics of life
- I can describe how energy is passed from organism to organism in a food web (LS2A)
- I can describe how carbon, nitrogen, and water are cycled in ecosystems (LS2A)
- I can explain why carbon, nitrogen, and water are cycled in ecosystems (LS2A)
- I can explain how toxins are passed between levels of a food chain (LS2A)

Lesson /Unit Title: Eco Study:

Program Content:

Ronald Bog Field Study: After answering a series of questions and carefully investigating Ronald Bog, write a paragraph describing the Ronald Bog Ecosystem. Include abiotic and biotic factors, historical disturbances, and the current use of the park.

Ecocolumn Project: Students construct a 3 -level terrarium and measure changes to the air and water in the terrarium over the course of 6 weeks. Students then do presentations to the class. (This is our Ecocolumn project).

Calculations Table:

Number	Activity	# Students	# Classes / Sections	Hours
1	Bog Lesson	390	11	2
1	Ecocolumn	780	22	6

Shoreline School District
Stormwater Credit Lesson

Grade Level: 11, 12 Environmental Science

Approved Curriculum Topic: The effects of urbanization on surface water quality and quantity

Related Power Standard(s):
- I can explain the role of different organisms in communities (LS2E)
- I can explain how living and non-living things are connected in an ecosystem
- I can identify whether something is living or non-living using 5 characteristics of life
- I can describe how energy is passed from organism to organism in a food web (LS2A)
- I can describe how carbon, nitrogen, and water are cycled in ecosystems (LS2A)
- I can explain why carbon, nitrogen, and water are cycled in ecosystems (LS2A)
- I can explain how toxins are passed between levels of a food chain (LS2A)

Lesson /Unit Title:

Program Content: Water and Energy Conservation

1. Choose one water-saving idea and one energy saving idea (from the home audits given)
2. Perform these changes for one week.
3. Write down the data/observations from this week.

Calculations Table:

Number	Activity	# Students	# Classes / Sections	Hours
1	Water Saving Lesson	100	4	5

Shoreline School District
Stormwater Credit Lesson

Water and Energy Lab NAME_____per___

Question: How difficult will it be to change societal habits to become more efficient and conserving of Energy and Water?

Hypothesis: If I test myself and my household, then I will get a better idea of how difficult large-scale change will be to create, and what some of the problems will be.

Procedure:

Materials:

Steps:
1. Choose one water-saving idea and one energy saving idea (from the home audits given)
2. Perform these changes for one week.
3. Write down the data/observations from this week.

DATA: (Sample chart)

Water						
Energy						

Calculations, Analysis, Results, Discussion (CARD)

1. Calculate your success rate for each change.
2. Based on your success rate and the success of your classmates as given, what have you learned about the difficulty of making changes?
3. What experimental error or other problem exist in your data?

Conclusions

Restate your question and hypothesis. Use your DATA to discuss the hypothesis and the real answer. TESP difficulties you foresee in making societal Energy and Water conservation and efficiency changes. Include a discussion of why these changes might be necessary, whether we want them or not, using your data from myfootprint.org. Turn in your report with your water and energy audits and questions.