



2019

City of Bothell's
Water Quality Education Programs

Final Evaluation Results

December 31, 2019

Prepared for



Surface Water Division
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Final Evaluation Results for the City of Bothell Water Quality Education Programs 2019

Description and Purpose

The City of Bothell's Water Quality Education Program continues to educate students about pollution prevention, stormwater quality, and watershed ecosystem health. Students that participate in these workshops learn how natural water systems keep our water healthy, how human built water systems interact with these natural systems, and what we can all do to be good stewards of our watersheds. This program is helping to create awareness and foster sustainable practices and behaviors in the City of Bothell.

This report presents the final results from the tenth year of evaluating these programs.

Evaluation Goals and Methods

The evaluation was designed to measure:

Goal 1: Student Retention: To evaluate the retention of lessons in short-term and long-term student memory (short term immediately following the lessons, long term after 60 days).

- Method 1- select classroom surveys for grades 3-12 (to account for reading levels)
- Method 2- follow-up surveys after 60 days when applicable
- Method 3- student letter analysis (when letters are more than simple thank you letters)
- Method 4- select student responses to essay questions

Goal 2: Teacher Satisfaction: To evaluate how the program is received by teachers, i.e. are the workshops helping teachers meet state and local education standards and therefore desired by teachers as a teaching resource.

- Method 5- post workshop email survey

Goal 3: Agency Goals Met: To evaluate how we can more directly meet agency goals within NPDES permit and budget parameters.

- Method 6- classroom observations (done by City of Bothell, not included in this report)

Results

The 5 question classroom evaluation surveys given before and after each workshop show significant short-term retention of key facts by students at the elementary school level. Significant is defined as a 10 point or greater spread between pre and post-surveys. Seven elementary level classes of students participated in the surveys. The survey results showed that the 142 students that participated had an average score of 57.1% on the survey prior to the workshop (pre-survey). The 142 students that participated in the post-survey had an average

score of 77.9% immediately following the workshop. This 20.8 point spread between pre and post surveys is significant. Our students represent many languages, reading levels, and diverse learning needs. The spring classes took place too late in the school year due to snow reschedules for 60 day surveys to be possible. We will report on any 60 day survey data we receive for the fall period.

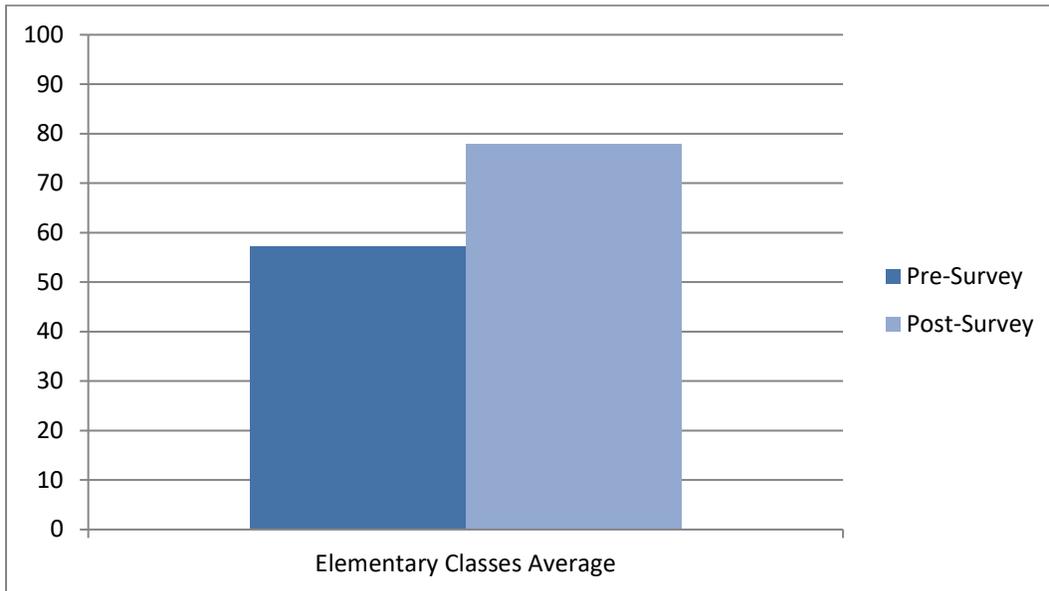


Figure 1: Elementary Pre and Post Survey results

No letters containing content were sent in during the survey period, despite leaving prompts and postage paid envelopes at schools, and reminding teachers via email. We did mail in some simple thank you letters from students from the winter/spring period.

The 5 question classroom evaluation surveys given before and after each workshop show significant short-term retention of key facts by students at the secondary school level as well. Significant is defined as a 10 point or greater spread between pre and post-surveys. Nine secondary level classes of students participated in the surveys. The survey results showed that the 231 students that participated had an average score of 51.5% on the survey prior to the workshop (pre-survey). The 231 students that participated in the post-survey had an average score of 80.3% immediately following the workshop. This 28.8 point spread between pre and post surveys is significant. Our students represent many languages, reading levels, and diverse learning needs. We will report on any 60 day survey data we receive for the fall period.

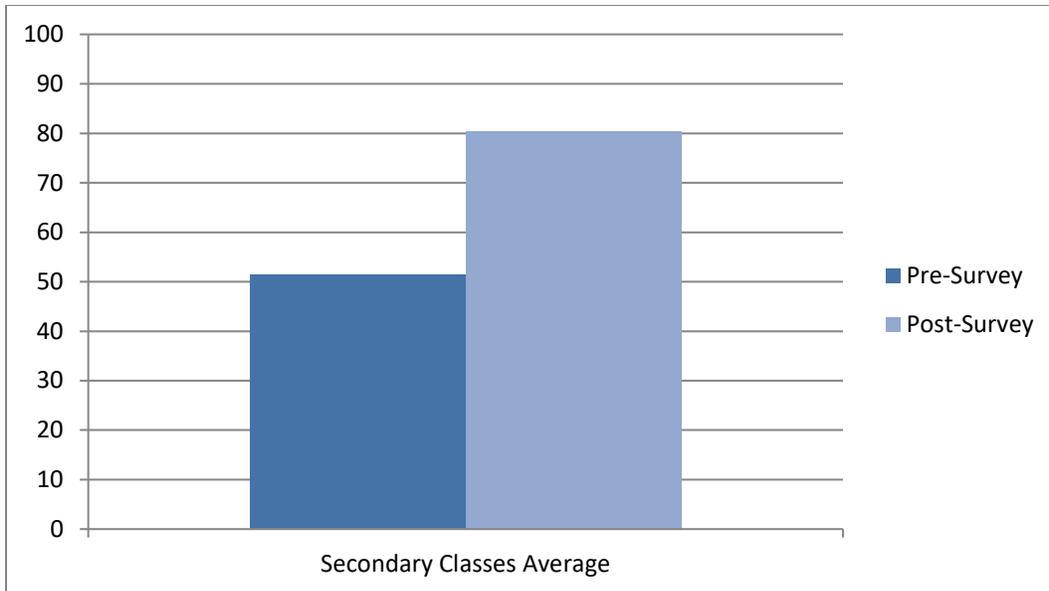


Figure 2: Secondary Pre and Post Survey results

No secondary letters were sent in during the survey period. Secondary teachers seldom send in letters.

Select student responses to questions

Further examination of specific survey questions yielded significant results as well. These results are presented below. For fill-in questions, results were compiled by the number of students that responded the same way. For example, if a student response to *How can we help keep water in our rivers, lakes, streams and the Puget Sound healthy?* is *Pick up after your dog* 10 students, that means that 10 students responded to this question in the same way in the class or combined classes. Many students list multiple options on fill-in questions. We only compile the answers to the fill in questions on post-surveys, as pre-survey fill in questions have little to no information from students.

Elementary Classes

Wetland Filters

- Wetland Filters – Bothell – 5 May 2019 – Canyon Creek – Burkett
Question #1: What are the characteristics that all wetlands have? A) Soil, Water, Plants B) Water, Animals, Plants C) Soil, Water, Animals

Pre-Survey

#Students: 12/22

Percent: 54.5%

Post Survey

#Students: 17/22
Percent: 77.3%

Question #2: Wetlands help prevent floods, filter water, and are important habitats.
True/False

Pre-Survey
#Students: 19/22
Percent: 86.4%

Post Survey
#Students: 21/22
Percent: 95.5%

Question #3: People don't have to pick up dog poop, because wetlands will filter it out of the water. True/False

Pre-Survey
#Students: 20/22
Percent: 90.9%

Post Survey
#Students: 19/22
Percent: 86.4%

This is an unusual result and may be considered an outlier.

Question #4: What are the 3 parts of a wetland that filters water? A) Leaves, Roots, Rocks B) Roots, Soil, Water C) Leave, Roots, Soil

Pre-Survey
#Students: 10/22
Percent: 45.5%

Post Survey
#Students: 19/22
Percent: 86.4%

Question #5: List 3 things you can do to help keep wetlands healthy.

Post-Survey:

- Pick up pet waste / 18 students
 - Pick up trash/don't litter / 11 students
 - Don't pollute / 3 students
 - Go to a commercial car wash / 4 students
 - Wash your car on grass or soil / 6 students
 - Walk or bike more, drive less / 2 students
 - Prevent oil spills / 2 students
 - Plant trees / 5 students
-
- Wetland Filters – Bothell – 5 May 2019 – Canyon Creek – Farner

Question #1: What are the characteristics that all wetlands have? A) Soil, Water, Plants
B) Water, Animals, Plants C) Soil, Water, Animals

Pre-Survey

#Students: 10/21

Percent: 47.6%

Post Survey

#Students: 15/21

Percent: 71.4%

Question #2: Wetlands help prevent floods, filter water, and are important habitats.

True/False

Pre-Survey

#Students: 14/21

Percent: 66.7%

Post Survey

#Students: 20/21

Percent: 95.2%

Question #3: People don't have to pick up dog poop, because wetlands will filter it out of the water. True/False

Pre-Survey

#Students: 17/21

Percent: 80.1%

Post Survey

#Students: 19/21

Percent: 90.5%

Question #4: What are the 3 parts of a wetland that filters water? A) Leaves, Roots, Rocks
B) Roots, Soil, Water C) Leave, Roots, Soil

Pre-Survey

#Students: 5/21

Percent: 23.8%

Post Survey

#Students: 16/21

Percent: 76.2%

Question #5: List 3 things you can do to help keep wetlands healthy.

Post-Survey:

- Clean up pet waste / 8 students
- Pick up trash/don't litter / 17 students
- Wash your car on grass or soil / 5 students
- Prevent oil spills / 4 students

- Don't pollute / 4 students
- Protect wildlife / 2 students
- Go to a commercial car wash / 2 students

Water Supply

- Water Supply – Bothell – 6 June 2019 – Crystal Springs – Romano
Question #1: A watershed is: A) A building where water is stored and treated B) An area of land where water drains and collects at the lowest spot C) An area set aside to protect wildlife

Pre-Survey

#Students: 12/19

Percent: 63.2%

Post Survey

#Students: 11/19

Percent: 57.9%

This is an unusual result and may be considered an outlier.

Question #2: Where does the water that comes out of your faucet come from? A) Lake Washington B) Snow melt and rainwater from the Cascade Mountains C) Puget Sound

Pre-Survey

#Students: 6/19

Percent: 31.6%

Post Survey

#Students: 15/19

Percent: 78.9%

Question #3: Washington gets so much rain, we do not need to think about how much water we use. True/False

Pre-Survey

#Students: 15/19

Percent: 78.9%

Post Survey

#Students: 17/19

Percent: 89.5%

Question #4: During which time can we most conserve water? A) In the summer months, when rainfall is low and water demand is high B) We can conserve water year-round. C) In the winter, when rainfall is high and water demand is low

Pre-Survey

#Students: 11/19

Percent: 57.9%

Post Survey

#Students: 15/19

Percent: 78.9%

Question #5: List all of the ways you can think of that people can save water.

Post-Survey:

- Take shorter showers / 18 students
 - Turn off the tap while brushing / 15 students
 - Flush less / 4 students
 - Use rain barrels / 3 students
 - Fill bathtub only halfway / 4 students
 - Fill dishwasher before running it / 2 students
 - Give leftover water to pets / 3 students
 - Go to a commercial carwash / 5 students
 - Fix leaks / 4 students
 - Water plants with old water / 2 students
-
- Water Supply – Bothell – 6 June 2019 – Crystal Springs – Ames
Question #1: A watershed is: A) A building where water is stored and treated B) An area of land where water drains and collects at the lowest spot C) An area set aside to protect wildlife

Pre-Survey

#Students: 12/20

Percent: 60%

Post Survey

#Students: 20/20

Percent: 100%

Question #2: Where does the water that comes out of your faucet come from? A) Lake Washington B) Snow melt and rainwater from the Cascade Mountains C) Puget Sound

Pre-Survey

#Students: 7/20

Percent: 35%

Post Survey

#Students: 20/20

Percent: 100%

Question #3: Washington gets so much rain, we do not need to think about how much water we use. True/False

Pre-Survey

#Students: 17/20

Percent: 85%

Post Survey

#Students: 20/20

Percent: 100%

Question #4: During which time can we most conserve water? A) In the summer months, when rainfall is low and water demand is high B) We can conserve water year-round. C) In the winter, when rainfall is high and water demand is low

Pre-Survey

#Students: 11/20

Percent: 55%

Post Survey

#Students: 15/20

Percent: 75%

Question #5: List all of the ways you can think of that people can save water.

Post-Survey:

- Take shorter showers / 13 students
- Turn off the tap while brushing / 13 students
- Conserve water / 2 students
- Use rain barrels / 2 students
- Fill bathtub only halfway / 2 students
- Don't get dirty / 1 student

Watershed Ecosystems

- Watershed Ecosystems – Bothell – 18 Oct. 2019 – Shelton View El. – Thiessen
Question #1: What is a watershed? A) Shed filled with water B) Area of land where water drains and collects at the lowest spot C) An area set aside to protect wildlife

Pre-Survey

#Students: 12/21

Percent: 57.1%

Post-Survey

#Students: 17/21

Percent: 80.9%

Question #2: Plants help keep water in a watershed. A) True B) False

Pre-Survey

#Students: 16/21

Percent: 76.2%

Post-Survey

#Students: 20/21

Percent: 95.2%

Question #3: Only people get their water from a watershed. A) True B) False

Pre-Survey

#Students: 17/21

Percent: 80.9%

Post-Survey

#Students: 16/21

Percent: 76.2%

This is an unusual result and may be considered an outlier.

Question #4: Roads and parking lots are also part of our watershed. A) True B) False

Pre-Survey

#Students: 6/21

Percent: 28.6%

Post-Survey

#Students: 8/21

Percent: 38.1%

Question #5: List 3 or more ways you can help keep water in our rivers, lakes, streams and Puget Sound Healthy.

Post-Survey:

- Don't litter or pollute / 16 students
 - Plant trees / 6 students
 - Protect wildlife / 5 students
 - Recycle / 1 student
 - Drive less / 1 student
 - Don't cut down trees / 3 students
 - Don't spill oil / 1 student
 - Pick up trash / 2 students
-
- Watershed Ecosystems – Bothell – 18 Oct. 2019 – Shelton View El. – Zehring
Question #1: What is a watershed? A) Shed filled with water B) Area of land where water drains and collects at the lowest spot C) An area set aside to protect wildlife

Pre-Survey

#Students: 12/22

Percent: 54.5%

Post-Survey

#Students: 14/22

Percent: 63.6%

Question #2: Plants help keep water in a watershed. A) True B) False

Pre-Survey

#Students: 15/22

Percent: 68.2%

Post-Survey

#Students: 16/22

Percent: 72.7%

Question #3: Only people get their water from a watershed. A) True B) False

Pre-Survey

#Students: 19/22

Percent: 86.4%

Post-Survey

#Students: 21/22

Percent: 95.5%

Question #4: Roads and parking lots are also part of our watershed. A) True B) False

Pre-Survey

#Students: 9/22

Percent: 40.9%

Post-Survey

#Students: 16/22

Percent: 72.7%

Question #5: List 3 or more ways you can help keep water in our rivers, lakes, streams and Puget Sound Healthy.

Post-Survey:

- Don't litter or pollute / 9 students
- Plant trees / 4 students
- Don't spill oil / 1 student
- Protect wildlife / 1 student
- Follow laws and rules / 1 student
- Save water / 2 students
- Pick up trash / 2 students
- Don't cut down trees / 1 student
- Educate others / 2 students
- Use reusable water bottles / 1 student

Water Cycles Round

- Water Cycles Round – Bothell – 1 Nov. 2019 – Woodmoor El. – Gochnour
Question #1: The water cycle is a process where: A) People clean and recycle water in treatment plants B) Nature cleans and recycles water over and over again C) People take water out of the environment to use

Pre-Survey

#Students: 13/16

Percent: 81.3%

Post-Survey

#Students: 15/16

Percent: 93.8%

Question #2: Water is a finite resource, which means: A) There is enough water for all living things to survive comfortably B) There is a limited amount of water on the planet for all to use C) It goes through the water cycle

Pre-Survey

#Students: 3/16

Percent: 18.8%

Post-Survey

#Students: 7/16

Percent: 43.8%

Question #3: Water conservation means: A) Protecting the environment so that it does not change B) Holding more water for people and less for wildlife C) A careful preservation and protection of water supply

Pre-Survey

#Students: 11/16

Percent: 68.8%

Post-Survey

#Students: 13/16

Percent: 81.3%

Question #4: Since almost 75% of Earth is covered in water, we do not need to worry about running out of water we can use. A) True B) False

Pre-Survey

#Students: 11/16

Percent: 68.8%

Post-Survey

#Students: 15/16

Percent: 93.8%

Question #5: List 3 or more ways you can help keep water in our rivers, lakes, streams and Puget Sound Healthy.

Post-Survey:

- Go to a commercial carwash / 10 students
- Conserve water / 4 students
- Use less fertilizer / 3 students
- Don't pollute / 4 students
- Recycle / 1 student
- Compost / 1 student
- Don't litter / 4 students

- Pick up pet waste / 4 students
- Use fewer boats / 1 student

Secondary

- Be the Solution – Bothell – 5 Dec. 2019 – Skyview Middle – Fryer
Question #1: What type of pollution has a more negative impact on water? A) Point Source Pollution B) Non-Point Source Pollution

Pre-Survey

#Students: 15/29

Percent: 51.7%

Post-Survey

#Students: 27/29

Percent: 93.1%

Question #2: Where does stormwater that enters a storm drain go? A) Treatment facility to be filtered B) The nearest body of water without being filtered

Pre-Survey

#Students: 17/29

Percent: 58.6%

Post-Survey

#Students: 25/29

Percent: 86.2%

Question #3: What is the best management practice for pet waste? A) Leave it, so decomposers can turn it into soil B) Scoop the poop, bag it, and place it in the trash

Pre-Survey

#Students: 21/29

Percent: 72.4%

Post-Survey

#Students: 28/29

Percent: 96.6%

Question #4: What is the best management practice for washing your car? A) Wash it in your driveway B) Take it to a commercial carwash

Pre-Survey

#Students: 14/29

Percent: 48.3%

Post-Survey

#Students: 28/29

Percent: 96.6%

Question #5: List 3 or more ways you can help keep our local watershed healthy.

Post-Survey:

- Conserve water / 3 students
 - Fix car leaks / 7 students
 - Collect rainwater / 1 student
 - Go to a commercial carwash / 13 students
 - Plant more plants / 10 students
 - Compost / 5 students
 - Pick up pet waste / 19 students
 - Don't litter / 3 students
 - Build fewer parking lots / 2 students
 - Don't pollute / 4 students
 - Use fewer chemicals / 4 students
- Be the Solution – Bothell – 5 Dec. 2019 – Skyview Middle – Fryer
Question #1: What type of pollution has a more negative impact on water? A) Point Source Pollution B) Non-Point Source Pollution

Pre-Survey

#Students: 8/27

Percent: 29.6%

Post-Survey

#Students: 17/27

Percent: 63%

Question #2: Where does stormwater that enters a storm drain go? A) Treatment facility to be filtered B) The nearest body of water without being filtered

Pre-Survey

#Students: 16/27

Percent: 59.3%

Post-Survey

#Students: 20/27

Percent: 74.1%

Question #3: What is the best management practice for pet waste? A) Leave it, so decomposers can turn it into soil B) Scoop the poop, bag it, and place it in the trash

Pre-Survey

#Students: 18/27

Percent: 66.7%

Post-Survey

#Students: 22/27

Percent: 81.5%

Question #4: What is the best management practice for washing your car? A) Wash it in your driveway B) Take it to a commercial carwash

Pre-Survey

#Students: 18/27

Percent: 66.7%

Post-Survey

#Students: 22/27

Percent: 81.5%

Question #5: List 3 or more ways you can help keep our local watershed healthy.

Post-Survey:

- Conserve water / 2 students
 - Fix car leaks / 3 students
 - Go to a commercial carwash / 6 students
 - Reuse water / 2 students
 - Plant more plants / 2 students
 - Recycle / 2 students
 - Compost / 3 students
 - Don't litter / 5 students
 - Pick up pet waste / 13 students
 - Use fewer chemicals / 3 students
 - Pick up trash / 4 students
 - Drive less / 1 student
- Be the Solution – Bothell – 5 Dec. 2019 – Skyview Middle – Fryer
Question #1: What type of pollution has a more negative impact on water? A) Point Source Pollution B) Non-Point Source Pollution

Pre-Survey

#Students: 17/24

Percent: 70.8%

Post-Survey

#Students: 20/24

Percent: 83.3%

Question #2: Where does stormwater that enters a storm drain go? A) Treatment facility to be filtered B) The nearest body of water without being filtered

Pre-Survey

#Students: 14/24

Percent: 58.3%

Post-Survey

#Students: 18/24

Percent: 75%

Question #3: What is the best management practice for pet waste? A) Leave it, so decomposers can turn it into soil B) Scoop the poop, bag it, and place it in the trash

Pre-Survey

#Students: 18/24

Percent: 75%

Post-Survey

#Students: 23/24

Percent: 95.8%

Question #4: What is the best management practice for washing your car? A) Wash it in your driveway B) Take it to a commercial carwash

Pre-Survey

#Students: 12/24

Percent: 50%

Post-Survey

#Students: 21/24

Percent: 87.5%

Question #5: List 3 or more ways you can help keep our local watershed healthy.

Post-Survey:

- Don't litter / 9 students
 - Pick up pet waste / 12 students
 - Conserve water / 5 students
 - Keep storm drains clean / 2 students
 - Use reusable water bottles / 2 students
 - Fix car leaks / 3 students
 - Go to a commercial carwash / 3 students
 - Use organic fertilizer / 1 student
- Be the Solution – Bothell – 5 Dec. 2019 – Skyview Middle – Klemczyk
Question #1: What type of pollution has a more negative impact on water? A) Point Source Pollution B) Non-Point Source Pollution

Pre-Survey

#Students: 14/28

Percent: 50%

Post-Survey

#Students: 17/28

Percent: 60.7%

Question #2: Where does stormwater that enters a storm drain go? A) Treatment facility to be filtered B) The nearest body of water without being filtered

Pre-Survey

#Students: 17/28
Percent: 60.7%

Post-Survey

#Students: 25/28
Percent: 89.3%

Question #3: What is the best management practice for pet waste? A) Leave it, so decomposers can turn it into soil B) Scoop the poop, bag it, and place it in the trash

Pre-Survey

#Students: 17/28
Percent: 60.7%

Post-Survey

#Students: 27/28
Percent: 96.4%

Question #4: What is the best management practice for washing your car? A) Wash it in your driveway B) Take it to a commercial carwash

Pre-Survey

#Students: 13/28
Percent: 46.4%

Post-Survey

#Students: 22/28
Percent: 78.6%

Question #5: List 3 or more ways you can help keep our local watershed healthy.

Post-Survey:

- Recycle / 3 students
 - Pick up trash / 8 students
 - Conserve water / 2 students
 - Pick up pet waste / 7 students
 - Fix car leaks / 2 students
 - Use fewer chemicals / 2 students
 - Compost / 1 student
 - Don't litter / 5 students
 - Educate others / 1 student
- Be the Solution – Bothell – 5 Dec. 2019 – Skyview Middle – Klemczyk
Question #1: What type of pollution has a more negative impact on water? A) Point Source Pollution B) Non-Point Source Pollution

Pre-Survey

#Students: 14/27
Percent: 51.9%

Post-Survey

#Students: 23/27

Percent: 85.2%

Question #2: Where does stormwater that enters a storm drain go? A) Treatment facility to be filtered B) The nearest body of water without being filtered

Pre-Survey

#Students: 17/27

Percent: 63%

Post-Survey

#Students: 22/27

Percent: 81.5%

Question #3: What is the best management practice for pet waste? A) Leave it, so decomposers can turn it into soil B) Scoop the poop, bag it, and place it in the trash

Pre-Survey

#Students: 14/27

Percent: 51.9%

Post-Survey

#Students: 27/27

Percent: 100%

Question #4: What is the best management practice for washing your car? A) Wash it in your driveway B) Take it to a commercial carwash

Pre-Survey

#Students: 16/27

Percent: 59.3%

Post-Survey

#Students: 25/27

Percent: 92.6%

Question #5: List 3 or more ways you can help keep our local watershed healthy.

Post-Survey:

- Don't litter / 6 students
- Conserve water / 5 students
- Use fewer chemicals / 11 students
- Fix car leaks / 4 students
- Pick up pet waste / 14 students
- Don't pollute / 9 students
- Go to a commercial carwash / 10 students
- Plant more plants / 3 students

- Be the Solution – Bothell – 6 Dec. 2019 – Skyview Middle – Fryer

Question #1: What type of pollution has a more negative impact on water? A) Point Source Pollution B) Non-Point Source Pollution

Pre-Survey

#Students: 13/24

Percent: 54.2%

Post-Survey

#Students: 17/24

Percent: 70.8%

Question #2: Where does stormwater that enters a storm drain go? A) Treatment facility to be filtered B) The nearest body of water without being filtered

Pre-Survey

#Students: 17/24

Percent: 70.8%

Post-Survey

#Students: 17/24

Percent: 70.8%

This is an unusual result and may be considered an outlier.

Question #3: What is the best management practice for pet waste? A) Leave it, so decomposers can turn it into soil B) Scoop the poop, bag it, and place it in the trash

Pre-Survey

#Students: 13/24

Percent: 54.2%

Post-Survey

#Students: 20/24

Percent: 83.3%

Question #4: What is the best management practice for washing your car? A) Wash it in your driveway B) Take it to a commercial carwash

Pre-Survey

#Students: 9/24

Percent: 37.5%

Post-Survey

#Students: 20/24

Percent: 83.3%

Question #5: List 3 or more ways you can help keep our local watershed healthy.

Post-Survey:

- Don't litter / 11 students
- Use fewer chemicals / 2 students

- Fix car leaks / 8 students
 - Pick up pet waste / 8 students
 - Recycle / 2 students
 - Use reusable bottles and containers / 2 students
 - Plant more plants / 2 students
 - Compost / 2 students
 - Conserve water / 1 student
- Be the Solution – Bothell – 6 Dec. 2019 – Skyview Middle – Fryer
Question #1: What type of pollution has a more negative impact on water? A) Point Source Pollution B) Non-Point Source Pollution

Pre-Survey

#Students: 15/29

Percent: 51.7%

Post-Survey

#Students: 24/29

Percent: 82.8%

Question #2: Where does stormwater that enters a storm drain go? A) Treatment facility to be filtered B) The nearest body of water without being filtered

Pre-Survey

#Students: 16/29

Percent: 55.2%

Post-Survey

#Students: 21/29

Percent: 72.4%

Question #3: What is the best management practice for pet waste? A) Leave it, so decomposers can turn it into soil B) Scoop the poop, bag it, and place it in the trash

Pre-Survey

#Students: 19/29

Percent: 65.5%

Post-Survey

#Students: 25/29

Percent: 86.2%

Question #4: What is the best management practice for washing your car? A) Wash it in your driveway B) Take it to a commercial carwash

Pre-Survey

#Students: 14/29

Percent: 48.3%

Post-Survey

#Students: 25/29
Percent: 86.2%

Question #5: List 3 or more ways you can help keep our local watershed healthy.

Post-Survey:

- Don't litter / 9 students
 - Pick up pet waste / 13 students
 - Fix car leaks / 11 students
 - Recycle / 2 students
 - Keep storm drains clean / 4 students
 - Go to a commercial carwash / 2 students
 - Use fewer chemicals / 1 student
 - Don't use single-use plastics / 2 students
- Be the Solution – Bothell – 6 Dec. 2019 – Skyview Middle – McMahon
Question #1: What type of pollution has a more negative impact on water? A) Point Source Pollution B) Non-Point Source Pollution

Pre-Survey

#Students: 7/23
Percent: 30.4%

Post-Survey

#Students: 15/23
Percent: 65.2%

Question #2: Where does stormwater that enters a storm drain go? A) Treatment facility to be filtered B) The nearest body of water without being filtered

Pre-Survey

#Students: 15/23
Percent: 65.2%

Post-Survey

#Students: 20/23
Percent: 87%

Question #3: What is the best management practice for pet waste? A) Leave it, so decomposers can turn it into soil B) Scoop the poop, bag it, and place it in the trash

Pre-Survey

#Students: 12/23
Percent: 52.2%

Post-Survey

#Students: 22/23
Percent: 95.7%

Question #4: What is the best management practice for washing your car? A) Wash it in your driveway B) Take it to a commercial carwash

Pre-Survey

#Students: 11/23

Percent: 47.8%

Post-Survey

#Students: 21/23

Percent: 91.3%

Question #5: List 3 or more ways you can help keep our local watershed healthy.

Post-Survey:

- Don't litter / 6 students
 - Pick up pet waste / 2 students
 - Fix car leaks / 7 students
 - Conserve water / 6 students
 - Plant more plants / 4 students
 - Keep storm drains clean / 3 students
 - Use fewer fertilizers / 2 students
 - Drive less / 2 students
- Be the Solution – Bothell – 6 Dec. 2019 – Skyview Middle – McMahon
- Question #1: What type of pollution has a more negative impact on water? A) Point Source Pollution B) Non-Point Source Pollution

Pre-Survey

#Students: 4/20

Percent: 20%

Post-Survey

#Students: 16/20

Percent: 80%

Question #2: Where does stormwater that enters a storm drain go? A) Treatment facility to be filtered B) The nearest body of water without being filtered

Pre-Survey

#Students: 14/20

Percent: 70%

Post-Survey

#Students: 17/20

Percent: 85%

Question #3: What is the best management practice for pet waste? A) Leave it, so decomposers can turn it into soil B) Scoop the poop, bag it, and place it in the trash

Pre-Survey

#Students: 7/20
Percent: 35%

Post-Survey
#Students: 17/20
Percent: 85%

Question #4: What is the best management practice for washing your car? A) Wash it in your driveway B) Take it to a commercial carwash

Pre-Survey
#Students: 11/20
Percent: 55%

Post-Survey
#Students: 17/20
Percent: 85%

Question #5: List 3 or more ways you can help keep our local watershed healthy.

Post-Survey:

- Don't litter / 4 students
- Pick up pet waste / 5 students
- Fix car leaks / 5 students
- Conserve water / 5 students
- Use fewer chemicals / 8 students
- Plant more plants / 3 students
- Recycle / 2 students
- Go to a commercial carwash / 4 students
- Use natural products / 2 students
- Drive less / 1 student

Teacher Satisfaction Results 2019

This was a wonderful program. Mr. Mike was a great teacher who used a variety of classroom management strategies to help the students remain engaged in the work. He was obviously a skilled presenter who was very attuned to the students. The material he presented fit very well with the curriculum we currently are using about habitats for various animals. I really loved the balance of in-class and outside hands-on learning. I would definitely encourage that this program be funded again next year. It really benefited my students and also taught them about water conservation.

- [REDACTED], Frank Love Elementary

Are there any improvements you would like to suggest? *We think it would be beneficial for the students to see an example terrarium before building their own. Also, more clear expectations about handling the terrarium would be helpful.*

Would you like to see these programs in your school next year? *Yes.*

Would you encourage this sponsor to fund this program next year? *Yes please! :)*

- [REDACTED], Crystal Springs Elementary

Courtney was great and I would definitely want to have this program next year!

[REDACTED], Crystal Springs Elementary

I just wanted to take a moment to thank Bethany for an AMAZING program on Monday! The kids were so engaged and she was so knowledgeable and enthusiastic about everything! And she also had a great rapport with the children! Thank you all very much for everything - I would highly recommend this program!!

[REDACTED], Woodinville Family Preschool

This was the fifth time Nature Vision has visited first grade at our school. Every year, Nature Vision does a fabulous job, but this year, the program and presenter were outstanding. Katie was amazing. She had wonderful energy and was so good with the kids. I have no suggestions for improvements - everything went so great! I would love to see this program again next year. The City of Bothell should continue to sponsor this wonderful program.

[REDACTED], Westhill Elementary

Are there any improvements you would like to suggest? *One improvement would be to have a handout that the students can keep that reminds them of the vocabulary and key learning objectives.*

Would you like to see these programs in your school next year? *Yes!*

Please share any special stories or examples of how this program helped your students gain awareness, understanding, or appreciation of ecological concepts. *My students were continuing to talk about pollution in our watershed later in the day. I believe that it helped them realize how humans affect our watershed.*

This education program was paid for by: City of Bothell - Sno. Would you encourage this sponsor to fund this program next year? *Yes!*

[REDACTED], Shelton View Elementary

Discussion

This tenth year of evaluating the City of Bothell Water Quality Education Programs has shown the programs to be effective in helping students learn about and understand stormwater quality, pollution prevention, how natural water systems work, and human interactions with these water systems. Additionally, students have learned best management practices to help keep our watershed healthy alongside their families and friends.

The short term retention of the key messages and concepts is on par with previous results. Students are showing an excellent points spread between pre and post surveys, indicating significant short term retention. The classes took place too late in the school year due to snow reschedules for 60 day surveys to be possible.

Exposure to key messages in schools each year is helping students to develop the desired culture of sustainability in our watersheds. We believe this is a result of students taking classes with us year to year as they progress through grade levels, and schools being willing to integrate standard-supportive environmental education programming into their curriculum. Students that participate in these classes through elementary and secondary education build a strong knowledge base, so we can take them much further in their learning and thus willingness to take action.

Appendix: Survey Questions

Elementary

Wetland Filters

Question #1: What are the characteristics that all wetlands have? A) Soil, Water, Plants B) Water, Animals, Plants C) Soil, Water, Animals

Question #2: Wetlands help prevent floods, filter water, and are important habitats. True/False

Question #3: People don't have to pick up dog poop, because wetlands will filter it out of the water. True/False

Question #4: What are the 3 parts of a wetland that filters water? A) Leaves, Roots, Rocks B) Roots, Soil, Water C) Leaf, Roots, Soil

Question #5: List 3 things you can do to help keep wetlands healthy.

Water Supply

Question #1: A watershed is: A) A building where water is stored and treated B) An area of land where water drains and collects at the lowest spot C) An area set aside to protect wildlife

Question #2: Where does the water that comes out of your faucet come from? A) Lake Washington B) Snow melt and rainwater from the Cascade Mountains C) Puget Sound

Question #3: Washington gets so much rain, we do not need to think about how much water we use. True/False

Question #4: During which time can we most conserve water? A) In the summer months, when rainfall is low and water demand is high B) We can conserve water year-round. C) In the winter, when rainfall is high and water demand is low

Question #5: List all of the ways you can think of that people can save water.

Watershed Ecosystems

Question #1: What is a watershed? A) Shed filled with water B) Area of land where water drains and collects at the lowest spot C) An area set aside to protect wildlife

Question #2: Plants help keep water in a watershed. A) True B) False

Question #3: Only people get their water from a watershed. A) True B) False

Question #4: Roads and parking lots are also part of our watershed. A) True B) False

Question #5: List 3 or more ways you can help keep water in our rivers, lakes, streams and Puget Sound Healthy.

Water Cycles Round

Question #1: The water cycle is a process where: A) People clean and recycle water in treatment plants B) Nature cleans and recycles water over and over again C) People take water out of the environment to use

Question #2: Water is a finite resource, which means: A) There is enough water for all living things to survive comfortably B) There is a limited amount of water on the planet for all to use C) It goes through the water cycle

Question #3: Water conservation means: A) Protecting the environment so that it does not change B) Holding more water for people and less for wildlife C) A careful preservation and protection of water supply

Question #4: Since almost 75% of Earth is covered in water, we do not need to worry about running out of water we can use. A) True B) False

Question #5: List 3 or more ways you can help keep water in our rivers, lakes, streams and Puget Sound Healthy.

Secondary

Be the Solution

Question #1: What type of pollution has a more negative impact on water? A) Point Source Pollution B) Non-Point Source Pollution

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Question #3: What is the best management practice for pet waste? A) Leave it, so decomposers can turn it into soil B) Scoop the poop, bag it, and place it in the trash

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Question #5: List 3 or more ways you can help keep our local watershed healthy.