2015-2016

Rouge Education Project: Survey Results

Friends of the Rouge

Dearborn, Michigan

www.therouge.org

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Contents

Introduction

Pre- and post-Rouge Education Project (REP) student evaluations, designed to reflect the program's impact, are distributed to each participating teacher and are written for different grade level groups: 4-6, and 7-12. Schools in the program that have numerous grade levels participating are given the appropriate mix so that each student has the ability to take the proper survey. Pre-REP surveys that do not have a matching post-REP survey (and vice-versa) are not included in overall calculations. This ensures that the assessments are balanced and accurate, though it also can mean some schools' data reflect more/less students who actually participated in the program than in the surveys because they missed either the sampling day or the survey distribution. Below is the compiled assessment of the survey for both fall and spring monitoring.

As of fall 2013, REP pre- and post-sampling surveys have been modified and are adapted (with permission) from similar surveys created and distributed by Friends of the Chicago River.

How Data are Used

Survey results are used in program development and grant writing to estimate a measurable impact from those students that participate. Quantitatively, the program will be considered a success for 2015-2016 the following are observed from student pre- and post- surveys:

- An increase in the percentage of students correctly answering multiple choice questions based on general watershed science and/or the Rouge River specifically
- An increase in the percentage of students who can identify specific water quality issues in the Rouge River
- An increase in the percentage of students who can correctly identify potential solutions to local and/or regional water quality issues

Fall Monitoring 2015 Results

All Grades

Sample Size	
4th	0
5th	37
6th	48
subtotal	**85**
7th	1
8th	2
9th	4
10th	146
11th	23
12th	59
subtotal	**235**
TOTAL	**320**

Have you ever been to the Rouge River?

	4th-6th		7th-12th	
No. of times to the Rouge River	Pre	Post	Pre	Post
Never	35	10	177	91
Once before	7	26	40	97
Twice before	35	8	8	29
Three times before	3	32	0	7
Four times before	3	3	5	3
Five times before	0	3	0	4
More than five times before	2	2	4	3
Blank	0	1	1	1

66% of participants had never been on a Rouge River field trip before.

Interest in science

There was a 5.76% increase in the number of students very interested in science.

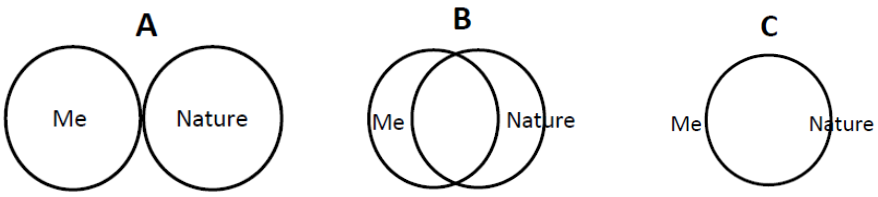
Interest in nature

There was a 9.17% increase in the number of students interested in nature.

Interest in school

There was a 5.02% increase in the number of students very interested in school.

Relationship with nature



There was a 9.06% decrease in the number of students that chose "A", a 7.44% increase in the number of students that chose "B" and a 1.62% increase in the number of students that chose "C" to represent their connection to nature.

Q: All macoinvertebrates are equally tolerant of pollution

There was a 3.59% increase in the number of students indicating the correct answer (*false*).

Number of students correctly identifying ALL macroinvetebrates from list (i.e., insects, mammals, **crustaceans, molluscs (snails, clams, etc.),** birds, fish**)**

There was a 21.56% increase in the number of students able to correctly identify these macroinvetebrates (from 84 students to 153 students).

Pollution in the Rouge

Number of students (4th-6th) able to list a source of pollution in the Rouge

There was an 11.70% increase.

Number of students (7th-12th) able to list a problem affecting the Rouge

There was a 9.16% increase.

Number of students able to list a corrective action to limit pollution

There was a 3.28% increase (272 students to 294 students).

Number of students (4th-6th) that know where to look to find out more about the pollution problem they listed

There was an 11.38% increase in the number of students able to find out more about the pollution problem they listed.

Number of students (7th-12th) that know where to look to find resources to fix the problem

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
Pre	25	63	86	48	10
Post	61	73	64	30	5

There was a 15.40% increase in the number of students that "strongly agreed" with this statement, and a 4.18% increase in the number of students that "agreed".

Students (7th-12th) able to research the problem listed

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
Pre	63	82	68	12	5
Post	79	89	48	14	4

There was a 6.37% increase in students that "strongly agreed" with this statement, and a 2.38% increase in the number of students that "agreed".

Students (7th-12th) able to explain the problem listed

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
Pre	43	86	63	30	9
Post	88	77	48	18	3

There was an 18.99% increase in students that "strongly agreed" with this statement.

Technical scientific questions (grades 7th-12th)

Q: Imagine you are at the river testing for the presence of dissolved oxygen in the water. If you want to get the most accurate result, you should repeat the test more than once.

98.28% of students answered this question correctly in the pre-survey (*true)*, and 97.00% of students answered correctly in the post-survey.

Students able to list a source of high nitrates in the Rouge

There was a 63.83% increase in the number of students able to list a source of high nitrates in the Rouge (34 students to 184 students). Answers that were left blank were considered incorrect.

Students able to list a corrective action to limit nitrates

There was a 45.96% increase in the number of students able to list a corrective action to limit nitrates (54 students to 162 students). Answers that were left blank were considered incorrect.

Feelings regarding the Rouge Education Project

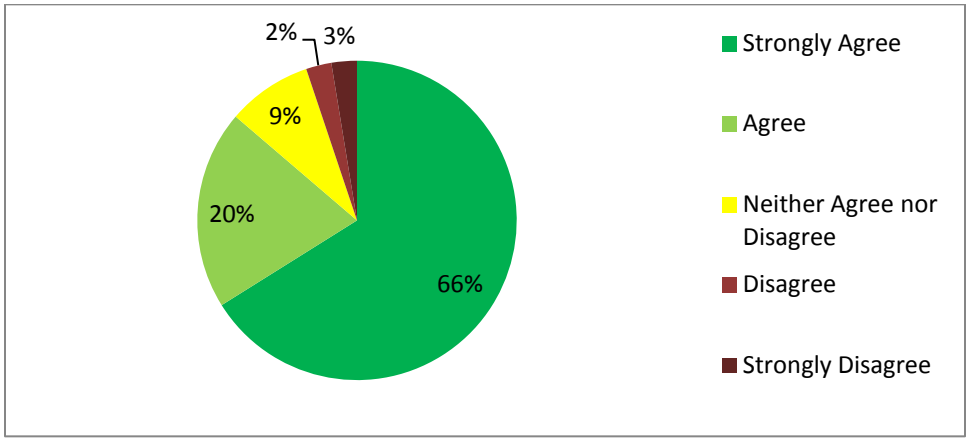
94% of all students were able to list a way participating in the Rouge Education Project helps the Rouge River.

4th-6th grade responses

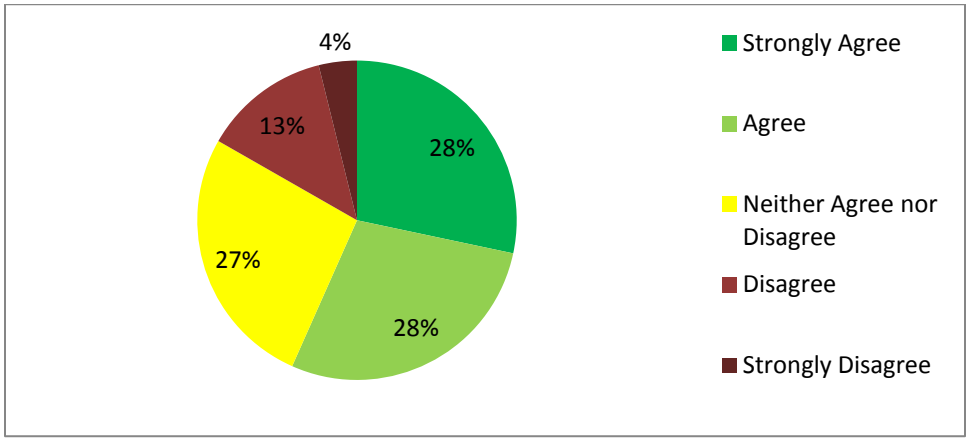
Question	Percent of students
Learned something new about the Rouge	89%
Participating in the REP made me feel like I could make a difference in protecting the environment	88%
Learned how to make the Rouge healthier	86%
Participating in the REP helped me to think like a scientist	81%
Plan to talk to family/friends about the REP	76%
Participating in the REP helped me understand classroom material better	69%

7th-12th grade responses

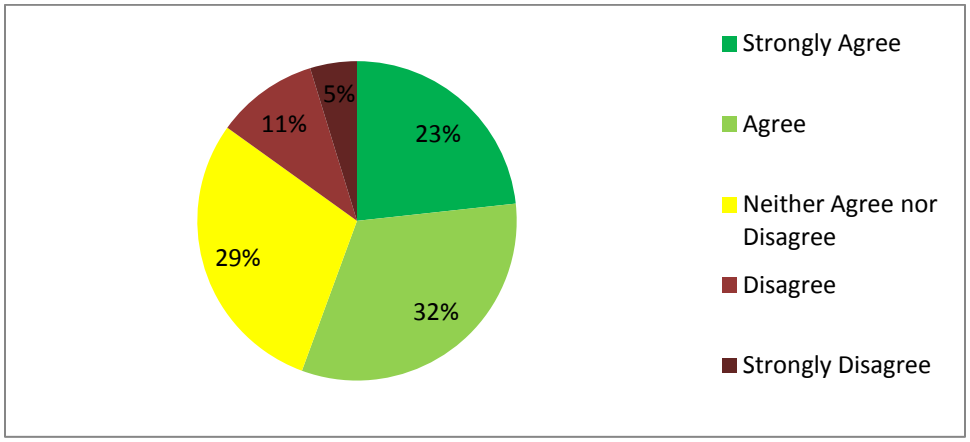
I learned something new about the Rouge River.



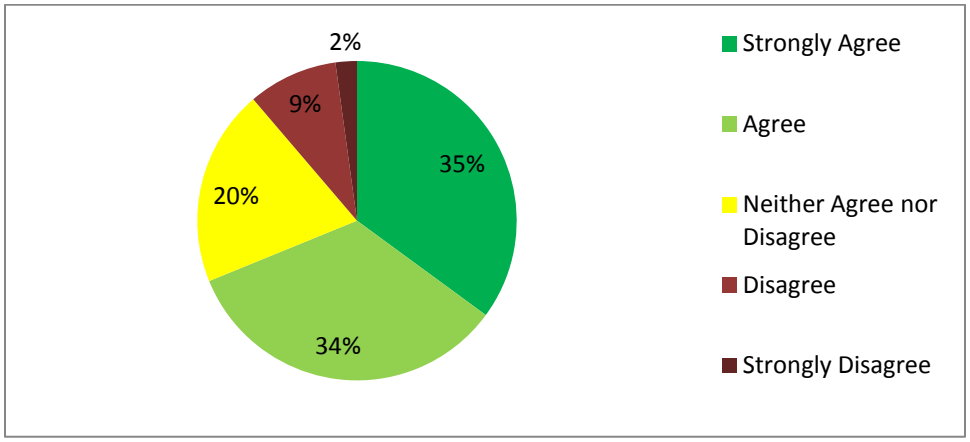
I plan to talk to family and/or friends about the information I learned.



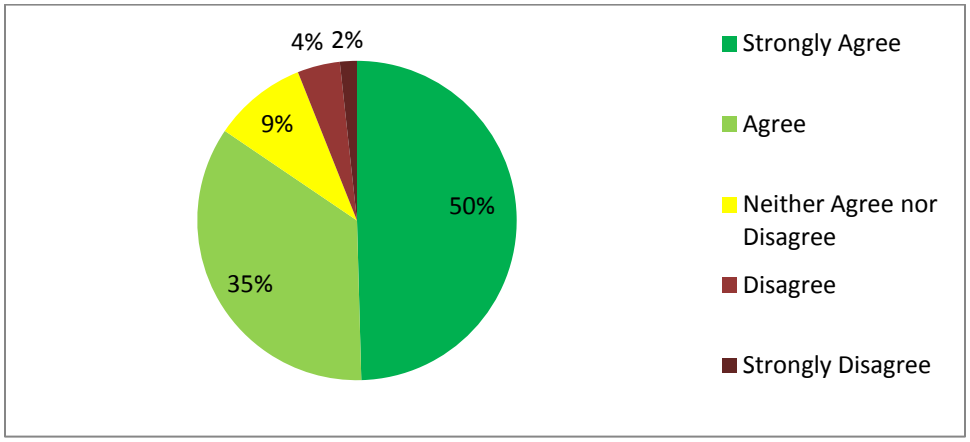
I experienced a feeling of connectedness to the Rouge River.



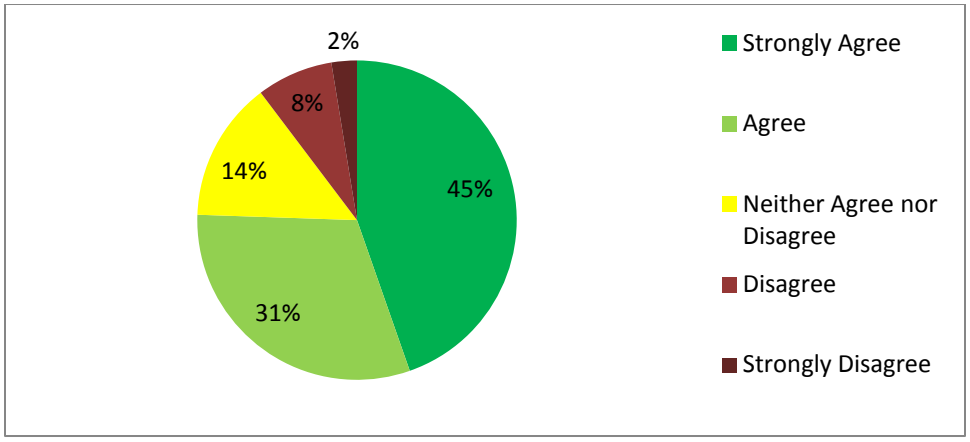
I found myself reflecting on new ideas about how my actions affect the river.



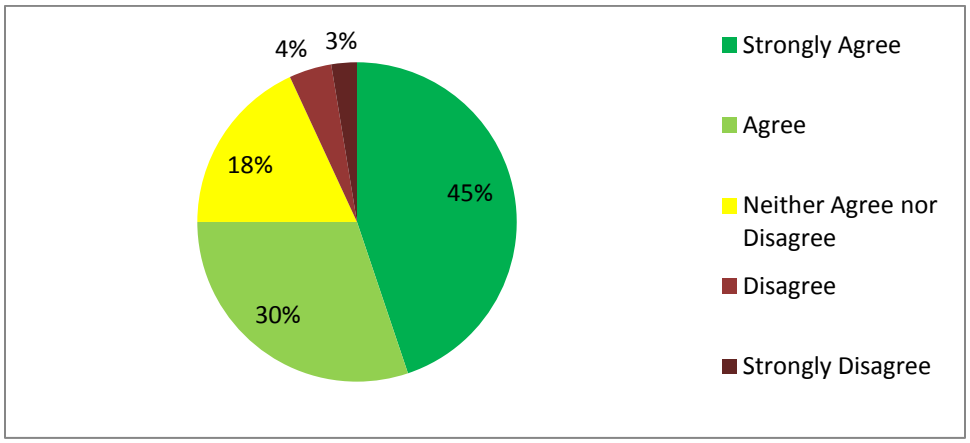
I learned about actions I could take to make the Rouge River healthier.



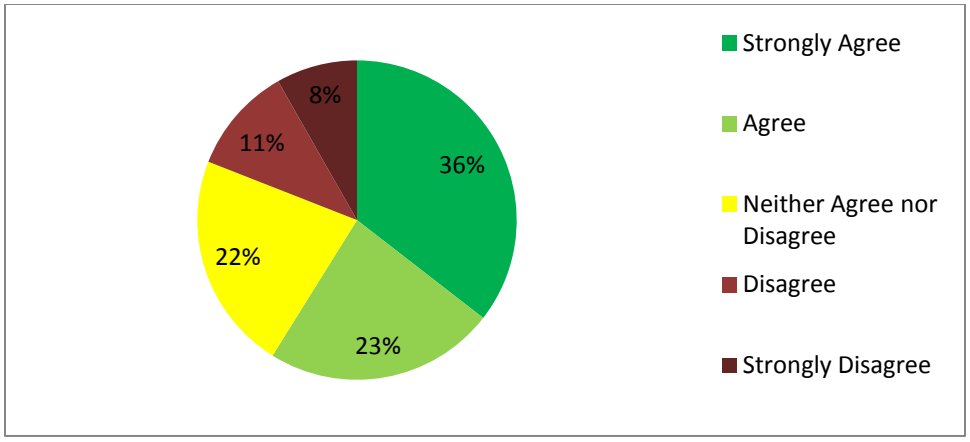
If given the opportunity, I would choose to participate in more projects that would help the Rouge River.



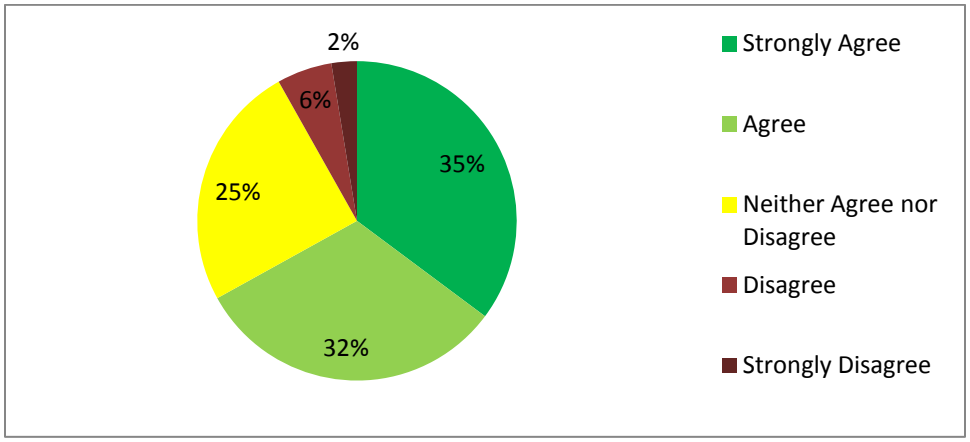
Our class' REP river monitoring made (or could make) a difference in the health of the Rouge River.



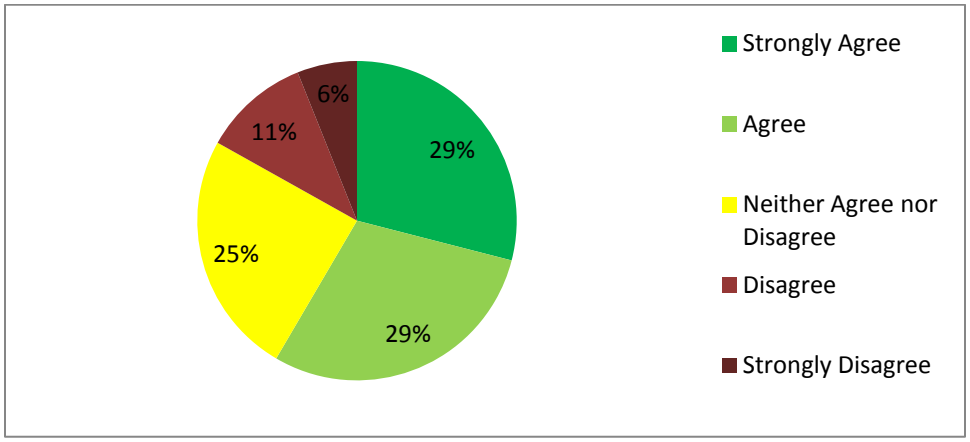
Our class' REP river monitoring involved people and/or organizations from the community (other than school staff/faculty.)



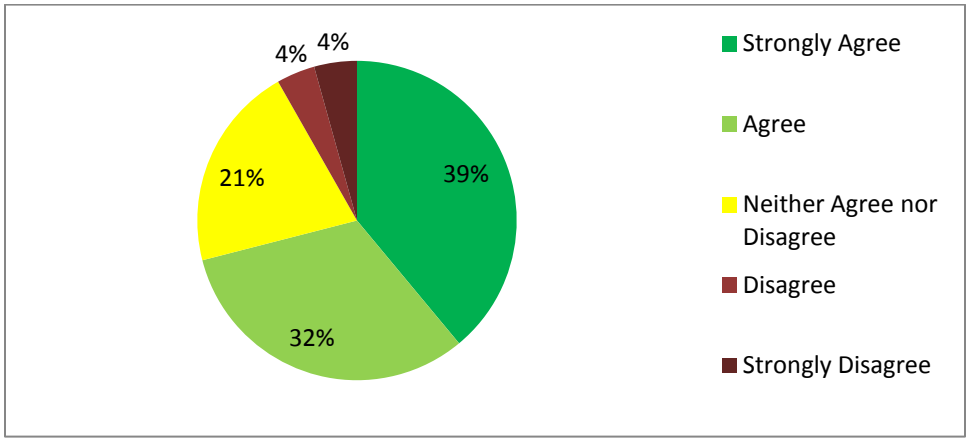
The REP helped me feel that I could make a difference in society.



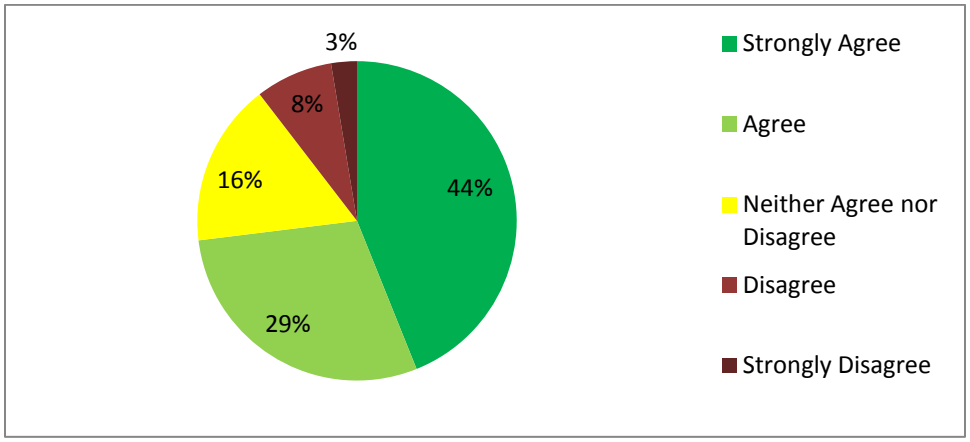
I met people/encountered things I normally wouldn't have during the REP.



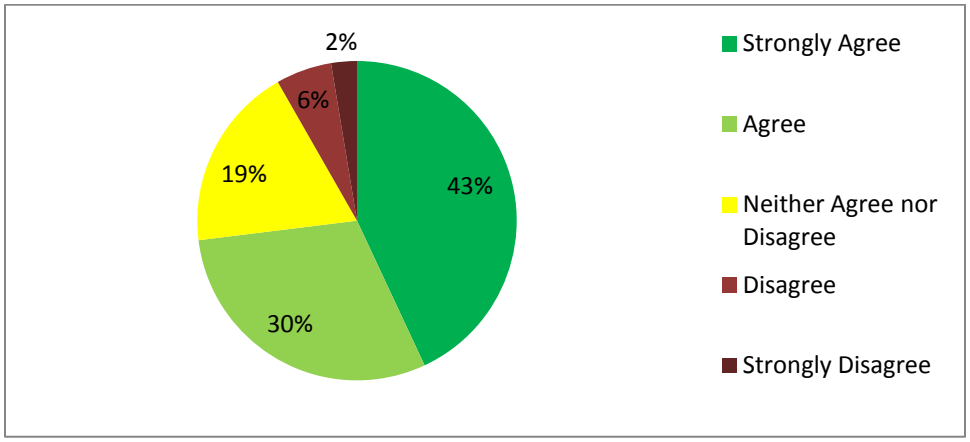
The REP challenged me to think like a scientist.



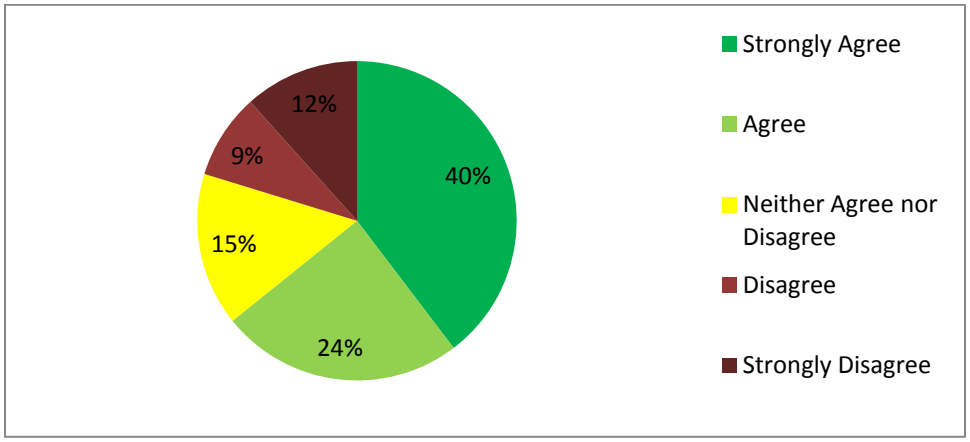
The REP was directly related to my classroom work.



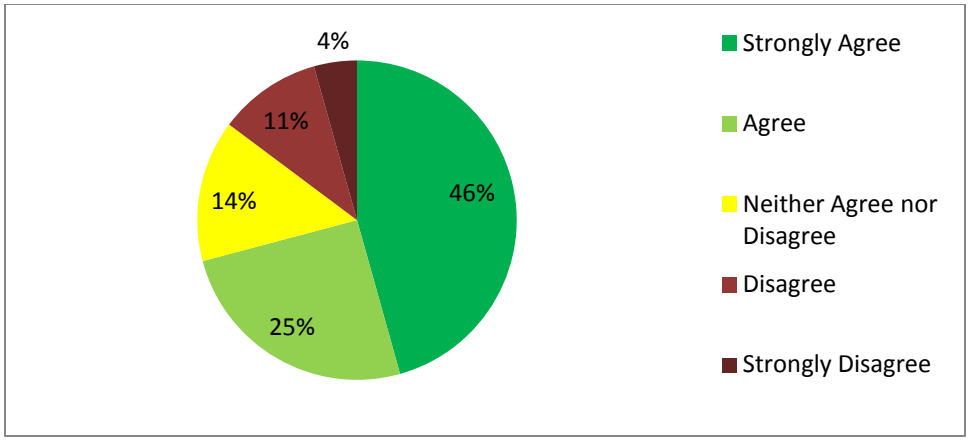
The REP helped me understand the classroom material better.



I had the opportunity to participate in river-related discussions and/or activities before our river field trip.



I had the opportunity to participate in river-related discussions and/or activities after our river field trip.



Open-ended Responses

When you think about the Rouge River, what is the first word that comes to mind?

4th-6th Pre-	4th-6th Post-	7th-12th Pre-	7th-12th Post-
Beautiful sun river	Awesome	Animals	80 colonies per 100 mL
Booth	Bugs (x2)	Aquatic life	Abused
Clean	Bugs and other small orginizams	Big (x2)	Abused and smelly
Cleanup	Cleaning	Black	Adequate
CrayFish	Crayfish (x2)	Brown	Algae
Detroit	Data	Brown water	APES
Dirty (x2)	Detroit	Clean	Aquatic life (x2)
Ducks	Dirt	Clean water	Aquatic lives
Environment	Dirty (x3)	Cold	Bacteria
Falling (x3)	Falling	Contaminated	Beautiful
Field Trip	Fish (x3)	Crack	Big
Fish & dirty water	Ford	Crawfish (x2)	Brown
Ford	Frog	Crayfish (x2)	Clean (x3)
Fresh	Fun	Currents	Cleanish
Fun (x2)	Good flowing not so dirty water stream	Detroit (x4)	Clear
Fun field trip	Heat Stroke	Dirty (x24)	Coming back
Heat strokes	Mud	Dirty Water	Contaminated (x2)
It's cool	My favorite river	Dirty/not clean	Crayfish
Mud	Nature (x2)	Dirty/polluted	Cross country
Nature	Park, ducks, and fresh air	Filthy (x2)	Current
Pie	Pollution	Fish (x4)	Dead Bodies
Pollution (x2)	Red river	Flooding (x2)	Detroit (x2)
River	River	Ford (x4)	Dirty (x13)
River (x11)	River (x11)	Ford car factory	Dirty but on a rebound
River full of fish and insects	River Rouge	Garlic mustard plant	Dirty smell
River, Water (x2)	River, Water (x2)	Henry Ford	Dirty water (x3)
Science (x3)	Rouge River	Hines Drive	Dissolved Oxygen
Sled	Sadness	I don't know.	Ducks
Testing	Shiawassee	It's a water source	Ecosystem (x2)
Um.. a river?!	Testing	Life	Environment (x2)
Water (x32)	Um... a river?!	Local	Environmental
Water and wild life	Unicorns	Long	Eutrophication
Water source	Water (x27)	Louisiana	Fecal coliform
Wet	Water, testing, bugs, fun	Michigan (x3)	Filthy
When we went to the Rouge River Last Year	Wet	My backyard	Fish
	When I have gone is past years	My neighborhood	Foggy/Green
	Wow	My neighborhood river that is polluted	Fox
		Nasty	Fresh water
		Naturalistic	Friends of the Rouge
		Nature (x5)	Fun
		NHS	Geese (x3)
		Nitrates	Getting better
		Not clean	Habitats

4th-6th Pre-	4th-6th Post-	7th-12th Pre-	7th-12th Post-
		Not dirty water	Healthier (x2)
		Paris	Healthy
		Park	Help
		Photosynthesis	High turbidity (x2)
		Polluted (x6)	Hines Drive
		Polluted water (x2)	Hope
		Pollution (x11)	Impoundment
		Red (x6)	Improved (x2)
		River (x13)	Improving (x4)
		River (x4)	Isolated River
		River flow	It's coming back.
		Riverside	Liberty
		Rouch	Life
		Rouge	Local
		Running	Long
		School	Long Lake and Coolidge
		Science	Macroinvertebrates
		Semi-clean	Michigan
		Small	Monitoring
		Smell (x2)	Nasty
		Smelly (x3)	Naturalistic
		Snapping turtle	Nature (x2)
		Testing	Needs help
		Trash (x2)	Nitrates
		Trees	Not clean
		Water (x72)	Not the best river for water quality
		Water field trip	Organisms
		Water supply	Phosphate
		Water testing	Polluted (x10)
		Water with trees	Pollution (x5)
		Watershed (x3)	Progress (x2)
			Progression
			Recovering (x4)
			Recovery (x9)
			Red (x4)
			River (x6)
			Rocks
			Rouge (x2)
			Rouge River
			Running
			Runoff and dissolved oxygen
			Runoff water
			School
			Science (x2)
			Sediment pollution
			Sediments
			Shallow
			Smell
			Smelly (x3)

4th-6th Pre-	4th-6th Post-	7th-12th Pre-	7th-12th Post-
			Soup
			Testing
			Turbid
			Turbidity
			Turtles
			Unclean
			Unsanitary (x2)
			Very stinky
			Wastes
			Water (x52)
			Water testing (x2)
			Water testing kits
			Watershed (x4)
			Zynda

Spring Monitoring 2016 Results

All Grades

Sample Size	
4th	82
5th	208
6th	200
subtotal	**490**
7th	127
8th	122
9th	22
10th	22
11th	27
12th	43
subtotal	**363**
TOTAL	**853**

Have you ever been on a Rouge River field trip?

	4th-6th		7th-12th	
No. of times to the Rouge River	Pre	Post	Pre	Post
Never	336	47	192	129
Once before	121	303	107	110
Twice before	20	101	47	82
Three times before	3	21	6	24
Four times before	1	6	2	4
Five times before	1	1	1	3
More than five times before	7	9	6	8
Blanks	1	2	2	3

62% of participants had never been on a Rouge River field trip before.

Interest in science

There was a 1.4% increase in the number of students interested in science.

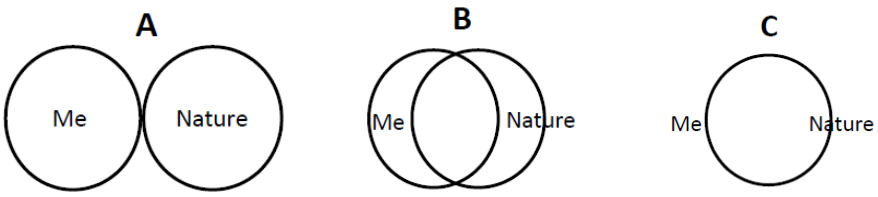
Interest in nature

There was a 0.32% increase in the number of students interested in nature.

Interest in school

There was a 2.83% increase in the number of students *not* very interested in school.

Relationship with nature



There was a 1.37% decrease in the number of students that chose "A", a 3.56% increase in the number of students that chose "B" and a 2.19% decrease in the number of students that chose "C" to represent their connection to nature.

Q: All macoinvertebrates are equally tolerant of pollution

There was a 3.93% increase in the number of students indicating the correct answer (*false*).

Number of students correctly identifying ALL macroinvetebrates from list (i.e., insects, mammals, **crustaceans, molluscs (snails, clams, etc.),** birds, fish**)**

There was a 10.9% increase in the number of students able to correctly identify these macroinvetebrates (from 160 students to 253 students).

Pollution in the Rouge

Number of students (4th-6th) able to list a source of pollution in the Rouge

There was an 11.81% increase.

Number of students (7th-12th) able to list a problem affecting the Rouge

There was a 13.84% increase.

Number of students able to list a corrective action to limit pollution

There was a 3.75% increase (718 students to 789 students).

Number of students (4th-6th) that know where to look to find out more about the pollution problem they listed

There was an 8.42% increase in the number of students able to find out more about the pollution problem they listed.

Number of students (7th-12th) that know where to look to find resources to fix the problem

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
Pre	49	75	141	73	18
Post	66	85	145	45	17

There was a 4.67% increase in the number of students that "strongly agreed" with this statement, and a 2.68% increase in the number of students that "agreed."

Students (7th-12th) able to research the problem listed

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
Pre	84	115	115	30	12
Post	93	115	107	29	14

There was a 2.38% increase in students that "strongly agreed" with this statement.

Students (7th-12th) able to explain the problem listed

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
Pre	82	109	105	42	18
Post	108	112	92	32	15

There was a 7.05% increase in students that "strongly agreed" with this statement, and a 0.58% increase in students that "agreed."

Technical scientific questions (grades 7th-12th)

Q: Imagine you are at the river testing for the presence of dissolved oxygen in the water. If you want to get the most accurate result, you should repeat the test more than once.

96.38% of students answered this question correctly in the pre-survey (*true)*, and 96.64% of students got answered correctly in the post-survey.

Students able to list a source of high nitrates in the Rouge

There was a 24.35% increase in the number of students able to list a source of high nitrates in the Rouge (38 students to 123 students).

Students able to list a corrective action to limit nitrates

There was a 30.09% increase in the number of students able to list a corrective action to limit nitrates (38 students to 130 students).

Feelings regarding the Rouge Education Project

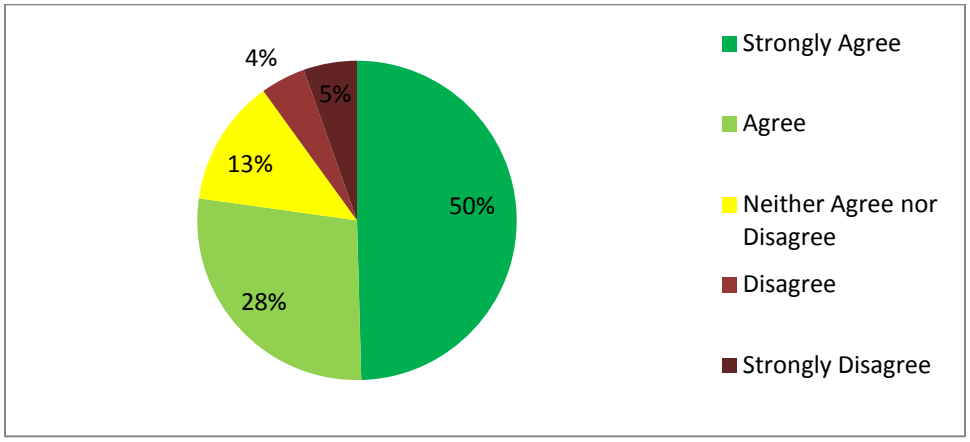
93.22% of all students were able to list a way participating in the Rouge Education Project helps the Rouge River.

4th-6th grade responses

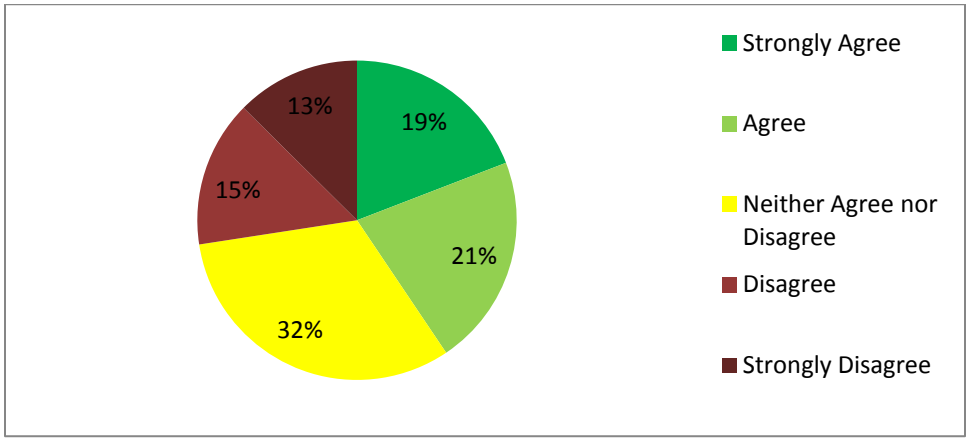
Question	Percent of students
Learned something new about the Rouge	97%
Learned how to make the Rouge healthier	96%
Participating in the REP made me feel like I could make a difference in protecting the environment	94%
Participating in the REP helped me to think like a scientist	83%
Plan to talk to family/friends about the REP	80%
Participating in the REP helped me understand classroom material better	78%

7th-12th grade responses

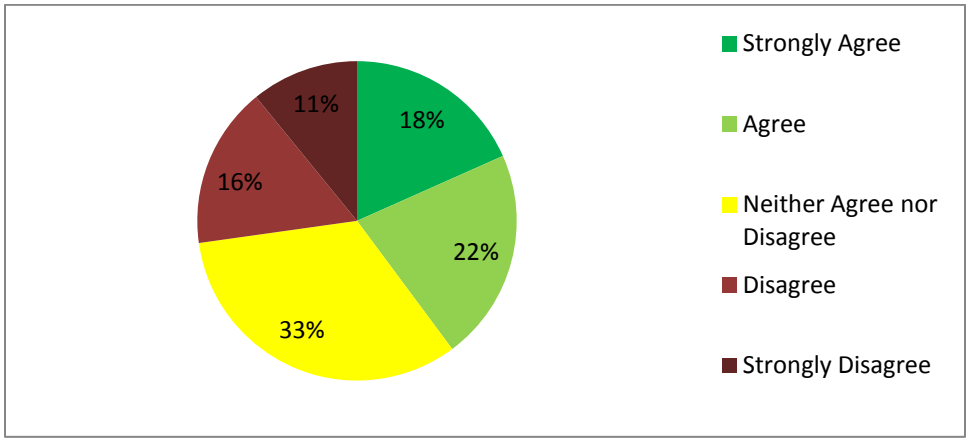
I learned something new about the Rouge River.



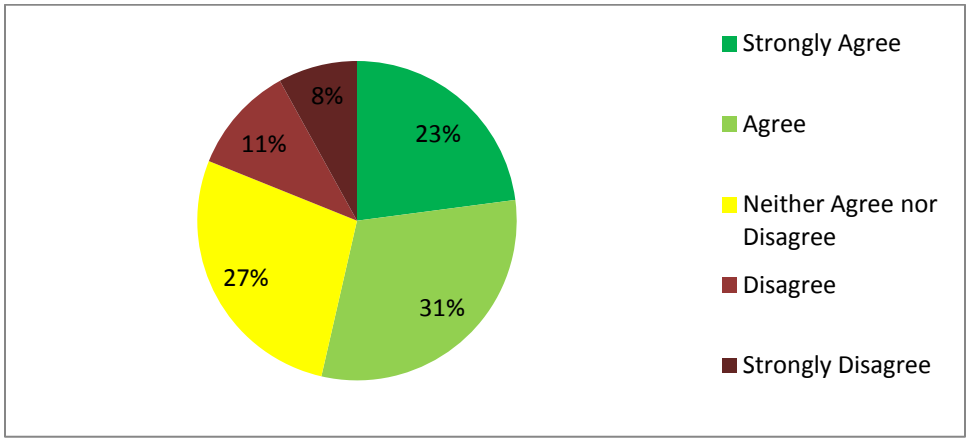
I plan to talk to family and/or friends about the information I learned.



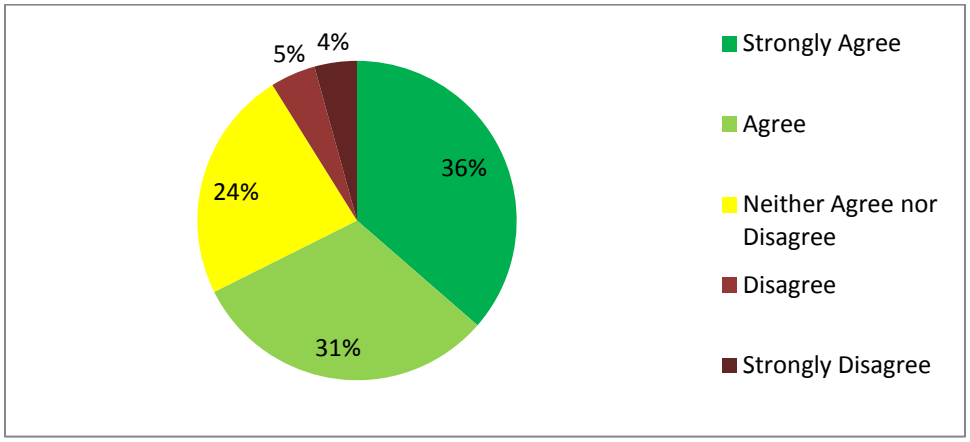
I experienced a feeling of connectedness to the Rouge River.



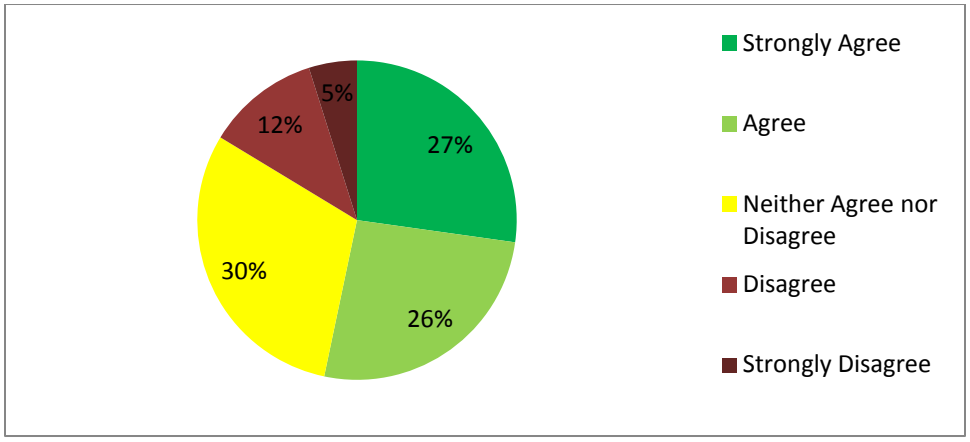
I found myself reflecting on new ideas about how my actions affect the river.



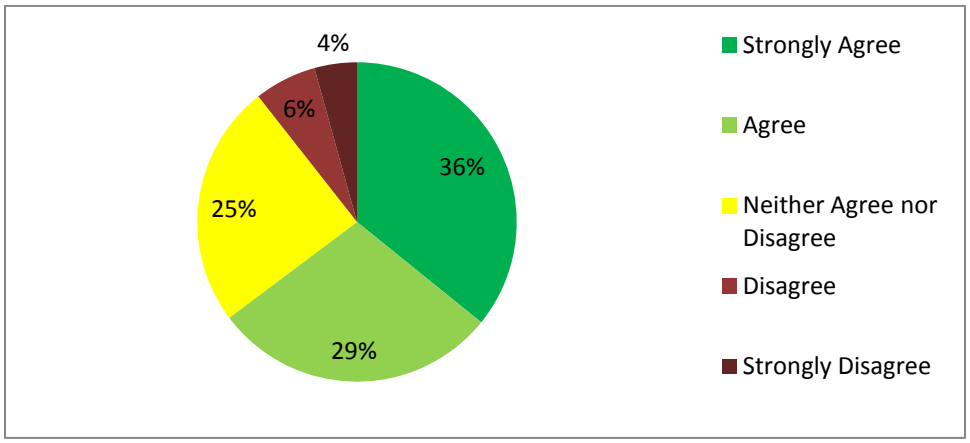
I learned about actions I could take to make the Rouge River healthier.



If given the opportunity, I would choose to participate in more projects that would help the Rouge River.



Our class' REP river monitoring made (or could make) a difference in the health of the Rouge River.



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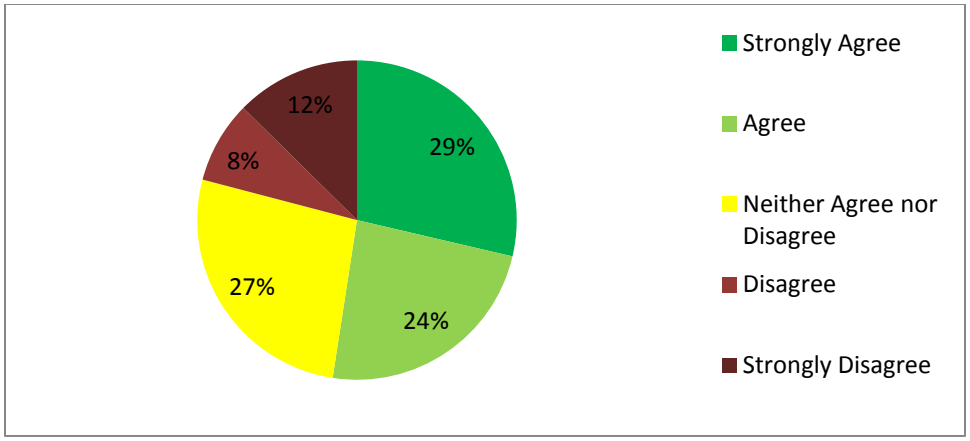
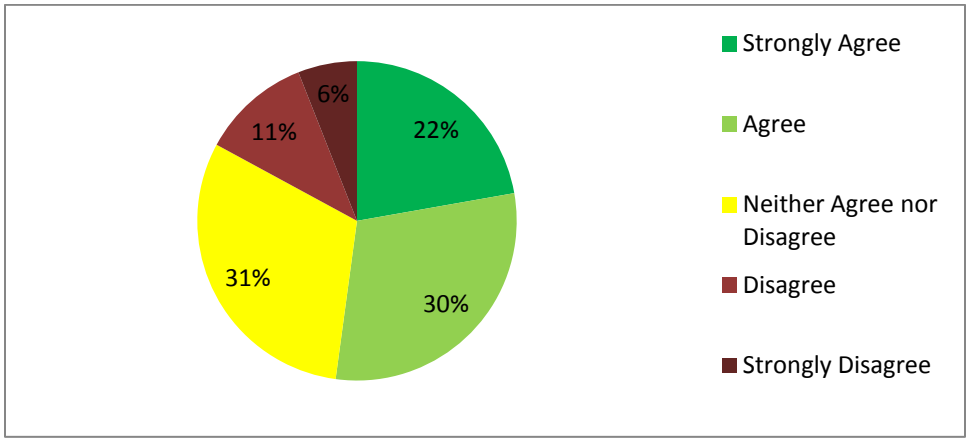
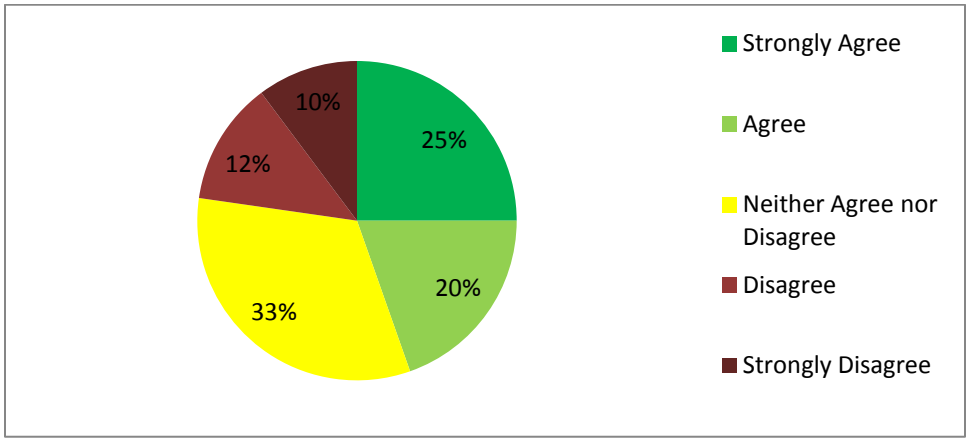


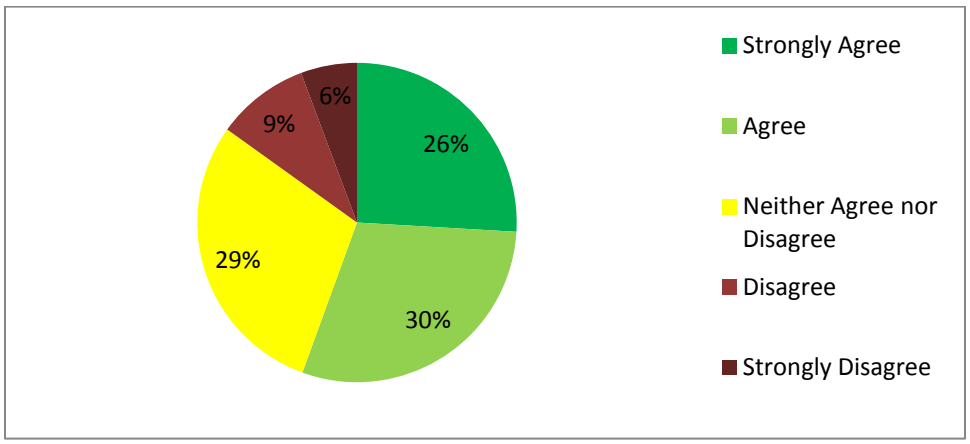
The REP helped me feel that I could make a difference in society.



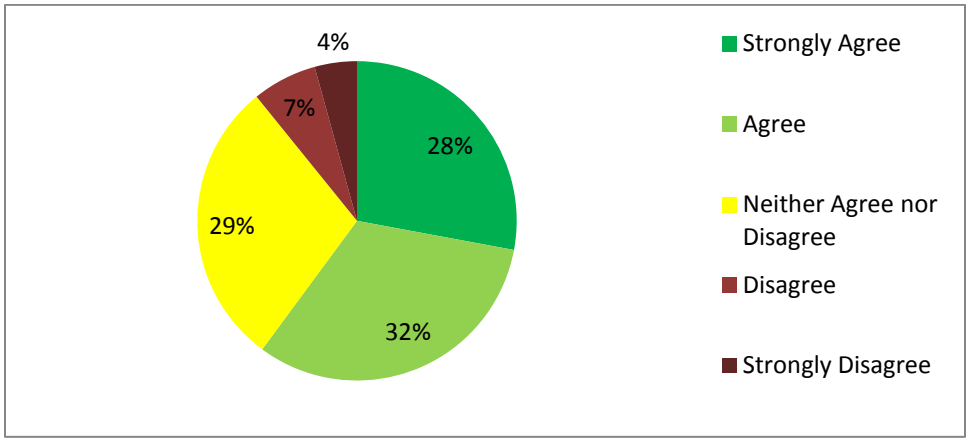
I met people/encountered things I normally wouldn't have during the REP.



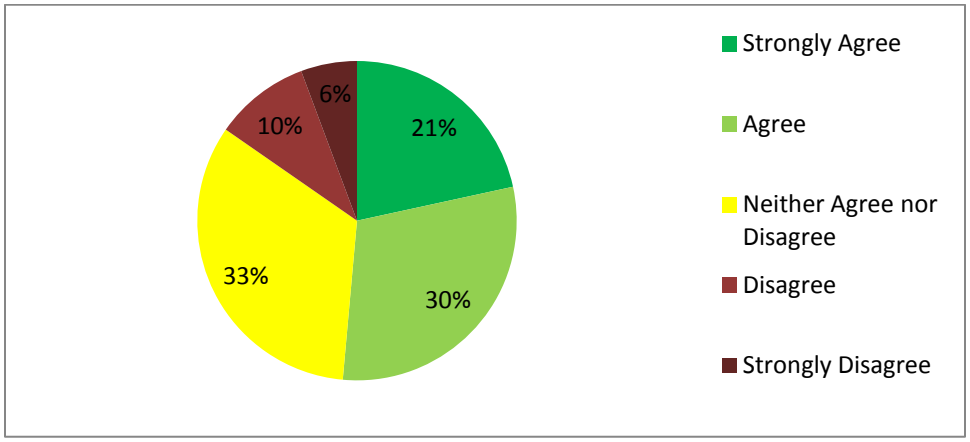
The REP challenged me to think like a scientist.



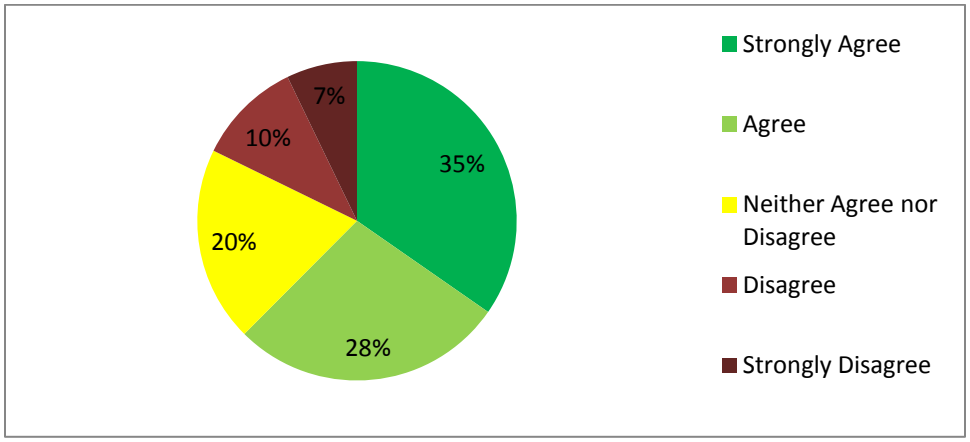
The REP was directly related to my classroom work.



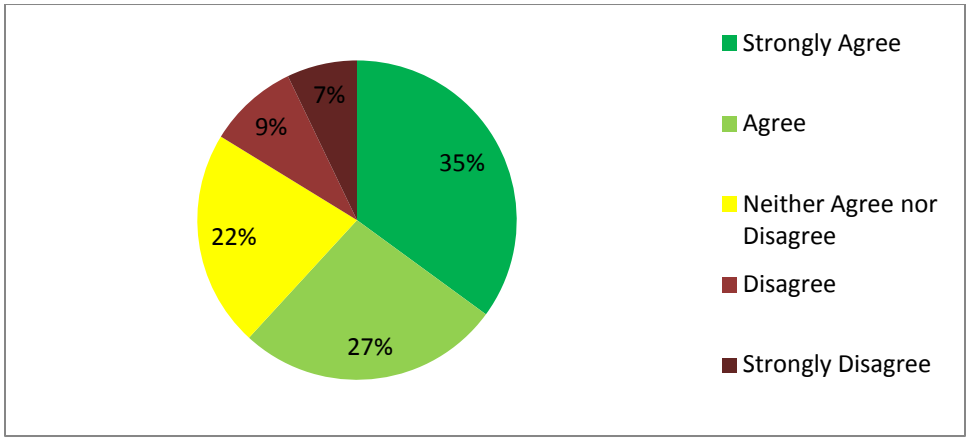
The REP helped me understand the classroom material better.



I had the opportunity to participate in river-related discussions and/or activities before our river field trip.



I had the opportunity to participate in river-related discussions and/or activities after our river field trip.



Open-ended Responses

When you think about the Rouge River, what is the first word that comes to mind?

4th-6th Pre-	4th-6th Post-	7th-12th Pre-	7th-12th Post-
Water (x151)	Water (x135)	Water (x129)	Water (x122)
River (x76)	River (x54)	River (x35)	River (x31)
Nature (x18)	Nature (x28)	Red (x19)	Dirty (x14)
Fun (x10)	Watershed (x20)	Dirty (x14)	Red (x12)
Pollution (x10)	Pollution (x14)	Nature (x7)	Watershed (x11)
Fish (x9)	Dirty (x9)	Polluted (x6)	Nature (x10)
Polluted (x8)	Fish (x9)	Watershed (x6)	Pollution (x7)
Dirty (x6)	Fun (x8)	Detroit (x5)	Polluted (x6)
Red (x6)	Polluted (x7)	Pollution (x4)	Brown (x5)
Wet (x6)	Wildlife (x7)	Science (x4)	Fun (x5)
Bugs (x5)	Bugs (x6)	Beautiful (x3)	Beautiful (x4)
Awesome (x4)	Red (x6)	Fish (x3)	Michigan (x4)
Cool (x4)	Awesome (x6)	I don't know (x3)	Detroit (x3)
Detroit (x4)	Beautiful (x5)	I don't know yet (x3)	Rouge (x3)
Animals (x3)	Wet (x5)	Trash (x3)	Testing (x3)
Creek (x3)	Clean (x4)	Bugs (x2)	Trash (x3)
Ford (x3)	Crayfish (x4)	Car (x2)	Clean (x2)
Frogs (x3)	Interesting (x3)	Clean (x2)	Crayfish (x2)
Helping (x3)	Mud (x3)	Dirt (x2)	Dirty water (x2)
Red river (x3)	Amazing (x2)	Gross (x2)	Ford (x2)
Rivers (x3)	Animals (x2)	Long (x2)	Habitat (x2)
Rouge (x3)	Bugs and water (x2)	Mud (x2)	Home (x2)
Trees (x3)	Cold (x2)	Park (x2)	Long (x2)

4th-6th Pre-	4th-6th Post-	7th-12th Pre-	7th-12th Post-
Water pollution (x3)	Cool (x2)	Rouge (x2)	Mud (x2)
Watershed (x3)	Environment (x2)	Wet (x2)	Nasty (x2)
Drinking Water (x2)	Fellows Creek (x2)	Wildlife (x2)	Oxygen (x2)
Exciting (x2)	Good (x2)	a lot of water	Science (x2)
Flowing (x2)	Help (x2)	almost clean	Wet (x2)
Garbage (x2)	Murky (x2)	amazing	a school and a river called a rouge
Gross (x2)	Park (x2)	Beauty	amazing
Home (x2)	Rivers (x2)	Bleh	animals
Long river (x2)	Rouge (x2)	bug-filled	Aqua
OK (x2)	Rouge River (x2)	Calm	assitance
Park (x2)	Science (x2)	canoeing	Bad
Pretty (x2)	Trash (x2)	clean it	Baton Rouge Louisiana capital
Rouge River (x2)	Trees (x2)	clean river.	Beautify Stream
Water, river (x2)	Waders (x2)	Community	Better
adventure	Adventure	courious	Béyonce
aquatic animals	Benthics	Current	Big
Aquatic Life	big river	Dead	Birds and Rivers
Atlantic	big river that goes pass Rouge	dirty River	bridge
Beautiful	bioindicators	dirty water	Bridges
beautiful lake	blood river	Disgusting	brown river
Bell Creek Park	bock	dishonorably discharged river that's started killing it's fellow rivers after joining the lake	bugs

4th-6th Pre-	4th-6th Post-	7th-12th Pre-	7th-12th Post-
		side	
big	brown	Douglas Evan Nature Preserve	clean river
big river	Call of Duty	drown	cleaner
blood	canoeing	Elie	Cleaning
blood moons	Changed	Factory	cool
body of water	classify	Filthy	Curry
By my school	clean water	Fishes	Damp
canal	conservation	fishing	dcds
Cars	Creek	Flint	DCDS Middle School
Clean	critters	Flint River pollution	Death
Clean up nature!	dead fish	Flood-plain	Diluted
Clean water, trees, and other things in nature.	delicate balance	Flowers	Dirt
Clear	Detroit	Ford	Dirty River
clear river	Dirt	Ford Rouge Plant	Douglas Evans Nature Preserve
Clear Waters	Dirty river	Fresh water	Exciting
conservation	drink	Frogs	falling
cool river	Enviormental Issue	Fun	Feild trip
Cranbrook, and the presentation that I had with water guns	eww	fun river	Fire
creatures	extraordinary	garbage	Firefighters park

4th-6th Pre-	4th-6th Post-	7th-12th Pre-	7th-12th Post-
Creek/ river	fast running river	Grass	Fish
did	Fishes, water bugs , boats	Green	Ford Rouge Plant
dirty water	Fishing	grime	France
discovering	flowing water	Havent Been	French word for red
Duck	Ford	Home	Frogs
Ducks	Ford Motor company	Improved	fun river
ecosystem	fun and cold	In need of help	Green
environment	fun/amazing	Interested	Happiness
Environmental	getting wet	Local rivers/ creeks	helping the water
Environmental Protection	Great	long river going throw Detroit and in to the ocean	how dirty it is
Factory	Gross	Michigan	How long is the river
filth	Habitat	Mucky River	I thought it was going to be a water park and a lot of animals there
fine	habitat	Muddy	Idk
Fishing	happy to go	nasty water	Important
forest	Healthy	nature and animals and bugs	Improvement
fresh water	Helping	Near School	Insects
going to a river and testing water	Hines Drive	never been	It probably has trash in thr river.
goo	how cold is the weater	Nice	Jenna
Good	Huge river	park	lake
Green	i don't no	peaceful	Lots of Grass
happy	Insects	peaceful waters	muddy

4th-6th Pre-	4th-6th Post-	7th-12th Pre-	7th-12th Post-
Harmful things that could be in the water	insects and dirt	Plants	murky
Heathy	it looks awsome	pleasant	nature place
Helpful	it was okay	Pretty	nice
Helping the Rouge River	its polluted	rapid	Outside
hot day	Krayfish	really dirty like wast land	Park
hot weather	large river	red dirt/powder	pH
invasive species	Life	Red river	place where its a famous river at and lots of trees
Lake	Litter	river in Louisiana	plants
lake Erie	Long	river surrounded by nature	poplution
leads into detroit river	Lots of Rivers	river that called the rouge river	Recovering
Life,plants,Water	macroinvertebrates	river walk	Rick
Long	McClumpha Park	Rouge river	river in danger
McClumpha Park	me falling	rouge river plant	river in France.
murky	mess	school	river with a bit of pollution along the banks or in the water.
murky green water	mini river	Small	River/Water
My Grandpa's house	Modified	small river	rocks
my school	My grandpaws 5 akers of river	Smooth	School
Narrow	nature & bugs	species	Small

4th-6th Pre-	4th-6th Post-	7th-12th Pre-	7th-12th Post-
nature/water	needs cleaning	Stick	Smells like death
Ocean	Next to my school	stop pollution	solve problem
Organisms	nuture	Streams	Swamp
Our drinking water	Organisms	Testing	the plants & insects
parasitic worm	plants	The French word for red	The stuff effecting it
Parks and Rivers	poop	The place were it passes my school	trashy
Peaceful	poop water	This project and the organisms involved	Twigs
Percy Jackson Movie/Book	Poor Water Quality	to clean and water	waste
poisoned	Pretty	Trashy	water and the beautiful site
quiet	red river	trees	water being dirty
Red (Rouge means red in French)	Red, because "Rouge" in French means red.	tubing down itz	water bugs
River (clean.)	Relaxing	walter	water meander
river and plants	reptiles	waste dump	Water souce
river cot on fire	river tasing	Water, fish.	Water, Detroit River
river filled with bugs	river/water	yes	watery
river in Detroit	River testing	Yotube	Wet
River Testing	rouge means red in french, so read		Wildlife
River that people are trying to keep	Rouge or red		wonderful
river that sounds French.	Rouge River Plant		

4th-6th Pre-	4th-6th Post-	7th-12th Pre-	7th-12th Post-
river with a brige	rushing		
river/stream	Science Class		
river/water	stream		
rouge people	stream/river		
School	strong		
Science	testing		
Science class	The creek by our school		
scince	Thinking		
Small	thirsty		
small and kind of dirty river.	Together		
streams	Toilet		
strolling on a river	Tropical		
STRONG	type of river		
Stupid Pollution	unclean		
Sweet!	Very Clean Water		
swim and fish	Want to do it again.		
TESTING	water (clean)		
thriving	Water and life		
trashy	Water and mud		
trees, and grass (nature in general)	Water and Sun		
type of river	water flowing		

4th-6th Pre-	4th-6th Post-	7th-12th Pre-	7th-12th Post-
water and nature	water, pollution, bugs		
Water animals	Water, watershed		
waterfall	water,mud,tree branches,		
waterway	What I think a of the Rouge river is all of the runoff going into the watershed. The polluted water that is going into the river.		
what will i see	Wild life		
wild	Wilderness!!!		
wilderness	wood in the river		
Wow Nature	Yos		

Notable Results & Discussion

Fall Monitoring 2015

Matching pre- and post- surveys were found for 320 students out of the 536 reported students that participated, accounting for almost 60% of students.

Schools that submitted pre- and post- survey data include: Birmingham Covington School, Chandler Park Academy High School, Crestwood High School, Inter-City Baptist High School, Oakland Schools Technical Campus SE, Steppingstone School, and Troy High School. One school, Huron Valley Lutheran High School, submitted their pre- surveys, but will not submit their post surveys until after spring monitoring. Their group of 16 students was not included in the 536 reported student number.

There was a large subsection of students that indicated they had never been on a Rouge River field trip, even in the post-survey. This may be due to the large number of students at Crestwood High School (150) that completed a Rouge River unit in the classroom, but only a small number of students (30) visited the river to conduct sampling.

While over half of the students had never been to the Rouge River before, the large number of students that had attended a field trip previously was likely due to 6th graders at Birmingham Covington School that went to the river the previous year (they take both 5th and 6th graders, and could have attended the monitoring event that previous spring). Chandler Park Academy High School now takes their science club, and those students may have gone last year. Another exception was Steppingstone School, who took all of their students to the river and continues to each year.

Analyzing a student's interest in science, nature, and school, is to gauge the receptiveness of that student to a project like the REP. An increase in student interest in any of these fields throughout the Rouge Education Project is not a goal, but could be an added benefit to project-based learning. Students that left this section blank were not included in overall calculations.

The survey question referring to conducting multiple trials of the same test to get the most accurate result may be too "easy" for students in grades 7th-12th. This must be a concept covered heavily in science classes before students reach that grade. There was a small decrease in the percentage of students answering that question correctly from the pre- to post survey, further emphasizing that this question may not provide meaningful analysis.

Most students (7th-12th) agreed with the statement that they learned something new about the Rouge River. Over a third of students in 7th-12th grade did not plan to talk to their friends or family about what they learned. There was also an increase in the number of students that felt connected to *nature*, but almost half of students (7th-12th) would not say they experienced a feeling of connectedness with the Rouge River. This could also have been due to the high number of students that did not go on the Rouge River field trip at Crestwood High School.

Over a third of students did not take the time to reflect on new ideas about how their personal actions affected the river, but most students (85%) would agree they learned about actions that would help the river. A quarter of students did not feel like participating in the project would make a difference in society.

The 19% of students that didn't feel their project involved people from the community likely were not familiar with the school's involvement with Friends of the Rouge. Often, students don't know their "school project" is part of a bigger-picture sampling event due to the lack of direct involvement with REP staff.

Open-ended questions such as "When you think about the Rouge River, what is the first word that comes to mind?" rendered responses that fell within a few categories: most mentioned "river" or "water," while the remaining may have noted pollution or that the river was dirty, testing, nature/woods, and a few miscellaneous others. Older students included some responses noting their testing site or park, mentioned pollution, "improved", or specific testing parameters.

Spring Monitoring 2016

Matching pre- and post- surveys were found for 853 students out of the 1,378 reported students that participated and had not already completed the survey, accounting for almost 62% of students.

Schools that submitted pre- and post- survey data include: Achieve Charter Academy, Chandler Park Academy High School, Clippert Academy, Crescent Academy International, Detroit Academy of Arts & Sciences, Detroit Country Day Middle School, Garden City High School, Huron Valley Lutheran High School, Inter-City Baptist High School, Mary Helen Guest Elementary School, Niles Community High School, Oakland Schools Technical Campus SE, Pierce Middle School, Plymouth High School, Power Upper Elementary School, Ronald Brown Academy, Roosevelt High School, Salem Elementary School, St. Valentine Catholic School, Steppingstone School, Thompson K-8 International Academy, and Tonda Elementary School. Schools that completed the survey in the fall and took the same group of students out were not included in the 1,378 total. This includes Birmingham Covington School (216), Crestwood High School (150), Oakland Schools Technical Campus SE (11), and Troy High School (70). No matching pre- or post- surveys were received from Smith Middle School or Universal Academy.

There was a large subsection of 7^{th} – 12^{th} grade students that indicated they had never been on a Rouge River field trip, even in the post-survey.

While over half of the students had never been on a Rouge River field trip before, the large number of students that had attended a field trip previously was likely due to Detroit Country Day and Roosevelt High School students that may participate through multiple grades. Another exception was Steppingstone School, who took all of their students to the river and continues to each year.

Analyzing a student's interest in science, nature, and school, is to gauge the receptiveness of that student to a project like the REP. An increase in student interest in any of these fields throughout the Rouge Education Project is not a goal, but could be an added benefit to project-based learning. Students that left this section blank were not included in overall calculations. Notably, there was an increase in

the number of students that were not very interested in school, which may have been due to the timing of monitoring so close to the end of the school year.

The survey question referring to conducting multiple trials of the same test to get the most accurate result may be too "easy" for students in grades 7^{th}-12^{th}. This must be a concept covered heavily in science classes before students reach that grade. There was an insignificant increase in the percentage of students answering that question correctly from the pre- to post survey, further emphasizing that this question may not provide meaningful analysis.

Many students left the nitrates question blank in the post survey, which may mean they were not sure of the answer, or somehow didn't see/skipped it.

In general, most students (7^{th}-12^{th}) agreed with the statement that they learned something new about the Rouge River (78%). They learned actions to make the river healthier (67%), and felt like their monitoring could make a difference in the overall health of the river (65%). They participated in river discussions before and after their trip (63% and 62%, respectively). The project was related to their classroom work (60%), but only a little over half of students (51%) felt like it helped them understand their classroom material better.

Generally, students felt like the project helped them to think like a scientist (56%). They reflected on new ideas about how their actions affect the river (54%), and (53%) would participate in projects that would help the Rouge River. Many students (53%) recognized that their monitoring involved people and/or organizations from the community, and felt like their monitoring would make a difference in society (52%).

Only 45% of students felt like they met people and encountered things they normally wouldn't. Most students did not plan to talk to family and friends about what they learned (40% did), and didn't experience a sense of connectedness to the Rouge (40% did).

Open-ended questions such as "When you think about the Rouge River, what is the first word that comes to mind?" rendered responses that fell within a few categories: most mentioned "river" or "water," while the remaining may have noted pollution or that the river was dirty, nature/woods, that the trip was fun, or watershed, and a few miscellaneous others.

Teacher Evaluation Results

Rouge Education Project teachers are also given a program evaluation at the end of the school year to give them the opportunity to share their feelings about project execution. Fourteen teachers responded.

Most teachers felt comfortable teaching the chemical, physical, and biological assessments of the river.

Level of comfort	Chemical	Physical	Biological
Completely comfortable	7	7	6
Very comfortable	3	2	0
Moderately comfortable	2	3	3
Uncomfortable	0	0	0
Very uncomfortable	1	0	3
N/A	0	1	1
Blank	1	1	1

Some teachers that responded were able to attend training events, whereas others didn't feel they needed to because they had gone through training and were confident. Barriers to attending training events included time constraints and conflicts with family and other workshop schedules.

Thirteen teachers felt that they were completely satisfied with the level of support received from REP staff, and one was very satisfied.

The REP is a good outlet for schools that may not be able to implement a water quality monitoring project on their own.

Likelihood of implementing water quality monitoring program if the REP did not exist	# respondents
Very likely	1
Likely	4
Doubtful	2
Unlikely	3
Very unlikely	4

Eleven teachers were completely satisfied with their participation in the REP this year, and three teachers were very satisfied.

Some suggestions for additional training events include a focus on "airshed" issues (what is deposited into the water from the air), a specific training on collecting benthic macroinvertebrates at a site with a large variety, and to include short videos about the Rouge River showing the different branches for students to see how the river changes. The teacher that suggested the benthic macroinvertebrate training must have been unaware that three in-depth benthic training events are offered throughout the year and have been for the past two years.

Select teachers are able to take their program a step further, and **incorporate an environmental action component** following their participation in the REP. Additional projects include:

-Studying issues of bottled water and its effects on groundwater supplies in communities

-Assigning an environmental issues project
-Having the students participate in Rouge Rescue and their city's Ecorse Creek clean-up as well as actively maintaining three city rain gardens
-Studying subjects at different grade levels – 6th graders devote an entire year to the Great Lakes and the Rouge River and did a Salmon in the Classroom program, and 8th graders look at groundwater contamination
-an Earth Day mini project
-Use of a wikiwatershed program and ISTI program to teach about conservation practices; students made a proposal to the school to make a change on the campus
-Encouraging students to assess how they were potentially harming their watershed at home and suggesting ways to do less potentially harmful actions
-Discussing in class about what they can do and/or host a mock town meeting where the town experiences a fish kill and the students go over what caused it and what they can do to fix it
-Students look into their use of water and how they can perform their ritual ablutions with the least amount of water possible
-Making posters about conserving resources
-Studying oil spills and their impact on the environment, as well as clean-up methods

Some students are encouraged to take their project further and take **environmental action in their community**:

-Writing letters to the Congress of Michigan, creating posters about reducing water pollution for a display at their parent's night/science expo
-Removing invasive species at their sampling site
-Being a part of the school's extra-curricular Green Team
-Becoming student watershed commissioners for their city, using their knowledge to sway parents to use more watershed friendly practices at their homes and businesses
-Telling their families about conservation practices and trying to convince them to change
-Cleaning the grounds near the school to pick up litter and water bottles; one year it started the water bottle recycling program at their school
-Volunteering at their local nature center

Barriers to action: students have busy schedules; an action project would need to be organized by someone else or the school.

Suggestions to **improve communication** included having an easier to navigate place to enter data - there has been trouble with navigating the online classroom and finding resources, starting a blog or Facebook page, and that reading e-mail is difficult to do during the school day.

REP Strengths:

-"Strengths, for me, include the volunteers that work with my students on testing day. I could not manage a group this large without their help. They are amazing! The REP does a great job training teachers and volunteers. As a low socio-economic bracket school, the grants for chemicals and

transportation are incredibly important. I could not have my students participate without the financial assistance."
-"I think you are doing a great job! I love all the work you do to organize community involvement."
-"Very hands on activities for students and they directly impact the data collection"
-"Great support and encouragement - keep trying to involve new schools."
-"Well organized; clear; easy to follow"
-"Support from FOTR and REP, hands-on, project based, authentic audience."
-"Able to answer questions asked promptly or find resources that answer the question for the teacher."
-"Getting students out doing science in their community, allows them to see real life applications, exposes them to issues most have never thought of before"
- "It is a great program that gets students doing science. The kids love determining if the water quality is good or bad. They love learning about what makes a good water system so it is a great program to get kids involved."
-"Leaders, volunteers, trainings and support."
-"You do a great job with communication, and opportunities for teacher PD and involvement."

REP Weaknesses:

-"I would like to communicate with other groups that are collecting and maybe Skype, chat, or tweet with them about their site. Can we set up a partnership with any of the schools for students to share their findings? Maybe using edublogs or something similar? I would be happy to pilot!"
-"Your website could be more user friendly and include short interesting videos of the Rouge River branches. Some of the information is presented in very older fashion, which needs to be updated to engage students [to] be more likely to read the information."
-"It is so much work for the teachers to go on this trip. It is great you have grants for the bus and chemicals but we still need to get money for the substitutes which is 100 dollars per teacher, we go with 3 teachers which is a cost we pass on to the students and unfortunately in my district many students can not afford."
-"The paperwork (forms and documents) needs to be a little more streamlined."

Overall Summary & Conclusion

Previous survey evaluations were analyzed by grade level. In an attempt to conduct meaningful analysis of the project's impact overall (rather than by grade level), some questions included all student responses to provide a larger sample size. This method of analysis began in spring of 2015.

Pre- and post- survey analysis rendered the program a success based on the following criteria: an increase in the percentage of students correctly answering multiple choice questions based on general watershed science and/or the Rouge River specifically, an increase in the percentage of students who could identify specific water quality issues in the Rouge River, and an increase in the percentage of students who could identify potential solutions to local and/or regional water quality issues.

The REP did not receive a pre- and post- student survey from every student participating in the program. In addition, students that already participated in the REP may have received this survey multiple times. Ensuring the surveys are only given to those students that participate in the full program (including the field trip) and are not given repeat surveys year after year may help to give a more accurate picture of the student's first exposure to the Rouge Education Project and field science. All submitted surveys this fall were electronic. Only one school, Achieve Charter Academy, submitted hard-copies of surveys in the spring which were then translated by REP staff into the electronic format.

Many students were able to list a problem affecting the Rouge River watershed, but were generalized statements such as "pollution." The post- survey reflected that the 7th-12th grade students were learning more about specific causes of pollution, which will help them to identify corrective actions to limit the pollution. The 5th and 6th graders did not seem to learn more about how to limit the pollution, and often provided unrealistic answers to the pollution problem. They may not be discussing this topic further in the classroom, or are not of an age where they can critically think about how to address these problems.

There needs to be an increase in engagement with older students to reach more than half of students on certain topics: to help them start a discussion with friends and family about the river, to find a way to connect them to the river, and generally increase their involvement and enthusiasm with the project. The survey reached students across many different demographics and backgrounds, and some may already have environmental knowledge, and some may not have much of an interest due to lack of exposure.

Having students complete more service-learning projects such as restoration activities (i.e. invasive species removal, rain garden or native garden plantings, etc.) and/or participation in river clean-up events may help these students realize the impact that they, personally, can have on the river. Having students reflect more about how their personal actions affect the river could be done through a writing assignment as part of a service learning project. Through this, students will hopefully feel a greater connection and sense of ownership of the Rouge River and tributaries.

Service learning opportunities would increase with community involvement. Many schools did not request corporate or other trained volunteers to help with their project and worked completely independently. Establishing a greater connection to their collection of data and submission to Friends of

the Rouge/the Rouge Education Project should be explored. The REP should also work with local communities to identify potential project areas (such as parks or city land) the students could restore. An increase in excitement and enthusiasm may also help to increase the number of students that plan to talk to their family and friends about the project. This could be done through a greater social media presence and media coverage of the event. A new Friends of the Rouge Instagram account was able to highlight each monitoring event in real time this fall and spring, but there was little student interaction. This spring explored more activity on Twitter, directly interacting with some school Twitter accounts and slightly increasing the presence of Friends of the Rouge and number of followers.

Fall monitoring schools operate fairly independently and generally have a lot of experience with the Project. There was less of an overall change in student attitudes and behaviors in the spring, which could have been a result of a larger sample size, or that the fall monitoring teachers have more experience with the program, and therefore are comfortable presenting the material in an engaging way. Exploring ways to engage these schools in different opportunities throughout the year would bring the project full-circle in the spring.

This fall brought about the launch of a new online classroom, and utilizing technology able to increase staff "presence" in the classroom may help teachers bridge the gap between the project and the students. Facilitating more service learning projects and on-the-ground restoration work will continue to empower students to take action and help shape them into the next generation of environmental stewards.

Teacher evaluations were mostly positive with some helpful constructive criticism of the program. The teachers that responded felt very comfortable, and many were able to help with additional action projects in their community. The online classroom has room for improvement, and updates to that as well as the paperwork and documentation required for the program are of high priority for REP staff in preparation for the upcoming school year.

While this spring did not bring about many new avenues for schools to participate, efforts will be made to continue to incorporate new technology and provide additional student engagement opportunities.

Evaluations clearly illustrated a positive impact on the students (and teachers) participating, but also highlighted areas with opportunity for improvement. This long withstanding program will continue to operate with the same program framework that has proved successful since 1987, although survey results will help to shape modifications to the program moving forward. This will ensure that the Rouge Education Project remains relevant and meaningful to its participants.

The Rouge Education Project would like to extend a heartfelt thank you to all of the teachers and students that participated in 2015-2016. Thank you for your commitment to this program and your river.