

Ferry Beach Ecology School (FBES) SELU Evaluation

Utilization Preview

PEER Associates, July, 2010

NOTE: *This document is intended only for internal use, not for public distribution. The purpose is to provide a scaffold for verbal discussion of findings in light of the original plan. Thus, the content is extremely distilled, and in note form only.*

Why did we do this evaluation?

- ❖ Primary stakeholders identified: FBES staff
- ❖ Overall Goals of 2010 Evaluation:
 - Guide FBES in the development of an overall comprehensive evaluation framework, including specification of short- and long-term program goals, and tools to begin evaluating progress toward those goals.
 - Build the capacity of FBES to internally conduct in-depth, ongoing, staff-driven evaluation.
- ❖ Evaluation Question:
 - To what extent, and under what conditions, does the SELU program impact student:
 - 1a- Environmental knowledge, application, and stewardship
 - 1b- Comfort outdoors/connection to nature
 - 1c- Academic engagement and achievement
 - 1d- Personal development (i.e. cooperation, leadership, self-esteem, etc.)

What data did we collect?

- ❖ **NOTE:** *There were challenges with some teachers not fully understanding how to administer evaluation tools, so the findings around 3rd grade student surveys and 5th grade Concept Maps are less certain and should be considered in light of how they are triangulated by other findings.*
- ❖ 172 Student surveys
 - Teachers administered surveys to their students, some online, and some in paper format, in Spring, 2010. All 3rd and 5th grade teachers administered the surveys, but only one 4th grade teacher did. Final counts for surveys were:
 - 74 3rd graders
 - 21 4th graders
 - 77 5th graders
- ❖ 7 Educator surveys
 - Most educators took the survey online in Spring, 2010. One 3rd grade teacher, two 4th grade teachers, and four 5th grade teachers completed the survey.
- ❖ 4 Focus Groups
 - FBES staff conducted focus groups in Spring, 2010 with students from each grade, and a group of teachers. The 3rd grade focus group had 13 students, 11 students for the 4th grade group, and 11 students from 5th grade. The number, names, and grade levels of teachers were not specified.
- ❖ 14 Concept Maps
 - In Spring 2010, one 5th grade teacher administered pre- and post-concept maps to 17 students. Concept maps for 3 of the children were excluded for being illegible.

What did we find?

SELU program participation may have increased students' comfort in nature

- A majority of focus group students reported that they felt more comfortable in nature after their experiences with FBES. Some students attributed this to more experiences in nature with SELU, and others to having a better understanding of nature due to the program. All of the 3rd graders and all but one 4th grader said that they would be very comfortable walking in a natural wooded setting similar to a picture shown to them. The 5th grade students asserted that they would be more comfortable in their own neighborhoods or at a beach with people around than walking in the woods.¹
- Student surveys indicated that students felt fairly comfortable outdoors (average = 3.0), and spent time outdoors regularly (average = 2.8) (See Table F1). 5th grade students reported feeling more comfortable outdoors (average = 3.1) than 3rd (average = 2.9) or 4th (average = 2.8) grade students (See Table F3).

Students reported increased environmental knowledge and stewardship

- Many students in focus groups were able to articulate new content knowledge about nature learned in the SELU program. Examples of what they learned included: sand formation, animal and insect facts, and animal adaptations.
- In focus groups, most students in all three grades listed at least one way that they would change to help nature or the environment. The most common examples of environmental stewardship included: recycling, composting, conserving water, and treating wildlife with respect.
- 5th grade concept maps demonstrated fairly low levels of understanding of adaptation, even after it was taught in the SELU program. However, the maps did show significant improvement from before to after learning the concept in terms of the complexity of the maps (measured in number of nodes: pre-concept map, average = 3.9 nodes; post-concept map, average = 7.6 nodes; See Table F4). There was also a significant increase in the accuracy of the concept maps, although they went from not at all accurate to only slightly accurate on average (See Figure 1).
- Student surveys indicated fairly high levels of agreement with environmental stewardship values (average = 3.2; See Table F1). Surveys also showed that students participated in environmental stewardship activities on average somewhere between "sometimes" and "a lot" (average = 2.4; See Table F1). 3rd grade students reported significantly more environmental stewardship behaviors than 4th or 5th grade (See Table F3). ***NOTE: 3rd graders reported significantly higher levels than 4th or 5th graders for several outcome domains. There are two reasons why this finding is suspect: 1) The format of the paper surveys for the 3rd grade students did not match the suggested format, which could have compromised the data; and 2) Response bias (participants tend to answer the way they think we want them to instead of their true actions or beliefs) could be higher for these younger students.***

¹ It is uncertain whether they were shown the same picture as the other grades, and whether they thought that they had to be walking alone in that place.

SELU activities engaged students and may have helped them to master science standards.

- Student surveys showed that students were very engaged academically (average = 3.4; See Table F1). 3rd grade students reported significantly higher levels of academic engagement than 4th or 5th grade (See Table F3 and Note above). In the focus group, several teachers mentioned increased student engagement in learning as a positive outcome of the SELU program. They believed that student engagement could reinforce learning, and lead to fewer behavioral issues and longer-lasting knowledge of content areas. Additionally, one teacher pointed out that the engaging types of learning that FBES practices help special education students see themselves as learners and feel good about learning.
- In surveys, educators tended to report that SELU helped students achieve “little” to “somewhat” greater mastery of English and Math standards, and “somewhat” to “a lot” greater mastery of science standards. The 4th grade teachers reported lower student mastery than 3rd or 5th grade teachers on almost all standards (See Table F5).

The SELU program challenged students to try new experiences.

- Focus group students reported being challenged by the physical experiences and learning opportunities afforded by the SELU program. For 5th graders, the most challenging new experience was the overnight aspect of the FBES field trip, including “sleeping and being away for a week”. These 5th grade students admitted being scared to be away from home in a strange place for so long, but most felt successful about the experience in the end.
- In the teacher focus group, one teacher said that a benefit of SELU is that it helps students to mature.
- In student surveys, students reported high levels of leadership behavior (average = 3.3), self-esteem (average = 3.4), and cooperation (average = 3.5) (See Table F1). There were no differences in outcomes reported by grade (See Table F3).

What does it mean?

- Based on student and educator reported data, there is some evidence that the SELU program is beginning to accomplish its goals of increasing student comfort in nature, environmental literacy and stewardship, academic engagement, and to some extent personal development. Educators had a very positive view of the SELU program, how it was run, and the effects it has had on their students. In particular, they reported that the program helped engage students and master science standards.
- Students reported that they learned new information and tried new experiences in SELU. Overall, they tended to report high levels of outcomes, but the lack of expected differences between grades makes it challenging to attribute these outcomes to the SELU program.
- The evaluation for the 2009-2010 school year was really a pilot evaluation, with the primary goals of developing evaluation tools, and looking for patterns in the data. In the next few years, more intensive and rigorous evaluation should allow deeper delving into and confirmation of these emergent patterns.

Recommendations:

Educators offered much positive feedback about the Ferry Beach program in addition to a few suggestions for improvement:

- √ Increase the number of field trips to Ferry Beach.
 - Some teachers wanted students in the younger grades to be able to experience field trips at Ferry Beach as well.
- √ Allow for even more tactile, hand-on experience
 - For instance, give the students unstructured time to explore and just play with the sand.
- √ Increase the ratio of naturalists to students.
 - This greater number of naturalists could allow, facilitate, and promote desired program effects.
- √ Provide additional resources to school teachers.
 - In educator surveys and in focus groups, teachers requested: suggestions for children's books and websites, pre- and post-activities to supplement the FBES trips, and professional development on ways for school staff to use the outdoors for teaching and learning.

Evaluator recommendations, based on evaluation data and process:

- √ Clarify and explicitly lay out evaluation tools and timeline to the teachers.
 - Provide detailed, written explanations about the format for surveys, how to administer concept maps, and expectations for teachers and students filling out surveys.
- √ Add more qualitative data for next year.
 - The focus groups were very useful, and it might be even more valuable to do focus groups (or group interviews) with teachers in their grade levels.
- √ Attempt to find a "control" group for next year.
 - It would be quite useful to find a group of students who did not participate in the program, but were matched on grade level. If there were a school interested in working with FBES but had not started the work yet, that would be ideal.

Appendix A: Tables and Figures

The analyses presented may represent a different way of thinking for many people reading this document. Therefore, this page will attempt to explain the tables on the following pages.

Explanation of statistical analysis: comparison of means

The basic idea of a comparison of means measurement strategy is to use statistical analyses to test whether participating in this program increases the occurrence of intended program outcomes. The core question becomes: "Is the SELU program having an effect?" The measure of the SELU program, in this case, is the grade level, since each grade level had a different "dose" of the program. The outcomes of interest are numbers from 1 to 4 that represent the average of survey items about specific outcomes: environmental stewardship, comfort outdoors, academic engagement, leadership behavior, self-esteem, and cooperation. In general, if expected differences by grade show up in the data, then the program is likely to be having an effect. *NOTE: For these data, the 3rd grade surveys threaten the validity of this analysis.*

Interpreting the tables

The tables provide descriptive information: mean (average) and standard deviation (a number conveying how much variation is in the answers: small standard deviation means answers were closer together, larger standard deviation means answers varied widely). Remember that most of the answers correspond to a 4-point scale, which has different meanings depending on whether it is an Agreement scale or a Frequency scale.

Agreement:

- 0 = Not sure
- 1 = No Way
- 2 = Probably not
- 3 = Maybe
- 4 = Definitely

Frequency:

- 0 = Not sure
- 1 = Never
- 2 = Sometimes
- 3 = A lot
- 4 = Always

So, if the average answer is a 3.5 on the Agreement scale, then that means they are somewhere between Maybe and Definitely. And if the average answer is a 3.5 on the Frequency scale, they are somewhere between A lot and Always.

Table F1. Summary of Outcomes for FBES Student Surveys (N=172)

Variable <i>(items included)</i>	N	\bar{X}	SD
Environmental Stewardship Agreement (<i>fb1,fb2,fb3,fb4,fb5</i>)	172	3.2	0.7
Environmental Stewardship Frequency (<i>fb11,fb12,fb13,fb14,fb15</i>)	158	2.4	1.1
Comfort Outdoors Agreement (<i>fb19,fb20,fb21,fb22,fb23</i>)	155	3.0	0.6
Comfort Outdoors Frequency (<i>fb16,fb17</i>)	157	2.8	1.1
Academic Engagement Agreement (<i>fb6,fb7reverse,fb8,fb9,fb10</i>)	170	3.4	0.6
Classroom Climate Agreement (<i>fb33,fb34,fb35reverse,fb36</i>)	153	3.0	0.7
Leadership Behavior Agreement (<i>fb24,fb25,fb26</i>)	153	3.3	0.7
Self-Esteem Agreement (<i>fb27,fb28,fb29,fb30</i>)	153	3.4	0.6
Cooperation Agreement (<i>fb31,fb32</i>)	152	3.5	0.7

NOTES: Outcome scale range = 0 to 4; **N** = sample size; **X** = mean; **SD** = standard deviation; * = significant at $p < .05$; ** = significant at $p < .01$.

Table F2. Average Student Responses for All Items in Student Surveys, in Descending Order for Mean (N=172)

Item	Mean	SD
23. I like exploring outside.	3.7	0.8
10....enjoy learning about science.	3.6	0.8
6. ...work very hard in school.	3.6	0.9
26. I help my classmates when they need it.	3.6	0.7
8. ... get better grades	3.5	0.8
4. ...recycle at home or at school.	3.5	0.9
28. I feel self-confident.	3.5	0.9
32. I contribute when I work in a group.	3.5	0.8
31. I believe cooperating with others is important.	0.5	0.9
27. When I apply myself, I am confident I will succeed.	3.5	0.8
2. ...try to waste less food (take less, save leftovers, compost, etc.).	3.5	0.8
18 This is how I feel about school	3.4	0.8
29. I know I can accomplish anything I set my mind to.	3.4	0.8
21. It is fun to take walks to just look at plants and animals.	3.3	1.1
30. I feel respected by my classmates.	3.2	1.0
3. ...turn the heat down or lights off to save energy.	3.2	1.1
9....work independently on schoolwork.	3.2	0.9
1. ...think about how things I do affect the environment.	3.2	1.1
25. I take on leadership roles.	3.1	1.1
36. Students in my class care about each other.	3.1	1.1
19. I like finding out more about where I live.	3.1	1.1
24. I motivate others when something needs to be done.	3.1	1.1
33. Students in my class help each other, even if they are not friends.	3.0	1.1
14. I am willing to try new foods.	3.0	1.0
34. Students in my class get along together very well..	3.0	0.9
16. I visit farms, parks, forests, or other natural areas with friends or family.	3.0	1.1
5. ... grow some of my own food.	2.9	1.2
20. I can name at least three different ecosystems.	2.8	1.2
11. I think about where my food comes from.	2.5	1.0
13. I think about what it takes to get my food to my plate.	2.3	1.2
12. I think about what happens to the food I do not eat.	2.2	1.1
22. I can describe differences between ecosystems using ABCs of Ecology.	2.0	1.3
35. Students in my class are mean to each other.	2.0	1.0
7. ...be bored in school.	1.9	1.1
15. I ask where my food was raised or grown.	1.9	1.1
17. I spend almost the whole day inside buildings, cars, or buses.	1.6	0.9

Table F3. Summary of Average Differences Between Grades for Student Outcomes for FBES Student Surveys (N=172)

Variable (items included)	3 rd Grade			4 th Grade			5 th Grade			F
	N	\bar{X}	SD	N	\bar{X}	SD	N	\bar{X}	SD	
Environmental Stewardship Agreement (fb1,fb2,fb3,fb4,fb5)	74	3.3	0.6	21	3.0	0.8	77	3.3	0.7	2.1
Environmental Stewardship Frequency (fb11,fb12,fb13,fb14,fb15)	74	2.7	0.8	20	2.0	0.8	64	2.1	0.5	13.2**
Comfort Outdoors Frequency (fb16,fb17)	74	2.9	0.5	19	2.8	0.6	62	3.1	0.7	78.8**
Comfort Outdoors Agreement (fb19,fb20,fb21,fb22,fb23)	73	3.5	0.8	20	1.9	0.8	64	2.1	0.6	2.7
Academic Engagement Agreement (fb6,fb7reverse,fb8,fb9,fb10)	74	3.5	0.5	21	3.3	0.6	75	3.3	0.6	4.5*
Classroom Climate Agreement (fb33,fb34,fb35reverse,fb36)	74	3.1	0.7	19	3.2	0.7	60	2.8	0.7	2.9*
Leadership Behavior Agreement (fb24,fb25,fb26)	74	3.4	0.7	19	3.0	0.8	60	3.2	0.7	2.3
Self-Esteem Agreement (fb27,fb28,fb29,fb30)	74	3.4	0.6	19	3.5	0.5	60	3.3	0.6	0.5
Cooperation Agreement (fb31,fb32)	73	3.4	0.8	19	3.6	0.7	60	3.5	0.7	0.8

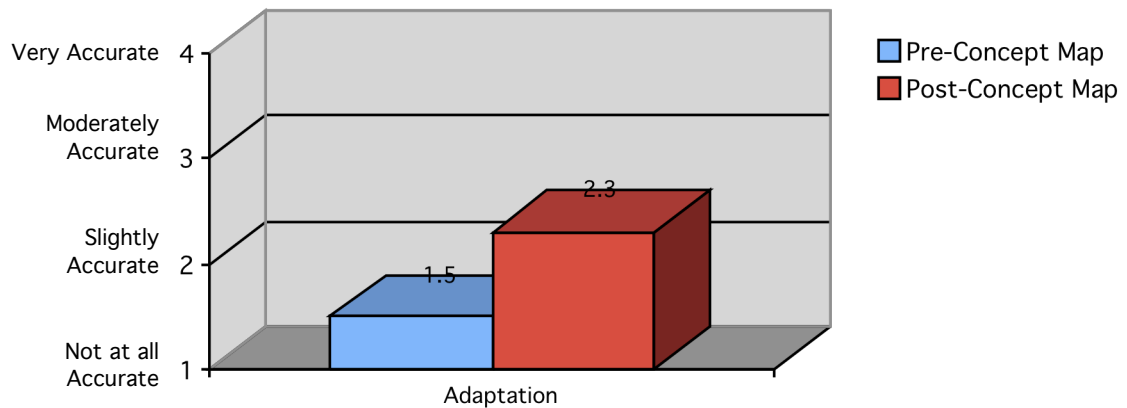
NOTES: Results of particular interest are shaded purple. Outcome scale range = 0 to 4; **N** = sample size; **X** = mean; **SD** = standard deviation; **F** = difference in mean between grades; * = significant at $p < .05$; ** = significant at $p < .01$.

Table F4. Summary of Data for Summer 2010 SELU Student Concept Maps, Comparing All Pre- and Post-Concept Maps (N=14)

Adaptation Concept Maps	Pre-Concept			Post-Concept			$\Delta \bar{X}$
	N	\bar{X}	SD	N	\bar{X}	SD	
Number of nodes	14	3.9	1.7	14	7.6	2.4	10.1**
Map accurately reflects concept	14	1.5	0.5	14	2.3	0.7	6.9**

NOTE: Results of particular interest are shaded purple. N = sample size; X = mean; SD = standard deviation; ΔX = change in mean between pre- and post- measures; * = significant at $p < .05$; ** = significant at $p < .01$.

Figure 1. Summary of Data for Spring 2010 FBES 5th Grade Student Concept Maps Accurately Reflecting Concept Taught (N=14)



Educator Survey Results:

Table F5.

How much, if at all, did Ferry Beach programs help students achieve greater mastery of the following state standards?

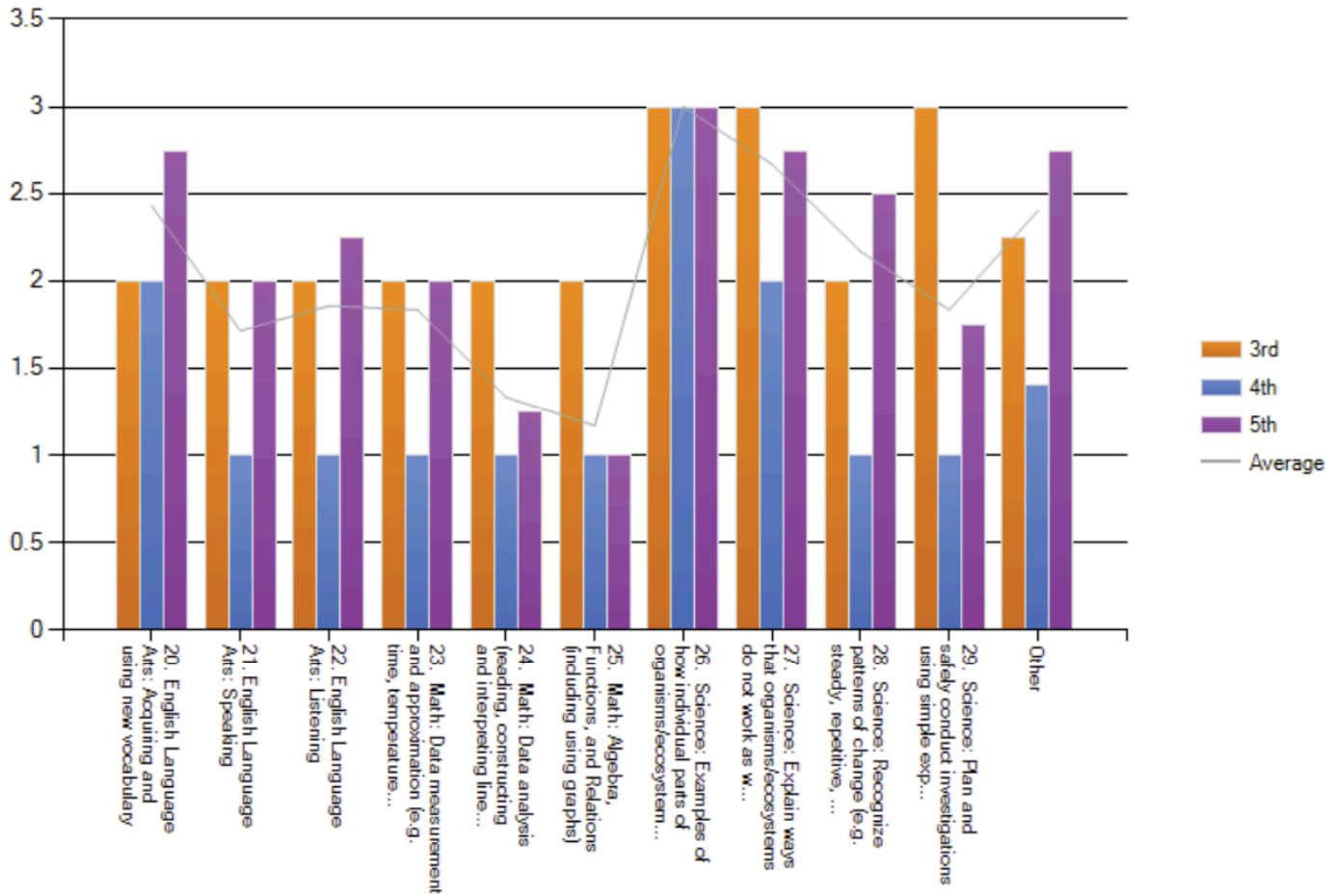


Table F6.

How much do you disagree or agree? For each item, please check only one circle that best matches your opinion of the program.

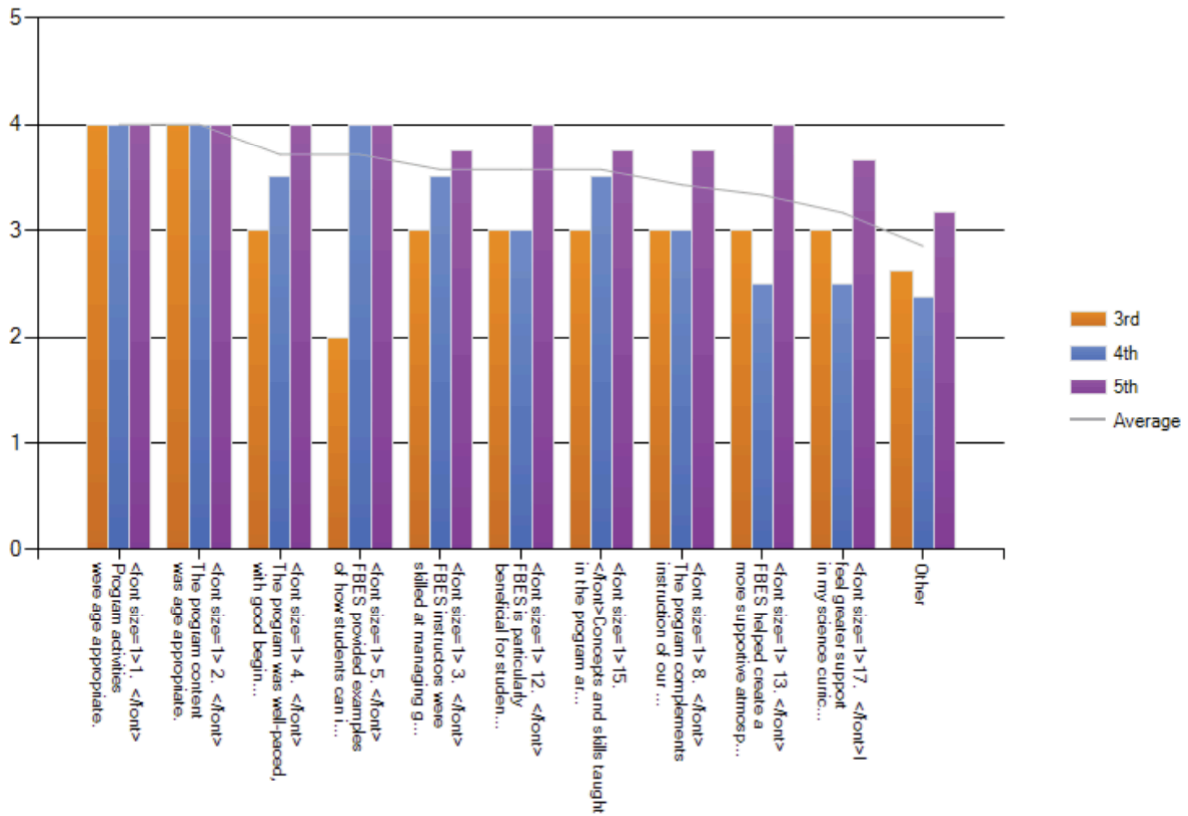


Table F7

TE.2 Which of the following resources would be helpful for us to provide to you to help you to develop curricula around the field trip content? (Please check all that apply)

