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Kentucky Science Center (KSC) After-School Enrichment Program

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EXECUTIVE SUMMARY

INTRODUCTION

This evaluation is of the third year of the science enrichment program. This program is a collaboration between Kentucky Science Center (KSC) and Jefferson County Public Schools (JCPS). This program is aligned with the *JCPS: Strategic Plan Vision 2015*. It is aligned to the:

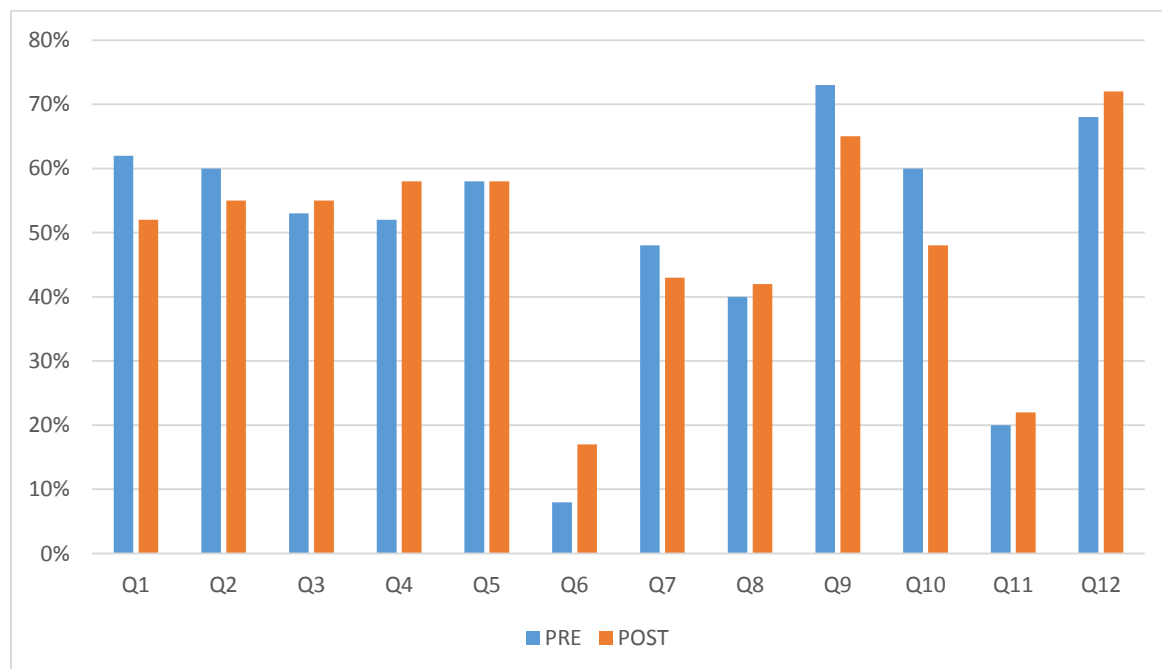
- **GOAL:** Increase partnerships with parents, community, and educational organizations to enrich students learning and experiences.
- **STRATEGY 3.3:** Student-community enrichment – collaborate with the community and parents to provide innovative and effective enrichment opportunities and interventions for pre-K through 12th grade students to extend learning in core areas as well as the arts, service learning, and personal growth.

FINDINGS

The 2015 Kentucky Science Center After-School Enrichment Program had:

- 98 total participants (attend at least one day),
- 38% had perfect attendance and over half (55%) attended 5 or 6 days of the program,
- The average daily attendance was 72%, and
- The range of daily attendance for the schools was 48.5% to 86.1%.

When examining the program for content growth, there was not a statistically significant difference between the students' program pre- and post-tests.



Additionally, there was not a statistically significant difference in student percentiles between the control group and the participants on the state's norm-referenced science test (the norm-referenced test was used due to the state not having a criterion-referenced test for the school year of 2014-2015). It should be noted that the students that scored Apprentice on the previous year's reading assessment, approached statistical significance.

The student survey responses were very positive regarding the program. When asked what their favorite things about the program, the top five categories were:

- Doing specific experiments (38 students commented),
- Doing experiments and learning in general (24 students commented),
- Liking their teachers (14 students commented),
- Having fun (9 students commented), and
- Getting to try new things (5 students commented).

RECOMMENDATIONS

- 1) Have the program earlier in the second semester. The 2015 program was later in the year than previous years, which caused some programming and attendance issues with end of the year activities and Derby Week.
- 2) If possible, have the program as 8 weeks instead of 6, as in previous years.
- 3) Work with the schools to develop a Science liaison to assist in reinforcing with the students what was learned in the after-school enrichment time.
- 4) Increase the number of students allowed in the program to try to have a minimum of 10 participants at each site.
- 5) Collaborate with the JCPS Science Specialist in working with the schools and to ensure content is aligned to state grade standards.

Continue ...

- 6) working with schools and families to develop methods to increase attendance and encourage appropriate behaviors (this was noted as much better in the 2015 cohort).
- 7) using priority selection of students based on their 3rd grade KPREP Reading Score (focus should be on student that scored in the Apprentice category).
- 8) sending cards home with additional ideas for families to discuss and explore the science topics.
- 9) communicating with families about the KSC Family Night through multiple methods.
- 10) providing core content aligned language arts and math instruction as major program components.

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- **GOAL:** Increase partnerships with parents, community, and educational organizations to enrich students learning and experiences.
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PREVIOUS PROGRAM DESIGN, FINDINGS, AND RECOMMENDATIONS (FROM 2012-2013 & 2013-2014)

Program Design & School Participation

Sessions for both years featured an inquiry-based framework for instruction and demonstration to promoted student engagement in specific scientific and engineering practices. Students scoring in the range of high novice to low proficient in reading were targeted for the intervention. Each session lasted 90 minutes was led by a KSC educator. Math and language arts content, aligned with the Common Core standards, were integrated into the program. Session attendance, assessment results, and K-PREP results in science provided the main outcome data. A culminating event at the KSC for all students enrolled in the schools and their families was offered both years.

YEAR 1

Students (N=52) from Byck, Cochran, Foster, McFerran, and Shelby Traditional fourth grade elementary schools participated in the pilot program. Six after-school sessions occurred weekly throughout March and mid-April.

YEAR 2

Fourth grade students (N=132) from 10 JCPS elementary schools participated in the program: Byck, Cochran, Foster, Gutermuth, Jacob, McFerran, Mill Creek, Roosevelt-Perry, Shelby, and Wheatley. Byck, Cochran, Foster, McFerran, and Shelby were also pilot schools last year. Eight after-school sessions were conducted between February 18th and April 17th. Two make-up sessions, offered during the week of April 22nd were required because of weather (snow and rain storm) related issues. Schools with sessions on Tuesday or Wednesday each had one make-up session. Only McFerran and Shelby elementary schools, which were scheduled for Wednesdays, did not require a make-up session.

Major Findings and Conclusions

YEAR 1

The KSC students did significantly better on the 2013 K-PREP assessment in reading and science than a matched control group. The KSC group showed a significant advantage in reading and science scale

scores, reading growth, and science performance category scores. The KSC group also outperformed the district in having fewer novices and more proficient /distinguished scoring students in reading and science. The KSC group outperformed the state in every performance category for science except distinguished.

YEAR 2

As with Year 1, student attendance continued to be a challenge with overall attendance ranging from 57.8% to 86.8%. Weather, lack of transportation, student behavior problems, and “program fatigue” are all possible factors that impact attendance. Attendance at the KSC Family night did increase substantially over the pilot year. The student post-test scores were relatively low on the content assessment and this needs to be further explored.

KSC students had significantly higher scale scores on the 2014 K-PREP assessment in math and science than their control group. The outcomes for Year 2 showed a smaller impact than what was demonstrated during the pilot year. For instance, this year, the analysis was limited to only those students attending 6 or more sessions while last year, there were more significant outcomes to report, the effect sizes were larger, and all students who attended at least one session were included in the analyses. Seven of the 10 KSC sites did outperform their overall school proficient/distinguished rates in science.

Recommendations

1. Continue priority selection of students based on K-PREP reading scores (high novice through low proficient).
2. Provide incentives for program completion such as a coupon to dress-down or an extra recess.
3. Consider a token system for behavior management during the sessions.
4. Continue parent communication approach and Family Night.
5. Develop a plan to address attendance and behavior issues that requires commitment of school principal.
6. Keep the 10:1 KSC student/teacher ratio.
7. Prioritize program delivery this year within current locations until attendance/behavior issues are better managed.
8. Collaborate with the district’s science specialist to ensure that the program and assessments continue to addresses common student misunderstandings and align with the Next Generation Science Standards.
9. Continue providing core content aligned language arts and math instruction as major program components.
10. Explore transportation options so that more students will have access to the program.

2014-2015 PROGRAM DESIGN

The program is designed as a 6 week program with each week having a designated theme. This is a change from previous years, which had 8 sessions. Table 1: Science Center Curriculum has the topics and the corresponding science standard.

Table 1: Science Center Curriculum

THEME	CONTENT	NEXT GENERATION SCIENCE STANDARDS
Adaptations	Camouflage Mimicry Structural Adaptations Behavioral Adaptations Human Impact on Natural Habitats	4-PS4-2: Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen. 4-LS1-1: Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction. 4-ESS3-1: Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.
Earth Science	Rock Formations Erosion Weathering How Earth's Landscape Changes Over Time	4-ESS1-1: Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time. [4-ESS2-1: Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation. 4-ESS3-2: Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.
Energy	Circuits Energy Transfer Conductors and Insulators Energy Conservation	4-PS3-2: Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents. 4-PS3-4: Apply scientific ideas to design, test, and refine a device that converts energy from one form to another. 4-ESS3-1: Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.
Forces and Motion	Newton's Laws Forces that Affect Motion Forces that Cause Motion	4-PS3-3: Ask questions and predict outcomes about the changes in energy that occur when objects collide. 4-PS3-1: Use evidence to construct an explanation relating the speed of an object to the energy of that object. 4-PS3-4: Apply scientific ideas to design, test, and refine a device that converts energy from one form to another. 4-PS3.C: When objects collide, the contact forces transfer energy so as to change the objects' motions.
Light and Sound	Reflection and Refraction with Light Waves Sound is Made by Vibrating Matter <ul style="list-style-type: none"> Pitch Amplitude 	4-PS3-2: Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents. 4-PS3-1: Use evidence to construct an explanation relating the speed of an object to the energy of that object. 4-PS4-3: Generate and compare multiple solutions that use patterns to transfer information. 4-PS4-2: Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.
Matter	Non-Newtonian Fluids Chemical Properties Temperature and States of Matter Physical Properties Solving for an Unknown	4-ETS1.A: Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account. 4-PS3.D: The expression "produce energy" typically refers to the conversion of stored energy into a desired form for practical use.

A typical session used the following format:

1. Ask a Question
2. Have the students make a hypothesis/ do an introduction
3. Do an experiment
4. Read an article related to the experiment
5. Analyze the evidence and debrief
6. Conclusion

During the sessions, students would also complete a notebook. Figure 1: Sample Notebook Pages gives an example of the information the students are asked to record during a session.

Figure 1: Sample Notebook Pages

ADAPTATIONS WORKBOOK

WHY DO ORGANISMS HAVE ADAPTATIONS?

HYPOTHESIS: _____

What have I changed my mind about?

EVIDENCE FOR YOUR HYPOTHESIS:

Why do organisms have adaptations?				
Organism:	Structural Examples:	Behavioral Examples:	Stimuli Cues:	Human Impacts:

Answer:

Measurements:

1

MODEL: WHAT ADAPTATIONS MAY ORGANISMS HAVE IN 2500 AND WHY?

Brainstorm:

Why do organisms have adaptations?				
Organism:	Structural Examples:	Behavioral Examples:	Stimuli Cues:	Human Impacts:

2

Ten JCPS elementary schools participated in the program: Byck, Cochran, Foster, Gutermuth, Jacob, McFerran, Mill Creek, Roosevelt-Perry, Shelby, and Wheatley. All program participants are fourth graders.

All of the schools trailed the state's score and all but one (Cochran) trailed the district's score on the 2014 state science assessment. TABLE 2: 2014 Next Generation Learners (NXGL) Science Achievement contains the 2014 science achievement scores on Kentucky's accountability test.

TABLE 2: 2014 Next Generation Learners (NXGL) Science Achievement

	# TESTED	% Novice	% Apprentice	% Proficient	% Distinguished	NAPD Score
Byck	86	24.4	32.6	30.2	12.8	59.3
Cochran	55	14.5	23.6	32.7	29.1	80.9
Foster	106	39.6	34.0	23.6	2.8	43.4
Gutermuth	61	31.1	42.6	16.4	9.8	47.5
Jacob	101	28.7	36.6	29.7	5.0	53.0
McFerran	110	18.2	30.0	34.5	17.3	66.8
Mill Creek	70	30.0	28.6	31.4	10.0	55.7
Roosevelt-Perry	54	50.0	25.9	20.4	3.7	37.1
Shelby	106	23.6	35.8	34.0	6.6	58.5
Wheatley	53	24.5	26.4	41.5	7.5	62.3
JCPS	7,069	13.9	23.2	37.3	25.6	80.2
STATE	50,358	7.8	20.8	40.5	30.9	93.2

2014-2015 PROGRAM EVALUATION

For the 2014-2015 school year, the evaluation will comprise of the following:

- A comparison of pre- and post-tests scores. The tests were designed in collaboration between JCPS and the KSC to match the 4th grade standards.
- A comparison of the Spring 2015 science percentile rankings to a control group (control group based in school, previous KPREP reading score, gender, race, and free/reduced lunch eligibility).
- A survey of the program participants.
- An examination of the level of implementation of the 2014 recommendations.

DEMOGRAPHICS AND ATTENDANCE

In order to assist school in selecting students for the program, a list of students was provided to each school. The list was comprised of students that scored an apprentice on the state reading assessment (KPREP) the prior year. The reading test was used since the state of Kentucky does not test science until the fourth grade (note: for 2014-2015 and 2015-2016 school years, science will not be part of the state's accountability model, but a norm referenced test will be administered). Some schools had some high novice performers and low proficient performers added to their list. This was to give them an ample number of students from which to choose if the school could not get enough students that scored at the apprentice level to attend.

Some of the demographic characteristics of the students include:

- 55% male, 45% female,
- 61% African-American, 30% White, 6% multiple races, and 3% Hispanic,
- 86% qualified for the federal free lunch program, 6% qualified for the reduced lunch program, and 8% did not qualify for the federal free or reduced lunch program, and

- Using the 2014 KPREP Reading scores, 74% were apprentice, 12% were proficient, 8% were novice, and 5% were distinguished. All 5 Distinguished students, 4 of the proficient students and 2 of the Novice students were not on the school's original list. Two of the added students were siblings (1 Novice and 1 Distinguished).

See Table 3: Demographics for the numbers and percent of students in each category.

Table 3: Demographics

Gender	#	%
Female	54	55%
Male	44	45%

Race/Ethnicity	#	%
African-American	60	61%
Hispanic	3	3%
White	29	30%
Multiple	6	6%

Free/Reduced Lunch Status	#	%
Free	84	86%
Reduced	6	6%
Paid	8	8%

2014 Reading Performance Level	#	%
Novice	8	8%
Apprentice	73	74%
Proficient	12	12%
Distinguished	5	5%

When examining attendance, students had to be in attendance at least 1 day in order to be considered enrolled. There were 98 students that attended at least one day of the six day program (note: two schools had a 5 day program due to Derby week activities that limited after hour access to the schools). The number of participants is down from 133 in 2014. Some of the attendance highlights are:

- 98 total participants,
- 38% had perfect attendance and over half (55%) attended 5 or 6 days of the program,
- The average daily attendance was 72% (this is down from 2014 average attendance rate of 77.3%),
- 21% attended only 1 or 2 sessions, and
- The range of daily attendance for the schools was 48.5% to 86.1%.

For detailed attendance information by school, see Table 4: Attendance.

Family Night had 113 total participants. This is down from 2014, which had 207 attendees. The number of attendees ranged from 0 for Jacob to 35 for Foster. Table 5: Family Night Attendance has the total number of participants by school.

Table 4: Attendance

SCHOOL	# Students	Average # Days	Average % Attendance	# with Either 1 or 2 Days Attendance	# with Either 3 or 4 Days Attendance	# with Either 5 or 6 Days Attendance	# with perfect Attendance*
Byck	9	4.4	74.1%	1 (11%)	2 (22%)	6 (67%)	3 (33%)
Cochran	8	3.5	70.0%	3 (38%)	2 (25%)	3 (38%)	3 (38%)
Foster	10	4.7	78.3%	0 (0%)	5 (50%)	5 (50%)	3 (30%)
Gutermuth	9	4.2	70.4%	2 (22%)	3 (33%)	4 (44%)	4 (44%)
Jacob	11	2.9	48.5%	7 (64%)	0 (0%)	4 (36%)	3 (27%)
McFerran	16	4.4	72.9%	3 (19%)	3 (19%)	10 (63%)	7 (44%)
Mill Creek	5	4.8	80.0%	0 (0%)	2 (40%)	3 (60%)	1 (20%)
Roosevelt-Perry	10	3.9	78.0%	2 (20%)	2 (20%)	6 (60%)	6 (60%)
Shelby	14	4.4	73.8%	3 (21%)	3 (21%)	8 (57%)	5 (36%)
Wheatley	6	5.2	86.1%	0 (0%)	1 (17%)	5 (83%)	2 (33%)
TOTAL	98	4.2	72.2%	21 (21%)	23 (23%)	54 (55%)	37 (38%)

Cochran and Roosevelt-Perry had only 5 sessions due to one session being cancelled because of Derby week events (limited access to schools)

Table 5: Family Night Attendance

SCHOOL	# Students	# Families Attending	# of Total Children Attending	# Adults Attending	# Total Attendance
Byck	9	4	10	6	16
Cochran	8	1	1	1	2
Foster	10	9	21	14	35
Gutermuth	9	1	2	2	4
Jacob	11	0*	0	0	0
McFerran	16	2	2	4	6
Mill Creek	5	12	18	15	33
Roosevelt-Perry	10	1	1	2	3
Shelby	14	1	3	2	5
Wheatley	6	1	1	2	3
Unknown/Other	3	3	3	3	6
TOTAL	98	35	62	51	113

* Jacob ES had a school event that conflicted with the KSC Family Night.

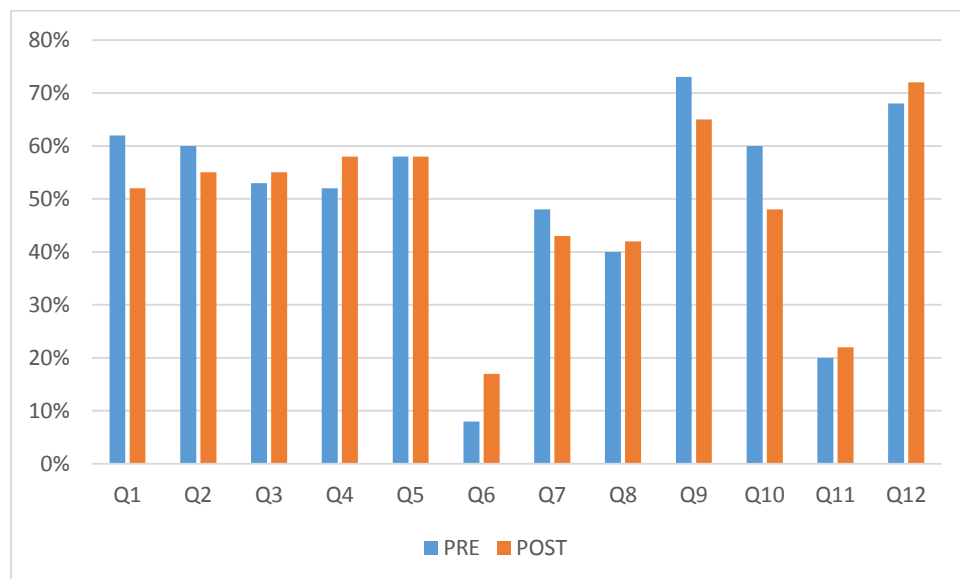
PRE/POST TESTS RESULTS

An assessment was developed by the Kentucky Science Center staff in collaboration with the JCPS Science Specialist. This test was designed to be aligned with the Next Generation Science Standards that were presented to the students. Of the 98 students, 60 students had both a pre-test and a post-test. The students had an average of 50% correct on the pre-test and 49% correct on the post-test. The difference showed students did not improve on the post-test compared to the pre-test.

The pre- and post-test scores were further analyzed to determine if certain groupings produced a significant difference. None of the following groupings produced statistically significant results: number of days attended, 2014 KPREP Reading Performance Level, or school. There were a few schools that showed a positive difference, but these differences did not reach statistical significance. These schools were: Shelby (+10.83%), Gutermuth (+9.72%), and Cochran (+8.33%).

Figure 2: Pre-Post Test Item Comparison shows the comparison of the percent of students that gave the correct response on the pre- and post-test by question.

Figure 2: Pre-Post Test Item Comparison (N=60)



KPREP TEST RESULTS

For the school year 2014-2015, the state assessment in Science (4th grade) was limited to a norm referenced test. The KDE science performance assessment is on hold. A control group was developed matching on the following criteria: school, grade, gender, race, free/reduced lunch status and previous year's KPREP reading performance level. There was no statistically significant differences between the two groups on the norm referenced science section. When comparing the participant group with the control group by KPREP Reading Performance Level, there was some evidence that indicated the participants that scored Apprentice on the KPREP Reading benefitted the most from this program. Note: it is more difficult to show statistical significance on a norm-referenced test than a criterion referenced test.

SURVEY RESULTS

Ratings

The first part of student survey had eight statements that asked the students to respond on a four point scale ranging from “Strongly Disagree” to “Agree”. All but one of the questions had at least 90 percent of the students rate either “Agree” or “Strongly Agree” and the remaining question had over 80% rate either “Agree” or “Strongly Agree”. The percent of agreement for each statement was:

- “The sessions are interesting” (100% “Agree” or “Strongly Agree”),
- “I liked learning about science” (98.4% “Agree” or “Strongly Agree”),
- “I had a lot of opportunities to actively participate” (98.4% “Agree” or “Strongly Agree”),
- “I plan on going to the Science Center with my family and friends” (96.9% “Agree” or “Strongly Agree”),
- “I really liked our teachers from the Science Center” (96.8% “Agree” or “Strongly Agree”),
- “I would recommend this program to my friends” (95.2% “Agree” or “Strongly Agree”),
- “I had a lot of opportunities to ask questions during the sessions.” (92% “Agree” or “Strongly Agree”), and
- “I liked working in our science notebooks” (81% “Agree” or “Strongly Agree”).

For more details on each question, see Table 6: Survey Ratings.

Table 6: Survey Ratings

QUESTION	STRONGLY DISAGREE	DISAGREE	AGREE	STRONGLY AGREE	AGREE OR STRONGLY AGREE	AVG
Q1 – The sessions are interesting	0.0%	0.0%	20.6%	79.4%	100%	3.79
Q2 – I had a lot of opportunities to actively participate	0.0%	1.6%	25.4%	73.0%	98.4%	3.71
Q3 – I had a lot of opportunities to ask questions during the sessions	1.6%	6.3%	19.0%	73.0%	92.0%	3.63
Q4 – I really liked our teachers from the Science Center	1.6%	1.6%	12.7%	84.1%	96.8%	3.79
Q5 – I would recommend this program to my friends	3.2%	1.6%	22.2%	73.0%	95.2%	3.65
Q6 – I plan on going to the Science Center with my family or friends	1.6%	1.6%	17.5%	79.4%	96.9%	3.75
Q7 – I liked learning about science	0.0%	1.6%	19.0%	79.4%	98.4%	3.78
Q8 – I liked working in our science notebooks	9.5%	9.5%	27.0%	54.0%	81.0%	3.25

Open Responses

The second part of the student survey had two open response questions. The first open response question asked students, "Please tell us two of your favorite things about this program." All of the survey respondents (63) listed at least one item that was their favorite. The comments were separated into categories. Some responses counted in two categories for a total of 98 total comments. *Table 7: Favorite Part of the Program* shows the categories and the number of responses for each category.

Table 7: Favorite Part of the Program

CATEGORY	NUMBER OF COMMENTS	CATEGORY	NUMBER OF COMMENTS
Specific Experiments	38	Liked Teachers	14
<i>Adaptations</i>	4	Had Fun	9
<i>Earth Science</i>	7	Try New Things	5
<i>Energy</i>	6	Notebooks	2
<i>Forces & Motion</i>	5	Hands-On	2
<i>Light & Sound</i>	3	Getting a Shirt	2
<i>Matter</i>	13	Other	2
Doing Experiments/Learning (General)	24		

A listing of the number of comments and a few sample comments for each category are:

- There were 38 comments that were categorized as "Specific Experiments". These comments were further classified by unit.
 - For Adaptations (4) some of the comments were:
 - "(I liked) touching animal structures."
 - "I liked the bird skulls. I liked the bird feathers."
 - For Earth Science (7) some of the comments were:
 - "I liked doing erosion."
 - "...I liked when we talked about the earth."
 - For Energy (6) some of the comments were:
 - "...we made electrical circuits."
 - "(I liked) electrical energy."
 - For Forces and Motion (5) some of the comments were:
 - "Making a tube roller coaster."
 - "Learning about forces and motion."
 - For Light and Sound (3) some of the comments were:
 - "I liked the light activity."
 - "(I liked) the lasers."
 - For Matter (13) some of the comments were:
 - "My favorite things were the explosions and talking about solid, gas, and liquid."
 - "I like the Coke bottle blew up."
 - "You get to do extreme things such as putting Mentos in soda, playing with this gooey thing called 'Oobleck', etc, etc,"

- There were 24 comments that were categorized as “Doing Experiments/Learning (General)”. Comments included:
 - “I like to do science and I like to do activities.”
 - “Learning cool science stuff.”
- There were 14 comments that were categorized as “Liked Teachers”. Comments included:
 - “I like the teachers are nice.”
 - “...how our teacher teach us about science.”
- There were 9 comments that were categorized as “Had Fun”. Comments included:
 - “I got to have fun doing science.”
 - “The activities were very fun and cool.”
- There were 5 comments that were categorized as “Try New Things”. Comments included:
 - “I like that we get to try new things.”
 - “...learning new cool stuff every week”
- There were 2 comments that were categorized as “Notebooks”. Comments included:
 - “(I like when) we work in our science notebook
- There were 2 comments that were categorized as “Hands-on”. Comments included:
 - “...hands-on work”
- There were 2 comments that were categorized as “Getting a Shirt”. Comments included:
 - “(I liked) getting a shirt.”
- There were 2 comments that were categorized as “Other”. Comments included:
 - “(I liked) reading.”
 - “(I liked) the first two.”

The second open response question asked students, “Please tell us how to improve this program for next time.” Most of the survey respondents (61) made a comment. The comments were separated into categories. Some responses counted in two categories for a total of 66 total comments. *Table 8: Program Improvement* shows the categories and the number of responses for each category.

Table 8: Program Improvement

CATEGORY	NUMBER OF COMMENTS
Nothing/Don't Know	19
Specific Ideas	9
No Notebooks	6
Do Fun Stuff/More Fun	6
Expand Program to Other Grades	4
Candy	4
More Experiments	3
Less Talking	3
Other	12
<i>Recommendations</i>	5
<i>Non-Understandable/Missing Context</i>	7

- There were 19 comments classified as “Nothing/Don’t Know”. Comments included:
 - “IDK” (multiple times)
 - “Nothing” (multiple times)
 - “You don't have to!! Thanks for all you do!!”
 - “I don't know it's already fun!!!”
 - “Really nothing because you guys are awesome.”
- There were 9 comments classified as “Specific Ideas”. Comments included:
 - “Let us actually make poisons and stuff.”
 - “Blow up stuff.” (Multiple similar comments)
 - “Make robots and build things.”
- There were 6 comments classified as “No Notebooks”. Comments included:
 - “All fun day - No notebooks!”
 - “One thing you can do to improve is cut notebook work!!!!!!”
 - “You can improve by making us do hands-on work all the time and not the science notebook.”
- There were 6 comments classified as “Do Fun Stuff/More Fun”. Comments included:
 - “Improve telling more interesting things.”
 - “Help a little and explaining stuff easier.”
 - “The things are cool, very cool, just do more cool science stuff every week.”
- There were 4 comments classified as “Expand Program to Other Grades”. Comments included:
 - “...it was a good time and you can add (grade) 5.”
 - “Make it for every single grade level.”
- There were 4 comments classified as “Candy”. Comments included:
 - “Bubble gum”
 - “Bring cotton candy”
 - “Candy!!!!!!!!!!!!!!!!!!!!!!”
- There were 3 comments classified as “More Experiments”. Comments included:
 - “...by adding a tiny bit more experiments.”
 - “Experiment outside.”
- There were 3 comments classified as “Less Talking”. Comments included:
 - “Stop talking a lot.”
 - “Less explaining.”
- There were 12 comments that were categorized as “Other”. These comments were further classified by:
 - Recommendations (5) – comments included:
 - “...more days.”
 - “...new t-shirt.”
 - “You could have more days of science club.”
 - “...going to the Science Center and race cars and time their speed.”
 - “By having someone pick me up every day.”
 - Non-understandable/Missing Context (7) – comments included:
 - “(Checkmark)”
 - “...do better.”

- “I will improve it good.”
- “I can’t improve, people get on my nerves.”

2014-2015 RECOMMENDATION IMPLEMENTATION

The 2014-15 Report made 10 recommendations. This is an update on how those recommendations were implemented.

1. Continue priority selection of students based on K-PREP reading scores (high novice through low proficient).

All schools were provided a list of their 4th grade students that scored Apprentice on the state’s reading assessment during their 3rd grade year. If a school did not have at least 20 students on their list, then additional students were added to the list that scored low proficient or high novice.

2. Provide incentives for program completion such as a coupon to dress-down or an extra recess.

For incentives, student work was displayed at the open house, Science Center membership were given to students that had perfect attendance and attended the Family Night, and at the Family Night event students were given t-shirts and there were drawings for “goody bags”.

3. Consider a token system for behavior management during the sessions.

Stickers were used to show completed work. KSC noted that the student behavior was much better this year with only minor issues.

4. Continue parent communication approach and Family Night.

The KSC staff reported that this was parent communication was better this year. The students were given cards with take home activities and the KSC staff would talk with parents when they picked-up their child after the sessions.

5. Develop a plan to address attendance and behavior issues that requires commitment of school principal.

According to KSC staff, the principal involvement was less this year than previous years. The attendance and behavior was school dependent. As already noted, KSC staff reported fewer behavior incidents.

6. Keep the 10:1 KSC student/teacher ratio.

Most schools kept the ratio at 10:1. Three schools had over 10 students. Some schools added students, but the rosters were fixed by the 3rd week.

7. Prioritize program delivery this year within current locations until attendance/behavior issues are better managed.

As noted, behavior issues were much better managed this year according to KSC staff. It was discussed that having the program later this than previous caused some attendance issues. For example, school located closed to Churchill Downs were not able to have a session during Derby Week due to Derby activities.

8. Collaborate with the district's science specialist to ensure that the program and assessments continue to addresses common student misunderstandings and align with the Next Generation Science Standards.

There was collaboration between KSC staff and the JCPS Science Specialist on the assessment, but there was limited collaboration beyond the assessment design.

9. Continue providing core content aligned language arts and math instruction as major program components.

To align with language arts, students were given articles related to the topic being studied. These articles were read and discussed with the program participants. Math was integrated in the experiments through measurement and calculations.

10. Explore transportation options so that more students will have access to the program.

Transportation remained the same as previous year. One school did provide transportation previously, but did not this past year.

CONCLUSION AND RECOMMENDATIONS

The 2015 Kentucky Science Center After-School Enrichment Program had:

- 98 total participants (attend at least one day),
- 38% had perfect attendance and over half (55%) attended 5 or 6 days of the program,
- The average daily attendance was 72%,and
- The range of daily attendance for the schools was 48.5% to 86.1%.

When examining the program for content growth, there was not a statistically significant difference between the students' program pre- and post-tests. Additionally, there was not a statistically significant difference in student percentiles between the control group and the participants on the state's norm-referenced science test (the norm-referenced test was used due to the state not having a criterion-referenced test for the school year of 2014-2015). It should be noted that the students that scored Apprentice on the previous year's reading assessment, approached statistical significance.

The student survey responses were very positive regarding the program. When asked what their favorite things about the program, the top five categories were:

- Doing specific experiments (38 students commented),
- Doing experiments and learning in general (24 students commented),
- Liking their teachers (14 students commented),
- Having fun (9 students commented), and
- Getting to try new things (5 students commented).

Recommendations

- 1) Have the program earlier in the second semester. The 2015 program was later in the year than previous years, which caused some programming and attendance issues with end of the year activities and Derby Week.
- 2) If possible, have the program as 8 weeks instead of 6, as in previous years.
- 3) Work with the schools to develop a Science liaison to assist in reinforcing with the students what was learned in the after-school enrichment time.
- 4) Increase the number of students allowed in the program to try to have a minimum of 10 participants at each site.
- 5) Collaborate with the JCPS Science Specialist in working with the schools and to ensure content is aligned to state grade standards.

Continue ...

- 6) working with schools and families to develop methods to increase attendance and encourage appropriate behaviors (this was noted as much better in the 2015 cohort).
- 7) using priority selection of students based on their 3rd grade KPREP Reading Score (focus should be on student that scored in the Apprentice category).
- 8) sending cards home with additional ideas for families to discuss and explore the science topics.
- 9) communicating with families about the KSC Family Night through multiple methods.
- 10) providing core content aligned language arts and math instruction as major program components.